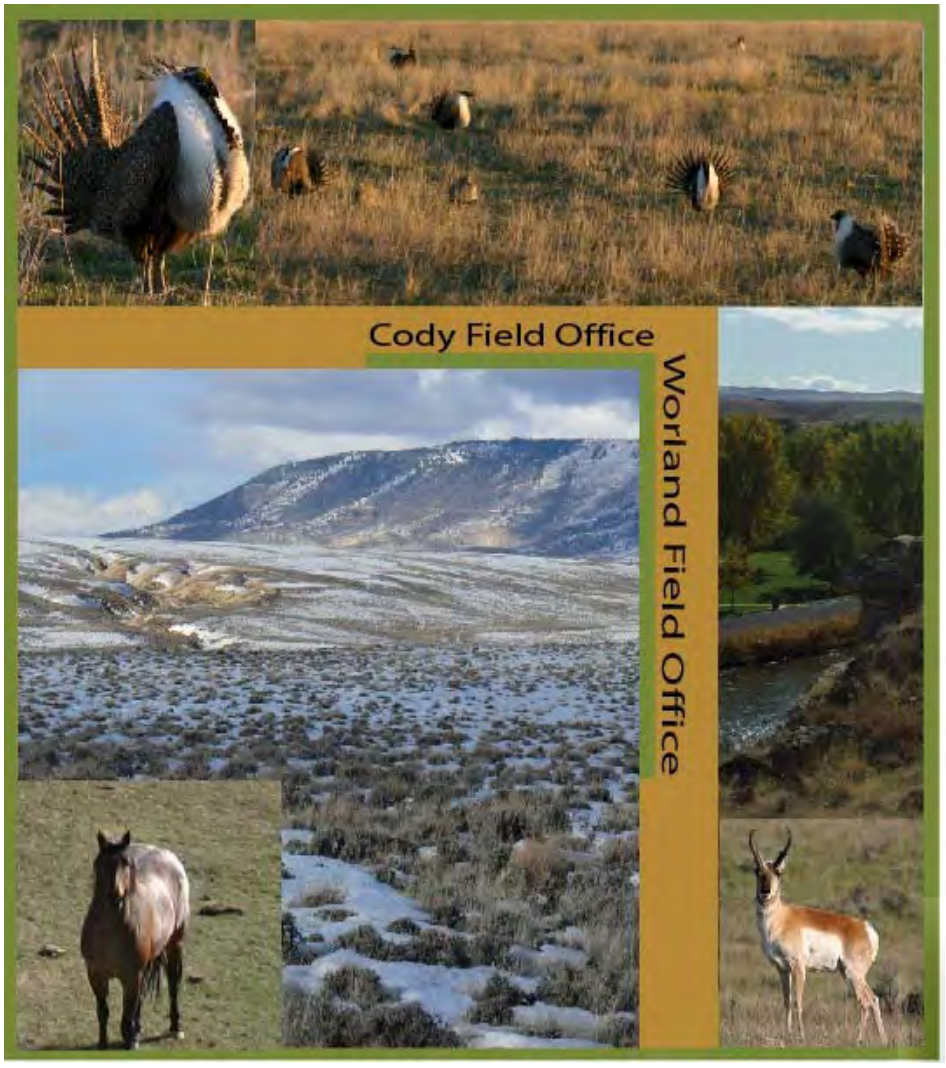
Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement



Volume 1 of 4
Chapters 1 - 3

May 2015

BLM

Wyoming - Cody & Worland Field Offices

The BLM's multiple-use mission is to sustain the health and productivity of public lands for the use and enjoyment of present and future generations.

The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

BLM/WY/PL-15/013+1610
Volume 1 of 4

Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement

Volume 1 of 4
Chapters 1 – 3

U.S. Department of the Interior
Bureau of Land Management
Cody Field Office, Wyoming

and

U.S. Department of the Interior
Bureau of Land Management
Worland Field Office, Wyoming

May 2015

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wind River Bighorn Basin District Office
101 South 23rd Street
Worland, WY 82401

TAKE PRIDE IN AMERICA

In reply refer to:
1610 (WY930)

Dear Reader:

Enclosed is the Proposed Resource Management Plan (PRMP) and Final Environmental Impact Statement (FEIS) for the Cody Field Office and Worland Field Office (Planning Area). The Bureau of Land Management (BLM) prepared the PRMP/FEIS in consultation with cooperating agencies, taking into account public comments received during this planning effort. The PRMP provides a framework for the future management direction and appropriate use of the Planning Area, located in Big Horn, Hot Springs, Park and Washakie Counties, Wyoming. The document contains land use planning decisions to guide the BLM's management of the Cody and Worland Field Offices.

This PRMP/FEIS is one of fifteen sub-regional planning efforts being conducted as part of the BLM's National Greater Sage-Grouse Planning Strategy. The PRMP identifies conservation measures to conserve, enhance and/or restore Greater Sage-Grouse (GRSG) habitat in response to the US Fish and Wildlife Service's (USFWS) March 2010 "warranted, but precluded" Endangered Species Act listing petition. The USFWS found that the inadequacy of regulatory mechanisms was identified as a significant threat to GRSG in their finding on the petition to list the GRSG. RMP conservation measures were identified as the BLM's principal regulatory mechanism.

This PRMP and FEIS have been developed in accordance with the National Environmental Policy Act of 1969, as amended, and the Federal Land Policy and Management Act of 1976, as amended. The PRMP is largely based on Alternative D, the preferred alternative in the Draft Resource Management Plan/Environmental Impact Statement (DRMP/DEIS), which was released on April 22, 2011 and the Supplement to the Draft RMP and Draft EIS, released on July 12, 2013. The PRMP/FEIS contains the Proposed Plan which integrates content from the DRMP/DEIS and Supplement, a summary of changes made between the DRMP/DEIS, Supplement and PRMP/FEIS, impacts of the Proposed Plan, a summary of the written and verbal comments received during the public review period for the DRMP/DEIS and Supplement, and responses to the comments.

Pursuant to BLM's planning regulations at 43 CFR 1610.5-2, any person who participated in the planning process for this PRMP and has an interest which is or may be adversely affected by the planning decisions may protest approval of the planning decisions within 30 days from date the Environmental Protection Agency (EPA) publishes the Notice of Availability of the FEIS in the Federal Register. For further information on filing a protest, please see the accompanying protest regulations in the pages that follow (labeled as Attachment # 1). The regulations specify the required elements of your protest. Take care to document all relevant facts. As much as possible, reference or cite the planning documents or available planning records (e.g., meeting minutes or summaries, correspondence, etc.).

Emailed protests will not be accepted as valid protests unless the protesting party also provides the original letter by either regular mail or overnight delivery postmarked by the close of the protest period. Under these conditions, the BLM will consider the emailed protest as an advance copy and will afford it full consideration. If you wish to provide the BLM with such advance notification, please direct emailed protests to: protest@blm.gov.

All protests must be in writing and mailed to one of the following addresses:

Regular Mail:
Director (210)
Attn: Protest Coordinator
P.O. Box 71383
Washington, D.C. 20024-1383

Overnight Delivery:
Director (210)
Attn: Protest Coordinator
20 M Street SE, Room 2134LM
Washington, D.C. 20003

Before including your address, phone number, email address, or other personal identifying information in your protest, be advised that your entire protest – including your personal identifying information – may be made publicly available at any time. While you can ask us in your protest to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

The BLM Director will make every attempt to promptly render a decision on each protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior on each protest. Responses to protest issues will be compiled and formalized in a Director's Protest Resolution Report made available following issuance of the decisions.

Upon resolution of all land use plan protests, the BLM will issue an Approved RMP and Record of Decision (ROD). The Approved RMP and ROD will be mailed or made available electronically to all who participated in the planning process and will be available on the BLM website at http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html.

Unlike land use planning decisions, implementation decisions included in this PRMP/FEIS are not subject to protest under the BLM planning regulations, but are subject to an administrative review process, through appeals to the Office of Hearings and Appeals (OHA), Interior Board of Land Appeals (IBLA) pursuant to 43 CFR, Part 4 Subpart E. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed. Where implementation decisions are made as part of the land use planning process, they are still subject to the appeals process or other administrative review as prescribed by specific resource program regulations once the BLM resolves the protests to land use planning decisions and issues an Approved RMP and ROD. The Approved RMP and ROD will therefore identify the implementation decisions made in the plan that may be appealed to the Office of Hearing and Appeals.

Sincerely,

Mary Jo Rugwell
Acting State Director

Attachment 1

Protest Regulations

[CITE: 43CFR1610.5-2]

TITLE 43--PUBLIC LANDS: INTERIOR
CHAPTER II--BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR
PART 1600--PLANNING, PROGRAMMING, BUDGETING--Table of Contents
Subpart 1610--Resource Management Planning
Sec. 1610.5-2 Protest procedures.

(a) Any person who participated in the planning process and has an interest which is or may be adversely affected by the approval or amendment of a resource management plan may protest such approval or amendment. A protest may raise only those issues which were submitted for the record during the planning process.

(1) The protest shall be in writing and shall be filed with the Director. The protest shall be filed within 30 days of the date the Environmental Protection Agency published the notice of receipt of the final environmental impact statement containing the plan or amendment in the Federal Register. For an amendment not requiring the preparation of an environmental impact statement, the protest shall be filed within 30 days of the publication of the notice of its effective date.

(2) The protest shall contain:

(i) The name, mailing address, telephone number and interest of the person filing the protest;
(ii) A statement of the issue or issues being protested;
(iii) A statement of the part or parts of the plan or amendment being protested;
(iv) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record; and
(v) A concise statement explaining why the State Director's decision is believed to be wrong.

(3) The Director shall promptly render a decision on the protest.

(b) The decision shall be in writing and shall set forth the reasons for the decision. The decision shall be sent to the protesting party by certified mail, return receipt requested. The decision of the Director shall be the final decision of the Department of the Interior.

Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Type of Action: Administrative (Final)

Jurisdiction: Portions of Big Horn, Hot Springs, Park, and Washakie counties, Wyoming

Abstract: This Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) describes and analyzes alternatives for the planning and management of public lands and resources the Bureau of Land Management (BLM) administers in the Bighorn Basin in northwestern Wyoming. The Draft RMP and Draft EIS were released for public review and comment in April 2011 (76 Federal Register [FR] 22721, April 22, 2011). In July 2012, the BLM Rocky Mountain Regional Interdisciplinary Team identified the need to prepare a Supplement to the Bighorn Basin Draft RMP and Draft EIS (the Supplement) to consider incorporation of proposed management actions in designated greater sage-grouse Key Habitat Areas and Priority Habitat Management Areas (PHMAs), and to thoroughly consider the conservation measures identified in the Greater Sage-grouse National Technical Team (NTT) Report on National Greater Sage-Grouse Conservation Measures (Sage-grouse NTT 2011), as referenced in BLM IM No 2012-044 (BLM National Greater Sage-Grouse Land Use Planning Strategy). The Supplement described and analyzed two additional alternatives (E and F) to address these issues.

The Proposed RMP and Final EIS integrate content from the Draft RMP and Draft EIS and the Supplement for the BLM Cody Field Office and BLM Worland Field Office (the Planning Area). The Planning Area is located in north-central Wyoming, and comprises approximately 5.6 million acres of land in Big Horn, Hot Springs, Park, and Washakie counties. Within the Planning Area, the BLM administers approximately 3.2 million acres of surface land and 4.2 million acres of federal mineral estate. The BLM is revising the three existing plans (the Cody, Washakie, and Grass Greek RMPs) under which the BLM Cody and Worland Field Offices operate to address the availability of new data and policies, emerging issues, and changing circumstances that have occurred during the approximately 20 years since the Records of Decision for the three existing plans were signed.

The Draft RMP and Draft EIS analyzed alternatives A through D, representing complete land use plans for managing the Planning Area. The Supplement analyzed management under Alternative E, which is the same as Alternative B, except it designates Key Habitat Areas for greater sage-grouse as the Greater Sage-Grouse Key Habitat Areas ACEC (Area of Critical Environmental Concern); and management under Alternative F, which is the same as under Alternative D, except it designates PHMAs for greater sage-grouse as the Greater Sage-Grouse PHMAs ACEC. The BLM analyzed ACEC designations for greater sage-grouse priority habitat because this resource was found to meet the relevance and importance criteria that require its consideration as an ACEC.

After careful consideration of both public and internal comments received on the Draft RMP and Draft EIS and Supplement, adjustments and clarifications have been made to the document, including Alternative D. As modified, Alternative D is now presented as the Proposed RMP in the Final EIS.

Protests: Protests must be postmarked or received no later than 30 days after publication of the U.S. Environmental Protection Agency Notice of Availability in the *Federal Register*.

Refer to the instructions in the letter preceding this abstract for additional information on how to protest. The close of the protest period will be announced in news releases, newsletters, and on the project website at http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html.

For further information, contact:

Bighorn Basin RMP Revision Project
BLM Worland Field Office
P.O. Box 119
101 South 23rd Street
Worland, Wyoming 82401

Telephone: (307) 347-5100
Email: BBRMP_WYMail@blm.gov

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ACRONYMS AND ABBREVIATIONS

<	Less than
>	Greater than
°C	Degrees Celsius
°F	Degrees Fahrenheit
µg/m^3	Micrograms per cubic meter
ACEC	Area of Critical Environmental Concern
AML	Abandoned mine lands
AMP	Allotment management plan
AMS	Analysis of the Management Situation
amsl	Above mean sea level
APD	Application for Permit to Drill
APHIS	Animal and Plant Health Inspection Service
AQRV	Air quality related values
ARMS	Agricultural Resource Management Survey
AUM	Animal unit month
BACT	Best available control technology
bbls	Barrels
BBM	Benefits-based management
bcf	Billion cubic feet
BEA	United States Bureau of Economic Analysis
BLM	Bureau of Land Management
BMP	Best management practice
BOR	Bureau of Reclamation
C&MU	Classification and Multiple Use
CAMx	Comprehensive Air Quality Model
CAMx	Comprehensive Air Quality Model with extensions
CASTNet	Clean Air Status and Trends Network
CBNG	Coalbed natural gas
CEA	Cumulative effects analysis
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CIAA	Cumulative Impact Assessment Area
CMAQ	Community Multiscale Air Quality
CO	Carbon monoxide
CO_2	Carbon dioxide
COA	Conditions of Approval
COT	Conservation Objectives Team
CPW	Colorado Parks and Wildlife
CREG	Consensus Revenue Estimating Group
CSU	Controlled surface use
CTTM	Comprehensive Travel and Transportation Management
CYFO	Bureau of Land Management Cody Field Office
dbh	Diameter at breast height
DDCT	Density and Disturbance Calculation Tool
DEQ	Department of Environmental Quality
DFC	Desired future condition
DLE	Desert Land Entry
DOI	United States Department of the Interior
DPC	Desired plant community
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESD	Ecological Site Descriptions
FCRPA	Federal Cave Resources Protection Act
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act
FMP	Fire Management Plan
FMU	Fire Management Unit
FR	Federal Register
FRCC	Fire Regime Condition Class
GHG	Greenhouse gas
GHMA	General Habitat Management Areas
GIS	Geographic Information System
GRSG	Greater sage-grouse
H_2S	Hydrogen sulfide
H_2SO_4	Sulfuric acid
ha	Hectare
HAP	Hazardous Air Pollutant
HMA	Herd Management Area
HMP	Habitat Management Plan
HNO_3	Nitric acid
HUC	Hydrologic unit code

ID	Interdisciplinary
IM	Instruction Memorandum
IMP	Interim Management Policy
IMPLAN	Impact Analysis for Planning model
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
kg	Kilogram
kV	Kilovolt
LAC	Limits of Acceptable Change
LAU	Lynx analysis unit
LOC	Level of Concern
LRP	Limited Reclamation Potential
LUP	Land Use Plan
LUPA	Land Use Plan Amendment
LWCF	Land and Water Conservation Fund Act
mbf	Thousand board feet
MCD	Meeteetse Conservation District
MFWP	Montana Department of Fish, Wildlife, and Parks
MLP	Master Leasing Plan
MLRA	Major Land Resource Area
MOU	Memorandum of Understanding
MYA	Million years ago
MZ	Management zone
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act
NH_4	Ammonium
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_3	Nitrate
NOA	Notice of Availability
NOC	National Operations Center
NOI	Notice of Intent
NO_x	Nitrogen oxides
NRCS	Natural Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NSO	No surface occupancy
NTT	National Technical Team
NWSRS	National Wild and Scenic River System
O_3	Ozone
OHV	Off-highway vehicle
ORV	Outstandingly remarkable value
PAC	Priority Areas for Conservation
PARC	Partners in Amphibian and Reptile Conservation
Pb	Lead
PETM	Paleocene-Eocene Thermal Maximum
PFC	Proper Functioning Condition
PFYC	Potential Fossil Yield Classification
PHMA	Priority Habitat Management Areas
PM	Particulate matter
PNC	Potential Natural Community
ppb	Parts per billion
ppm	Parts per million
PRPA	Paleontological Resources Protection Act
PSD	Prevention of Significant Deterioration
R&PP	Recreation and Public Purposes
RAAT	Reduced Agent Area Treatment
RAMP	Recreation Area Management Plan
RAMS	Risk Assessment Mitigation Strategy
RAS	Rangeland Administration System
RFD	Reasonable Foreseeable Development
RMA	Recreation Management Area
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
RMZ	Recreation Management Zone
ROD	Record of Decision
ROW	Rights-of-Way
RSCC	Recreational setting character condition
RVD	Recreation visitor-day
SCZ	Setting Consideration Zone
SDW	Stock driveway withdrawals
SFA	Sagebrush Focal Areas
SGI	Sage-Grouse Initiative

SHPO	State Historic Preservation Office
SLAMS	State and Local Air Monitoring Station
SLB	State Board of Land
SMA	Special Management Area
SO_2	Sulfur dioxide
SO_4	Sulfate
SPM	Special Purpose Monitoring
SRMA	Special Recreation Management Area
SRP	Special recreation permit
SUA	Special Use Authorization
SVR	Standard visual range
TCP	Traditional cultural property
TLS	Timing limitations
TMDL	Total Maximum Daily Load
TR	Technical Reference
U.S.	United States
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultra Violet
VOC	Volatile Organic Compound
VRI	Visual Resource Inventories
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standards
WAFWA	Western Association of Fish and Wildlife Agencies
WAPA	Western Area Power Administration
WARM	Water and Atmospheric Resource Monitoring
WARMS	Wyoming Air Resource Monitoring System
WEPP	Water Erosion Prediction Project
WFO	Bureau of Land Management Worland Field Office
WGFD	Wyoming Game and Fish Department
WHMA	Wildlife Habitat Management Area
WOGCC	Wyoming Oil and Gas Conservation Commission
WQD	Water Quality Division
WSA	Wilderness Study Area
WSGWG	Wyoming Sage-Grouse Working Group
WSR	Wild and Scenic River
WUI	Wildland Urban Interface
WYCRO	Wyoming Cultural Records Office
WYPDES	Wyoming Pollutant Discharge Elimination System
WYSO	Wyoming State Office

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The Federal Land Policy and Management Act of 1976 (FLPMA) directs the United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) to develop and periodically revise or amend its resource management plans (RMPs), which guide management of BLM-administered lands. This RMP and Environmental Impact Statement (EIS) describes and analyzes alternatives for the future management of public lands and resources the BLM administers within the Bighorn Basin planning area.

The BLM Bighorn Basin Proposed Plan provides a layered management approach that offers the highest level of protection for Greater Sage-Grouse (GRSG) in the most valuable habitat. Land use allocations in the Proposed Plan would limit or eliminate new surface disturbance in Priority Habitat Management Areas (PHMA), while minimizing disturbance in General Habitat Management Areas (GHMA).[1] In addition to establishing protective land use allocations, the Proposed Plan would implement a suite of management tools, such as disturbance limits, GRSG habitat objectives and monitoring, mitigation approaches, adaptive management triggers and responses, and other protective measures throughout the range. These overlapping and reinforcing conservation measures will work in concert to improve and restore GRSG habitat condition and provide consistency in how the BLM will manage activities in GRSG habitat in the planning area.

[1] For the Proposed RMP and Final EIS, GRSG habitat nomenclature has been changed from Core Areas to Priority Habitat Management Areas (PHMA) and Non-Core Sage Grouse Habitat to General Habitat Management Areas (GHMA).

ES.1.1 Rationale and Relationship to the Greater Sage-Grouse Planning Strategy

The Bighorn Basin RMP addresses the March 2010 US Fish and Wildlife Service (USFWS) 12-Month Finding for Petitions to List the GRSG (*Centrocercus urophasianus*) as Threatened or Endangered (75 *Federal Register* 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A "warranted, but precluded" determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, a species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. Of the five listing factors reviewed, the USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG," and Factor D, "the inadequacy of existing regulatory mechanisms," posed "a significant threat to the GRSG now and in the foreseeable future" (75 *Federal Register* 13910, March 23, 2010). The USFWS identified the principal regulatory mechanisms for the BLM as conservation measures in land use plans (LUPs).

The Bighorn Basin RMP is one of the 15 RMP revisions and amendments and EISs being prepared by the BLM as part of the National Greater Sage-Grouse Planning Strategy (BLM 2011).[2] These documents provide a set of management alternatives focused on specific conservation measures across the range of the GRSG (see **Figure ES-1**, Greater Sage-Grouse Planning Strategy Boundaries).

[2] BLM (US Department of the Interior, Bureau of Land Management). 2011. Instruction Memorandum 2012-044, BLM National. Greater Sage-Grouse Land Use Planning Strategy. Washington, DC. December 27, 2011.

Figure ES-1

Science-based decision making and collaboration with state and local partners are fundamental to the GRSG Planning Strategy. The 15 GRSG EISs address threats to GRSG identified by state fish and wildlife agencies, the BLM National Technical Team, and the USFWS in the context of its listing decision and the Conservation Objectives Team (COT) report. The COT report was prepared by wildlife biologists from state and federal agencies and provides a blueprint for the overall conservation approach set forth in the BLM GRSG EISs (USFWS 2013).[3] Where consistent with conservation objectives, the GRSG LUP/EISs adopt unique state- and stakeholder-developed approaches and priorities. Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the final BLM and Forest Service GRSG LUP/EISs. In addition, regular meetings with the Western Governors Association Sage-Grouse Task Force provided additional opportunities for coordination with member states.[4]

[3] USFWS (US Department of the Interior, Fish and Wildlife Service). 2013. Greater Sage-grouse *(Centrocercus urophasianus)* Conservation Objectives: Final Report. USFWS, Denver, CO. February 2013.

[4] The Western Governors Association Sage-Grouse Task Force works to identify and implement high priority conservation actions and integrate ongoing actions necessary to preclude the need for the GRSG to be listed under the ESA. The Task Force includes designees from the 11 western states where GRSG is found as well as representatives from USFWS, BLM, Natural Resources Conservation Service, Forest Service, United States Geological Survey, and Department of the Interior.

ES.1.2 Description of the Planning Area and Habitat Management Areas

The planning area is the geographic area within which the BLM will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction. The Bighorn Basin RMP planning area covers approximately 5.6 million acres of federal, state, and private lands in four Wyoming counties (Big Horn, Park, Washakie, and Hot Springs). Of the total area, 3.2 million acres are BLM-administered surface lands and 4.2 million acres are federal mineral estate.

While the planning area consists of all lands regardless of ownership, decisions resulting from Bighorn Basin RMP/EIS would apply only to BLM-administered lands, including surface and split-estate lands with BLM-administered subsurface mineral rights. **Chapter 3**, Affected Environment, describes the current resource and resource use conditions in the planning area.

As part of the National Greater Sage-Grouse Planning Strategy, GRSG habitat on BLM-administered lands in the decision area consists of lands allocated as PHMA and GHMA (**Figure ES-2**, Greater Sage-Grouse Habitat Management Areas – Bighorn Basin RMP/EIS, and **Table ES-1**, Habitat Management Areas in the Bighorn Basin Planning Area). PHMA and GHMA are defined as follows:

- PHMA (1,115,100 acres): BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Core Area boundaries identified in the Draft RMP/EIS. PHMA was identified in coordination with the State of Wyoming. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.
- GHMA (2,034,000 acres): BLM-administered lands that require some special management to sustain GRSG populations. GHMA was identified in coordination with the State of Wyoming.

The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. These lands would be managed as described in **Chapter 2**, Alternatives.

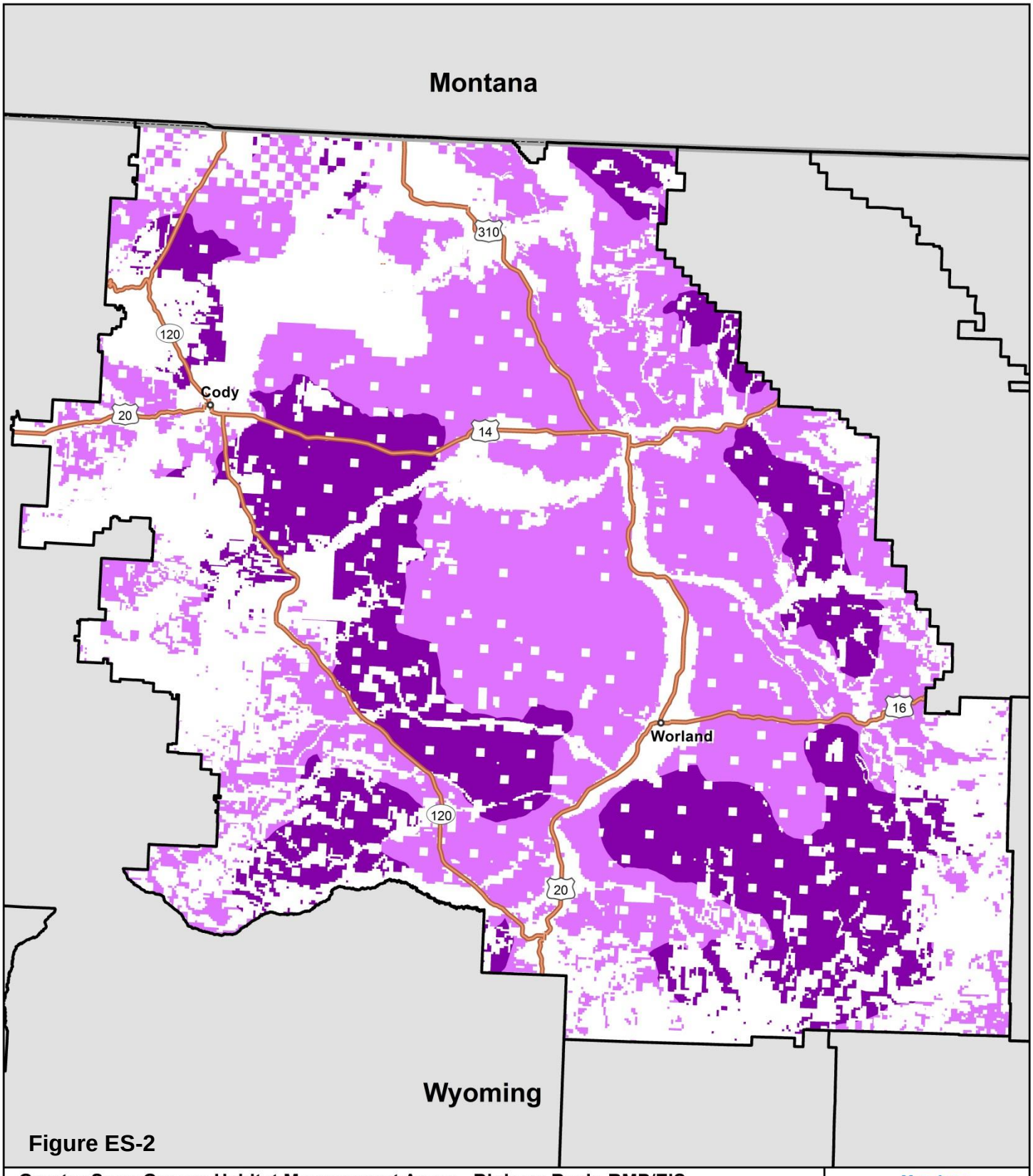

Figure ES-2

Greater Sage-Grouse Habitat Management Areas - Bighorn Basin RMP/EIS

- BLM Priority Habitat Management Areas
- BLM General Habitat Management Areas
- Other BLM Lands
- Private, State, and Other Federal Lands
- EIS Boundary
- State Boundary

N W E S

0 10 20 Miles

Map Area

No warranty is made by the Bureau of Land Management (BLM) or the U.S. Forest Service (USFS). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Table ES-1
Habitat Management Areas in the Bighorn Basin Planning Area

Habitat Management Area	Acres of BLM-administered Lands	Percent of BLM-administered Lands in Planning Area
PHMA	1,115,100	35
GHMA	2,034,000	64
Other BLM-administered lands	38,100	1

ES.2 PURPOSE AND NEED

The BLM currently administers public lands in the planning area according to three plans – the Cody RMP (BLM 1990)[5] for the Cody Field Office (CYFO) and the Washakie RMP (BLM 1988)[6] and Grass Creek RMP (BLM 1998)[7] for the Worland Field Office (WFO). Although these existing plans have been updated since the BLM adopted them, new data have become available, and laws, regulations, and policies regarding management of these public lands have changed. In addition, decisions in the existing plans do not satisfactorily address all new and emerging issues in the planning area. These changes and potential deficiencies created the need to revise the existing plans.

The purpose of this RMP revision project is to ensure that public lands are managed according to the principles of multiple use identified in FLPMA, while maintaining valid existing rights and other obligations already established. The new RMPs will address the changing needs of the planning area and create a management strategy that best achieves a combination of the following planning issues within the framework of the planning criteria.

- Employing a community-based planning approach to seek broadly supported solutions to issues, and collaborate with federal, state, and local cooperating agencies.
- Establishing goals and objectives for managing resources and resource uses in the approximately 3.2 million surface acres and 4.2 million acres of federal mineral estate in the planning area administered by the BLM CYFO and WFO in accordance with the principles of multiple use and sustained yield.
- Identifying land use plan decisions to guide future land management actions and subsequent site-specific implementation decisions.

[5] BLM. 1990. Cody Resource Management Plan. Worland, WY.
[6] BLM. 1988. Washakie Resource Management Plan. Worland, WY.
[7] BLM. 1998. Grass Creek Resource Management Plan. Worland, WY.

- Identifying management actions and allowable uses anticipated to achieve the established goals and objectives and reach desired outcomes.
- Providing comprehensive management direction by making land use decisions for all appropriate resources and resource uses the BLM administers in the planning area.
- Providing for compliance with applicable tribal, federal, and state laws, standards, and implementation plans, and BLM policies and regulations.
- Recognizing the Nation's need for domestic sources of minerals, food, timber, and fiber.
- Retaining flexibility to adapt to new and emerging issues and opportunities and to provide for adjustments to decisions over time based on new information and monitoring.
- Striving to be compatible with the plans and policies of adjacent local, state, tribal, and federal agencies and consistent with federal laws, regulations, and BLM policies; and be flexible enough to adapt to future BLM policy and guidance updates.

This RMP with associated EIS is needed to respond to the USFWS's March 2010 "warranted, but precluded" ESA listing petition decision (75 *Federal Register* 13910, March 23, 2010). The USFWS identified inadequacy of regulatory mechanisms as a significant factor in its finding on the petition to list the GRSG. In its listing decision, the USFWS noted that changes in management of GRSG habitats are necessary to avoid the continued decline of GRSG populations. Changes in land allocations and conservation measures in the BLM RMPs provide a means to implement regulatory mechanisms to address the inadequacy identified by the USFWS.

ES.3 PROPOSED ACTION

The proposed federal action is the Proposed Plan, which identifies resource management actions in accordance with the multiple-use and sustained-yield mandates of FLPMA. The proposed action is also intended to provide a consistent framework for managing GRSG and its habitat on BLM-administered land. The alternatives, including the Proposed Plan, comprise desired future outcomes and a range of management actions, allowable uses, and land use allocations that guide management on BLM-administered lands. The Proposed Plan (see **Section ES.6**, Greater Sage-Grouse Habitat Management Proposed Plan and Environmental Effects) represents the agencies' approach for addressing the purpose and need.

ES.4 DEVELOPMENT OF THE RMP/EIS

ES.4.1 Scoping

A Notice of Intent (NOI) published in the Federal Register on October 17, 2008, formally announced the BLM's intent to revise the existing plans and prepare the associated EIS. Publication of the NOI initiated the scoping process and invited affected and interested agencies, organizations, and the general public to participate in determining the scope and issues to be addressed by alternatives and analyses in the EIS. The BLM held six public scoping meetings in Thermopolis, Worland, Greybull, Cody, Powell, and Lovell, Wyoming, between November 5 and 14, 2008. The six scoping meetings provided the public with an opportunity to learn and ask questions about the project and the planning process and to submit their issues and concerns to the BLM. In addition to members of the BLM Interdisciplinary Team, 381 people attended the scoping meetings. The BLM collected comments from the public during the scoping meetings and throughout the scoping period. The final Scoping Summary Report, available online at *http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html*, prepared in conjunction with all the GRSG LUPAs, summarizes the scoping and issue-identification process and describes 13 broad issue categories identified during the scoping process.

ES.4.2 Cooperating Agency Collaboration

The BLM invited local, state, federal, and tribal representatives to participate as cooperating agencies on the Bighorn Basin RMP/EIS. The BLM invited these entities to participate because they have jurisdiction by law or because they could offer special expertise. Big Horn, Hot Springs, Park, and Washakie County Commissions, as well as seven local conservation districts, agreed to participate as cooperating agencies in the RMP revision. The State of Wyoming and the US Department of Agriculture Forest Service accepted cooperating agency status as well. The BLM and cooperating agencies participated in six workshops to formulate alternatives and multiple meetings to keep cooperating agencies informed and to solicit their input. Development of this Proposed RMP and Final EIS considered comments from cooperating agencies on the Draft RMP and Draft EIS and previous administrative drafts.

The BLM also invited Native American tribes to be cooperating agencies as part of the RMP revision and conducted ongoing coordination, including two letters, multiple phone calls, and face-to-face meetings. The BLM held a cooperating agency workshop on January 31, 2013, and sent tribal consultation letters to update cooperators and tribes on the status of the RMP revision process and the need to prepare a Supplement to the Draft RMP and Draft EIS. In addition, the BLM met with tribes in government-to-government consultation throughout the RMP process.

ES.4.3 Development of the Draft RMP/EIS

Development of Management Alternatives

In accordance with NEPA and the CEQ implementing regulations (40 CFR 1500), the planning team considered public input and developed a reasonable range of alternatives for the Draft RMP/EIS.

The planning team developed four unique alternatives, including one No Action Alternative and three action alternatives, which were subsequently analyzed in the Draft RMP/EIS. Each of the preliminary action alternatives was designed to:

- Address the 16 planning issues
- Fulfill the purpose and need for the RMP
- Meet the multiple-use and sustained-yield mandate of FLPMA
- Respond to USFWS-identified issues and threats to GRSG and its habitat, including specific threats identified in the COT report

Collectively, the three action alternatives (Alternatives B, C, and D) analyzed in the Draft RMP/EIS offered a range of possible management approaches for responding to the purpose and need as well as the planning issues and concerns identified through public scoping. While the overarching goal of the long-term conservation of GRSG and its habitat is the same across alternatives, each alternative contains a discrete set of objectives and management actions, which if selected as the final plan, would constitute a unique RMP.

Publication of Draft RMP/EIS

Public Comment Period

The Notice of Availability (NOA) for the Bighorn Basin Draft RMP and Draft EIS was published in the Federal Register on April 22, 2011, initiating the 90-day public comment period. At the request of the public and cooperating agencies, the BLM extended the comment period by 45 days, for a total comment period of 135 days. The comment period ended on September 7, 2011. The BLM held six public meetings in Thermopolis, Worland, Greybull, Cody, Powell, and Lovell, Wyoming. Written public comments were reviewed and considered by the BLM.

After release of the Draft RMP/EIS in April 2011, new data, changing circumstances, and emerging issues led the BLM Rocky Mountain Regional Interdisciplinary Team to conclude a Supplement was needed, as listed below. The Proposed RMP and Final EIS integrate content from the Draft RMP/EIS and the Supplement.

- Based on the identified threats to the GRSG and the USFWS timeline for making a listing decision on this species, the BLM announced (August 2011) the National GRSG Planning Strategy Charter. The charter requires the development of new or revised

regulatory mechanisms, through RMPs, to conserve and restore the GRSG and its habitat on BLM-administered lands on a range-wide basis over the long term.

- Three new sources of important data became available: The GRSG NTT Report on National GRSG Conservation Measures; the GRSG Baseline Environmental Report (Manier et al. 2013); and the GRSG Conservation Objectives Team (COT) Final Report.
- In December 2011, a Notice of Availability (NOA) was published in the Federal Register to initiate preparation of EISs and Supplemental EISs to Incorporate GRSG Conservation Measures into Land Use Plans and Land Management Plans in accordance with the BLM National GRSG Planning Strategy.
- In late December 2011, the BLM Washington Office released Instruction Memorandum No. 2012-044, which directed all of the planning efforts across the GRSG range to consider all applicable conservation measures when revising or amending its RMPs in GRSG habitat, including the measures developed by the National Technical Team that were presented in their December 2011 document – A Report on National GRSG Conservation Measures.
- In 2012, the Director of the USFWS asked the COT to produce recommendations regarding the degree to which the threats to GRSG need to be reduced or ameliorated so that the species would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future.

Publication of Supplemental Draft RMP/EIS

The BLM published the NOA for a Supplement to the Bighorn Basin Draft RMP/ EIS for public review and comment in the Federal Register on July 12, 2013, initiating the 90-day public comment period. The BLM later extended the comment period for an additional 20 days, ending the comment period on November 1, 2013. During the 110-day comment period, the BLM held six public meetings (in the same locations as meetings on the Draft RMP/ EIS) to discuss the content of the Supplement.

Comment Analysis

During the public comment periods, the BLM received thousands of written comments by mail, email, and submissions at the public meetings. Comments covered a wide spectrum of thoughts, opinions, ideas, and concerns. Upon receipt, the BLM reviewed the comments, grouped similar substantive comments under an appropriate topic heading, and evaluated and crafted summary responses addressing the comment topics. The response indicated whether or not the commenters' points would result in new information or changes being included in the Final RMP/EIS. In many circumstances, public comments prompted such changes to the Draft and Supplemental RMP/EIS.

Appendix A, Comment Analysis, provides a detailed description of the comment analysis methodology and an overview of the public comments received.

ES.5 RMP/EIS ALTERNATIVES AND ENVIRONMENTAL EFFECTS

ES.5.1 Alternative A – No Action

The No Action Alternative represents continuation of current management and provides a baseline from which to identify potential environmental consequences when compared to the action alternatives. The No Action Alternative describes current resource and land management direction as represented in the Cody RMP (BLM 1990) for the CYFO and the Washakie RMP (BLM 1988a) and Grass Creek RMP (BLM 1998a) for the WFO, and associated habitat management plans, maintenance actions, and updates. Current management identifies constraints on mineral leasing in the planning area to protect resource values. Current management includes nine Areas of Critical Environmental Concern (ACECs), one National Back Country Byway, one National Historic Landmark, and one National Historic Trail (NHT). This alternative also includes 20 Wild and Scenic River (WSR) eligible waterways, each with interim protective management, and 10 Wilderness Study Areas (WSAs). The BLM maintains seven Special Recreation Management Areas (SRMAs) under Alternative A and allows livestock grazing on all but 5,008 acres of the planning area.

Current management includes stipulations and seasonal restrictions for surface-disturbing and disruptive activities to protect sensitive wildlife areas, such as occupied GRSG leks and crucial winter range and migration corridors for big game.

ES.5.2 Alternative B

Alternative B is based on the conservation measures developed by the BLM National Technical Team (NTT) planning effort described in Instruction Memorandum (IM) No. WO-2012-044. As directed in the IM, the conservation measures developed by the NTT must be considered and analyzed, as appropriate, through the land use planning and NEPA processes by all BLM state and field offices that contain occupied GRSG habitat. Alternative B emphasizes conservation of physical, biological, heritage, and visual resources, and lands with wilderness characteristics, with constraints on resource uses. Alternative B conserves large areas of land for physical, biological, and heritage resources; designates 17 ACECs; and places a number of restrictions on motorized vehicle use and mineral development. Alternative B retains the current National Back Country Byway, designates two additional back country byways, and applies protective management prescriptions to the Heart Mountain Relocation Center National Historic Landmark, Nez Perce NHT, and other important historic and regional trails. All lands with wilderness characteristics under Alternative B are specifically managed to preserve their wilderness characteristics. Alternative B also applies additional constraints on travel within the 10 WSAs in comparison

to Alternative A. The BLM designates 12 SRMAs under Alternative B and closes 1,984,211 acres to livestock grazing in the planning area. This alternative maintains contiguous blocks of vegetation and habitat on BLM-administered lands.

Alternative B identifies protective measures for GRSG habitat. Restrictions on surface-disturbing and disruptive activities (e.g., oil and gas leasing closures and ROW avoidance areas) in sensitive wildlife habitats are generally more prohibitive under Alternative B than Alternative A, and the size of protective buffers is increased around areas of specific management concern such as occupied GRSG leks.

ES.5.3 Alternative C

Alternative C emphasizes resource uses and reduces constraints on resource uses to protect physical, biological, and heritage and visual resources. Compared to other alternatives, Alternative C conserves the least land area for physical, biological, and heritage resources; designates the fewest ACECs (2) and SRMAs (1); and is the least restrictive to motorized vehicle use and mineral development. The BLM delineates Oil and Gas Management Areas around intensively developed existing fields to be managed primarily for oil and gas exploration and development. Alternative C carries forward the current management of National Back Country Byways and applies similar, but more protective, management to the Heart Mountain Relocation Center National Historic Landmark and Nez Perce NHT than Alternative A. Under this alternative, the BLM manages all 20 WSR eligible waterways as unsuitable for inclusion in the National Wild and Scenic River System and releases these areas to other uses. The BLM manages lands with wilderness characteristics consistent with other resource objectives. Alternative C limits motorized vehicle use to designated roads and trails within the 10 WSAs. The BLM does not maintain contiguous blocks of native plant communities or minimize fragmentation. This alternative exempts Oil and Gas Management Areas and right-of-way (ROW) corridors from discretionary wildlife seasonal stipulations and allows the BLM to manage motorized vehicle use in big game crucial winter range consistent with other resource objectives.

Alternative C identifies protective measures for GRSG habitat. Under Alternative C, the BLM applies the same restrictions (outside of Oil and Gas Management Areas and ROW corridors) on surface-disturbing and disruptive activities for occupied GRSG leks and the same timing restrictions for GRSG winter concentration areas as under Alternative A.

ES.5.4 Alternative D (Proposed Plan)

Alternative D generally increases conservation of physical, biological, and heritage and visual resources compared to current management, including the designation of 1 Special Management Area, 2 Management Areas, and 12 ACECs. Alternative D also emphasizes moderate constraints on resource uses,

while applying specific reclamation and mitigation requirements to reduce impacts to resource values. Alternative D delineates Oil and Gas Management Areas, although smaller in size than Alternative C, to be managed primarily for oil and gas exploration and development. In addition to retaining the current National Back Country Byway, Alternative D would consider the designation of new National Back Country Byways on a case-by-case basis. Alternative D would also provide similar but less protective measures than Alternative B for the Heart Mountain Relocation Center National Historic Landmark, Nez Perce NHT, and other trails. The BLM manages all 20 WSR-eligible waterways as unsuitable for inclusion in the National Wild and Scenic River System. No lands are specifically managed to protect wilderness characteristics under Alternative D. Alternative D limits motorized vehicle use to designated roads and trails within six WSAs and closes four WSAs to motorized vehicle use. Vegetation resources are managed to maintain contiguous blocks of native plant communities. Alternative D exempts Oil and Gas Management Areas from discretionary big game seasonal stipulations, but places additional stipulations on oil and gas-related surface disturbances within the Absaroka Front, Fifteenmile, and Big Horn Front Master Leasing Plan areas.

Alternative D identifies protective measures for GRSG habitat consistent with the State of Wyoming Core Area Strategy. Alternative D generally applies greater restrictions on surface disturbance and disruptive activities to protect sensitive wildlife habitats, including occupied GRSG leks, than Alternative A.

ES.5.5 Alternative E

Management under Alternative E is the same as under Alternative B, except that Alternative E designates GRSG Key Habitat Areas (PHMA) as an ACEC (1,232,583 acres) for the conservation of GRSG priority habitat. Alternative E manages disturbances (e.g., roads, oil and gas wells, and pipelines) in the GRSG Key Habitat Areas ACEC to not exceed 1 disturbance per 640 acres and cover less than 3 percent of the total GRSG habitat. It also requires beneficial reclamation and rehabilitation activities that prioritize reestablishment of native vegetation communities in sagebrush steppe communities.

Due to additional management actions associated with the GRSG Key Habitat Areas ACEC, Alternative E exceeds Alternative B, as well as the other alternatives, in the amount of land conserved for physical, biological, and heritage and visual resources; the number of designated ACECs (18); and restrictions on minerals, ROWs, and renewable energy development.

ES.5.6 Alternative F

Management under Alternative F is the same as under Alternative D, except that Alternative F designates GRSG Core Areas (PHMA) as an ACEC (1,116,698 acres) for the conservation of GRSG priority habitat. Additionally, Alternative F manages nine areas to maintain their wilderness characteristics; the remaining lands with wilderness characteristics under Alternative F would not be

specifically managed to maintain their wilderness characteristics. Management for livestock grazing under Alternative F would be the same as Alternative D, except within the GRSG PHMA ACEC, where additional restrictions on livestock grazing would incorporate GRSG habitat management objectives.

In the GRSG PHMA ACEC, the BLM manages the density of disturbance to not exceed an average of 1 disruptive activity location per 640 acres and cover less than 3 percent of the total GRSG PHMA. Alternative F delineates the same Oil and Gas Management Areas as Alternative D, but applies additional restrictions for the protection of GRSG where these areas overlap the GRSG PHMA ACEC.

ES.6 GREATER SAGE-GROUSE HABITAT MANAGEMENT PROPOSED PLAN AND ENVIRONMENTAL EFFECTS

In consideration of public comments, best science, cooperating agency coordination, and internal review of the Draft and Supplemental RMP/EIS, the BLM developed this Proposed Plan for Greater Sage-Grouse Habitat Management (Proposed Plan). The Proposed Plan represents the BLM's proposed approach for meeting the purpose and need consistent with the agency's legal and policy mandates.

The BLM Proposed Plan addresses threats to GRSG and its habitat identified by the USFWS in the March 2010 listing decision that apply to the Bighorn Basin planning area as well as threats described in the COT report. The Proposed Plan seeks to provide greater regulatory certainty for management actions intended to conserve the GRSG (**Table ES-2**, Key Components of the Bighorn Basin Proposed Plan Addressing COT Report Threats). In making its determination of whether the GRSG is warranted to be listed as threatened or endangered under the ESA, the USFWS will evaluate the degree to which land use planning decisions proposed in this RMP/EIS address threats to GRSG and its habitat.

The Proposed Plan would maintain and enhance GRSG populations and habitat. The Proposed Plan benefits GRSG populations by eliminating disturbance near leks and other key areas.

The Proposed Plan establishes conditions, subject to valid existing rights, for new anthropogenic activities to ensure a net conservation gain to GRSG in PHMA. The Proposed Plan would reduce habitat disturbance and fragmentation through limitations on surface-disturbing activities, while addressing changes in resource condition and use through monitoring and adaptive management. The Proposed Plan provides a framework for prioritizing areas in PHMA for wildfire, invasive annual grass, and conifer treatments, which will maintain and enhance GRSG habitat.

The Proposed Plan is built upon the foundation for GRSG management established by and complementary to the Governor's Executive Order 2011-05, Greater Sage Grouse Core Area Protection (Core Area Strategy) (Wyoming

Office of the Governor 2011) by establishing similar conservation measures and focusing restoration efforts in the same key areas most valuable to GRSG.

For a full description of the Proposed Plan, see **Chapter 2**.

Table ES-2
Key Components of the Bighorn Basin Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the Bighorn Basin Proposed Plan
All Threats	• Implement the Adaptive Management Plan, which provides regulatory assurance that unintended negative impacts to GRSG habitat will be addressed before consequences become severe or irreversible. • PHMA: Require and ensure mitigation that provides a net conservation gain to GRSG. • Monitor implementation and effectiveness of conservation measures in GRSG habitats according to the Habitat Assessment Framework. • Apply Required Design Features (RDFs) when authorizing actions in GRSG habitat. • Prioritize the leasing and development of fluid mineral resources outside GRSG habitat.
All development threats, including mining, infrastructure, and energy development	• PHMA: Implement an anthropogenic disturbance cap of 5% at the project-area scale. • PHMA: Implement a density cap of an average of 1 energy and mining facility per 640 acres. • PHMA: Surface occupancy and surface-disturbing activities would be prohibited on or within a 0.6-mile radius of the perimeter of occupied GRSG leks. • GHMA: Surface occupancy and surface-disturbing activities would be prohibited on or within a 0.25-mile radius of the perimeter of occupied GRSG leks.
Energy Development—Fluid Minerals	• PHMA: Open to fluid mineral leasing subject to No Surface Occupancy (NSO) stipulation within 0.6 miles of an occupied lek, and Timing Limitation (TL) stipulation from March 15 to June 30. • GHMA: Open to fluid mineral leasing subject to NSO within 0.25 miles of an occupied lek and TL stipulations.
Energy Development—Wind Energy	• PHMA: Avoidance area (may be available for wind energy development with special stipulations)
Infrastructure – major Rights-of-Way (ROW)	• PHMA: Avoidance area (may be available for major ROWs with special stipulations)
Infrastructure – minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations)
Mining—locatable minerals	• Apply RDFs to locatable minerals consistent with applicable law.

Table ES-2
Key Components of the Bighorn Basin Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the Bighorn Basin Proposed Plan
Mining—coal	• PHMA is essential habitat for GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).
Livestock Grazing	• Prioritize the review and processing of grazing permits/leases in PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases will include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards, and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-Roaming Equid Management	• Update Herd Management Area plans to include GRSG objectives.
Range Management Structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats.
Recreation	• PHMA: Do not construct new recreation facilities.
Fire	• PHMA: Prioritize suppression immediately after life and property to conserve the habitat. • GHMA: Prioritize suppression where wildfires threaten PHMA.
Nonnative, Invasive Plants Species	• Improve GRSG habitat by treating annual grasses. • Treat sites in PHMA and GHMA that contain invasive species infestations through an integrated pest management approach.
Sagebrush Removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or Juniper Expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.
Agricultural Conversion and Ex-Urban Development	• Retain the majority of PHMA in federal management.

ES.7 SUMMARY

Since the release of the Draft and Supplemental Bighorn Basin RMPs/EISs, the BLM has continued to work closely with a broad range of governmental partners, including the United States Department of Agriculture Natural Resources Conservation Service, the USFWS and US Geological Survey in DOI,

Indian tribes, governors, state agencies, and county commissioners. Through this cooperation, the BLM has developed the Proposed Plan that, in accordance with applicable law, achieves the long-term conservation of GRSG and its habitat.

Conservation of the GRSG is a large-scale challenge that requires a landscape-scale solution spanning 11 western states. The Bighorn Basin RMP/EIS achieves the consistent, range-wide conservation objectives as outlined below. Additionally, the Bighorn Basin RMP/EIS aligns with the State of Wyoming's priorities and land management approaches consistent with GRSG conservation.

Minimize additional surface disturbance. The most effective way to conserve the GRSG is to protect existing, intact habitat. The BLM aims to reduce habitat fragmentation and protect key habitat areas. The Bighorn Basin RMP/EIS minimizes surface disturbance on over 3 million acres of BLM-administered lands by allocating lands as PHMA with decisions that aim to conserve GRSG habitat.

The limitations on mineral and ROW development, along with the disturbance cap, lek buffers, and adaptive management, would result in a net conservation gain for GRSG. The Proposed Plan prioritizes oil and gas development outside of GRSG habitat and focuses on a landscape-scale approach to conserving GRSG habitat. In the context of the planning area, land use allocations under the Proposed Plan would limit or eliminate new surface disturbances in PHMA.

The BLM also updated the Proposed Plan to reflect new GRSG state conservation strategies, including recent State Executive Orders. The objectives of these documents are consistent with the State of Wyoming's Core Area Strategy, which is designed to protect GRSG and its habitat within core areas using a suite of tools and mechanisms that work in concert to conserve GRSG by reducing habitat loss and fragmentation through lek buffers, disturbance limits, excluding activities, and a sophisticated mapping utility to monitor the amount and density of disturbance.

Improve habitat condition. While restoring lost sagebrush habitat can be very difficult in the short term, particularly in the most arid areas, it is often possible to enhance habitat quality through purposeful management. The Bighorn Basin RMP/EIS commits to management actions necessary to achieve science-based vegetation and GRSG habitat management objectives established in the Proposed Plan.

Habitat restoration and vegetation management actions would improve GRSG habitat and prioritize restoration to benefit PHMA. As a result, the restoration and management of vegetation actions would focus on GRSG. For mitigation, the BLM would coordinate with the Wyoming Sage Grouse Implementation Team for application of the "avoid, minimize, compensate" process to ensure anthropogenic activities result in a net conservation gain for GRSG habitat. The Proposed Plan also includes a process for monitoring and adapting to changing

conditions on the landscape. Using monitoring data for population and sagebrush canopy cover, the adaptive management strategy would apply more restrictive management where there is a consistent downward trend. The cause of the downward trend (e.g., anthropogenic disturbance, fire, disease, etc.) would be identified through monitoring data.

Reduce threat of rangeland fire to GRSG and sagebrush habitat. Rangeland fire can destroy sagebrush habitat and lead to the conversion of previously healthy habitat into landscapes dominated by invasive species. The Bighorn Basin RMP/EIS incorporates Secretarial Order 3336 and sets forth protocols to improve the BLM's ability to protect GRSG habitat from damaging wildfire. Prescribed fire would only be used to improve or maintain habitat for GRSG and to meet specific fuels objective standards.

READER'S GUIDE TO THIS DOCUMENT

Note to the Reader: Gray shaded text throughout this Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) indicate changes that were made between the Draft and Final versions of the RMP and EIS. These changes do not constitute modifications to the document that would require an additional supplement.

Volume 1

Chapter 1. Purpose and Need for Action. This chapter introduces the Proposed RMP and Final EIS, describes the purpose and need to which the BLM is responding, provides an overview of the BLM planning process, and identifies planning issues and criteria and topics not addressed by this RMP revision.

Chapter 2. Resource Management Alternatives. Chapter 2 describes how the six alternatives (A, B, C, E, F, and D – the Proposed Plan) were developed, the components and content of each alternative, and discusses the alternatives considered but eliminated from further consideration. It also presents a comparative summary of impacts of each alternative. Resource discussions in chapters 2, 3, and 4 are organized according to the following eight resource topics:

1000 Physical Resources – Air Quality, Geologic Resources, Soil, Water, and Cave and Karst

2000 Mineral Resources – Locatable, Leasable, and Salable Minerals

3000 Fire and Fuels Management – Wildfires (Unplanned Ignitions), Prescribed Fires (Planned Ignitions), and Stabilization and Rehabilitation

4000 Biological Resources – Vegetation, Fish and Wildlife, Special Status Species, and Wild Horses

5000 Heritage and Visual Resources – Cultural, Paleontological, and Visual

6000 Land Resources – Lands and Realty, Renewable Energy, Rights-of-Way and Corridors, Comprehensive Travel and Transportation Management, Recreation, Lands with Wilderness Characteristics, and Livestock Grazing Management

7000 Special Designations – Areas of Critical Environmental Concern, National Back Country Byways, National Historic Landmarks, National Historic Trails and Other Historic Trails, Wild and Scenic Rivers, and Wilderness Study Areas

8000 Socioeconomic Resources – Social and Economic Conditions, Health and Safety, Environmental Justice, and Tribal Treaty Rights

Chapter 3. Affected Environment. This chapter describes the Planning Area and the existing environmental conditions that could be impacted by the alternatives.

READER'S GUIDE

Volume 1

Chapter 1 *Purpose and Need for Action*

Chapter 2 *Resource Management Alternatives*

Chapter 3 *Affected Environment*

Volume 2

Chapter 4 *Environmental Consequences*

Volume 3

Chapter 5 *Public Involvement and List of Preparers*

Chapter 6 *References*

Chapter 7 *Cumulative Impacts (Greater Sage-Grouse)*

Glossary

Maps

Volume 4

Appendices

Volume 2

Chapter 4. Environmental Consequences. Chapter 4 forms the scientific and analytic basis for comparing environmental impacts of each alternative, including the No Action Alternative and the Proposed Plan. Impacts generally are described in terms of direct or indirect and short-term or long-term, when applicable. Potential cumulative and unavoidable impacts and irreversible and irretrievable commitments also are discussed in this chapter.

Volume 3

Chapter 5. Public Involvement and List of Preparers. Chapter 5 summarizes the public involvement process and consultation and coordination with other local, state, and federal agencies, as well as Tribes. Chapter 5 also presents the names and qualifications of the people responsible for preparing this Proposed RMP and Final EIS.

Chapter 6. References. This chapter provides full citation information for all references cited within the document.

Chapter 7. Cumulative Impacts (Greater Sage-Grouse). Chapter 7 provides a quantitative cumulative effects analysis that discloses the long-term effects on greater sage-grouse from implementing each alternative in conjunction with other past, present, and reasonably foreseeable future actions.

Glossary. The glossary defines select terms used throughout this document.

Maps. Maps depict the alternatives by resource. For CD versions of the document, maps are provided as separate files on the CD. Electronic copies of the maps are also available on the project website (www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html).

Volume 4

Appendices. The appendices include documents that support existing resource conditions or situations, substantiate analyses, provide resource management guidance, explain processes, or provide information directly relevant or supporting conclusions in the Proposed RMP and Final EIS. In hardcopy documents, the appendices can be found on a compact disk (CD) attached to the inside back cover of Volume 3. The 26 appendices include the following:

- Appendix A, Comment Analysis
- Appendix B, Laws, Regulations, Policies, and Guidance
- Appendix C, Monitoring and Evaluation
- Appendix D, Implementation
- Appendix E, Consultation Letters and Cooperating Agency Position Statements
- Appendix F, Special Designations: Wild and Scenic Rivers and Areas of Critical Environmental Concern
- Appendix G, Lease Stipulations including Exception, Modification, and Waiver Criteria
- Appendix H, Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities
- Appendix I, Standard Oil and Gas Stipulations
- Appendix J, Bighorn Basin Air Resource Management Plan

- Appendix K, Biological Resources
- Appendix L, Required Design Features and Best Management Practices
- Appendix M, Land Disposal and Acquisition
- Appendix N, Wyoming Standards for Healthy Rangelands
- Appendix O, Recreation Management
- Appendix P, Livestock Grazing
- Appendix Q, Economic Impact Analysis Methodology
- Appendix R, Comprehensive Travel and Transportation Management
- Appendix S, Lands with Wilderness Characteristics
- Appendix T, Surface Disturbance and Reasonable Foreseeable Actions
- Appendix U, Technical Support Document for Air Quality
- Appendix V, Water Erosion Prediction Project (WEPP) Technical Support Document
- Appendix W, Utilization Levels in the Planning Area
- Appendix X, Visual Resource Inventory
- Appendix Y, Greater Sage-Grouse Implementation Strategy
- Appendix Z, Federal Oil and Gas Operations on Split-Estate Lands

Geographic Information Systems (GIS)

Maps and data generated through the use of GIS software are intended to provide generalized representations of land use planning resources and decisions. Although every reasonable effort is made to ensure the accuracy and completeness of the data, they should not be construed or used as a "legal description" that meets engineering or surveying standards and, therefore, are not suitable for site-specific decision making. The BLM does not assume any liability for any errors, omissions, or inaccuracies in the information provided, regardless of the cause of such or for any decision made, action taken, or action not taken by the user in reliance upon any data provided herein.

Various errors that may be present in the data include, but are not limited to, inaccurate feature or boundary locations, incorrect overlays between one or more layers, missing or incorrect attribute information, outdated information, and distortions associated with map projections. For these reasons, the total acreage for a given area, as presented in the document, may not equal the sum of its constituent parts. These errors are not anticipated to affect the suitability of the data for characterizing existing conditions in the Planning Area, or performing comparative analysis of the alternatives at the intended scale.

Executive Summary and Chapter 7

Please note that preparation of the Executive Summary and Chapter 7 – Cumulative Impacts (Greater Sage-Grouse), was closely coordinated among the various BLM RMP revision and amendment processes taking place across the west to ensure that the National Greater Sage-grouse Planning Strategy was consistently applied. These sections were prepared largely independently from the remainder of this document. As a result, information presented in the Executive Summary and Chapter 7, including GIS-calculated acreages, may differ slightly than those presented elsewhere in the document. These differences are likely to be minor and do not alter the conclusions of the impact analysis.

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction and Background

This Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) describes and analyzes alternatives for the future management of public lands and resources the Bureau of Land Management (BLM) administers in the Bighorn Basin in northwestern Wyoming (Figure 1-1). The Bighorn Basin RMP Revision Project is a combined effort to revise RMPs for the BLM Cody Field Office (CYFO) and BLM Worland Field Office (WFO). This document refers to the combined CYFO and WFO planning areas as the Planning Area (Figure 1-1).

The BLM administers public lands in the Planning Area according to three plans – the Cody RMP (BLM 1990) for the CYFO and the Washakie RMP (BLM 1988a) and Grass Creek RMP (BLM 1998a) for the WFO. The existing plans have been updated and amended since the BLM adopted them. While the BLM is preparing one EIS to address the impacts of revising the three existing plans, each field office will issue a Record of Decision (ROD) and RMP for its jurisdictional area at the end of the planning process. When complete, the Bighorn Basin RMP Revision Project will replace existing RMPs with one Approved RMP and ROD for the CYFO and one Approved RMP and ROD for the WFO. The Bighorn Basin RMP Revision Project is scheduled for completion by July 2015.

The Planning Area covers approximately 5.6 million acres of federal, state, and private lands in four Wyoming counties (Big Horn, Park, Washakie, and Hot Springs). Of the total area, 3.2 million acres are BLM-administered surface lands and 4.2 million acres are federal mineral estate. The CYFO extends west beyond the Bighorn Basin. However, generally, the United States Department of Agriculture (USDA) Forest Service and the National Park Service manage those lands and leasing decisions are deferred to the surface management agency; therefore, this RMP and EIS does not consider them. The BLM Memorandum of Understanding WO-300-2006-07 describes BLMs role in leasing decisions on National Forest Service lands (BLM 2006a).

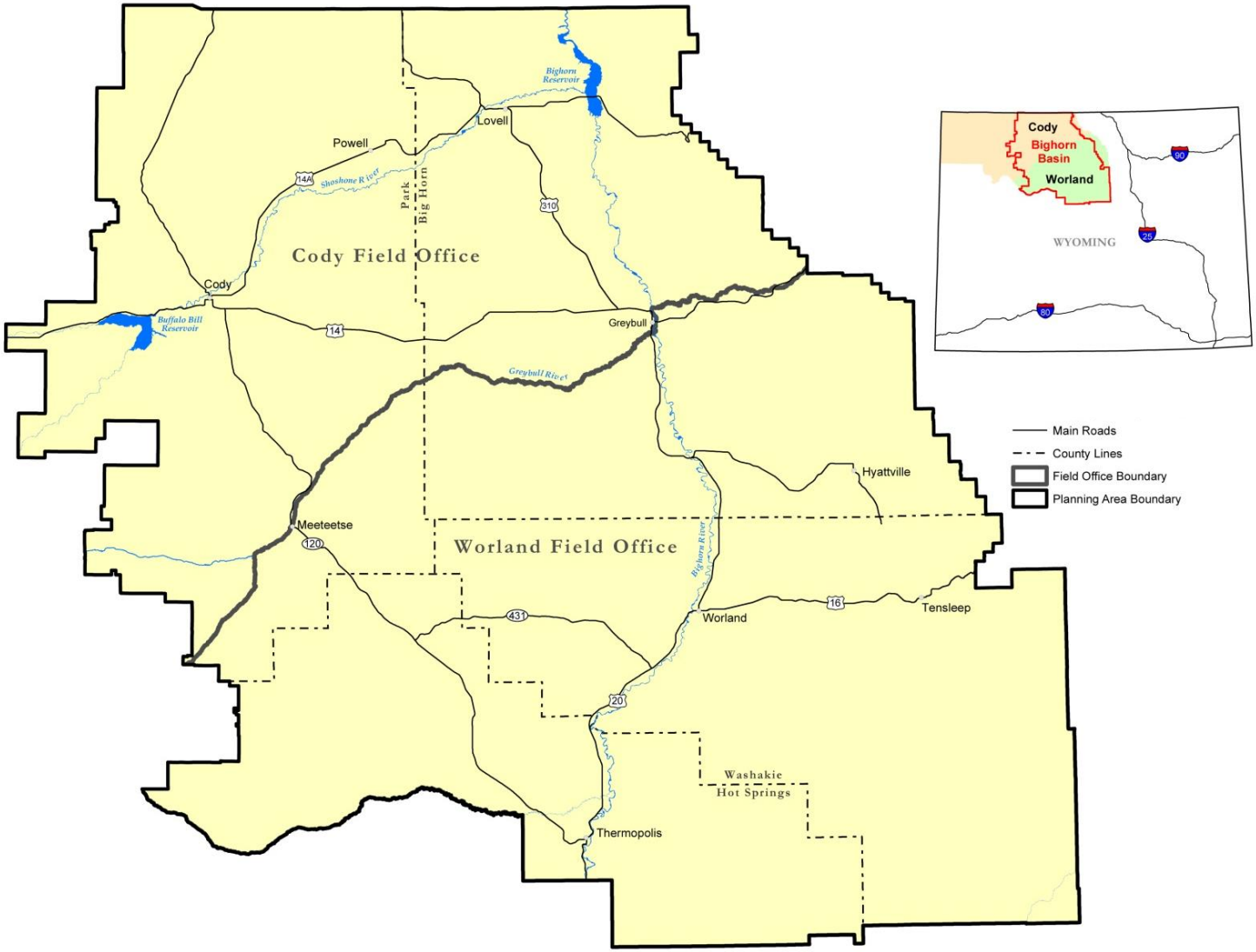
1.1.1 Historical Overview

The foundation for the BLM dates back to the Land Ordinance of 1785, which established the public domain and led to the creation of the General Land Office. In 1946, the United States (U.S.) Grazing Service merged with the General Land Office to form the BLM. Since the passage of the Federal Land Policy and Management Act of 1976 (FLPMA), the BLM has administered public lands according to the principles of multiple use and sustained yield, and to balance increasing and competing demands for resources on public lands.

1.1.1.1 Land Ownership in the Planning Area

As defined in the FLPMA, "… public lands means any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior through the Bureau of Land Management…." The U.S. Department of the Interior (DOI) BLM CYFO and WFO are responsible for managing most public lands in Wyoming's Big Horn, Park, Washakie, and Hot Springs Counties. County governments are responsible for land use planning for private lands in their jurisdictions.

Figure 1-1. Bighorn Basin Planning Area



BLM-administered surface lands in the Planning Area are mostly large blocks, with some scattered tracts intermingled with state and private lands (see Map 1). There are also areas in which different parties own surface rights and subsurface rights (such as rights to develop minerals) for a given piece of land, including federal minerals under privately owned surface, referred to as split-estate land.

These areas with scattered surface land patterns and varied mineral ownerships affect management options. Intermingled private lands also affect access to BLM-administered lands. Tables 1-1 and 1-2 summarize the surface and mineral ownership and administrative relationships in the Planning Area. The Approved RMP will not include planning and management decisions for private, State of Wyoming, or local government-owned lands or minerals (see Map 2).

Table 1-1. Surface Acreage in Each County of the Planning Area by Jurisdiction

Agency	Big Horn County	Hot Springs County	Park County	Washakie County	Totals
Bureau of Land Management	1,157,920	500,631	624,870	903,846	3,187,267
Bureau of Indian Affairs	0	76	0	0	**76**
Bureau of Reclamation	20,369	0	64,277	1,547	**86,193**
Department of Defense	3,543	0	0	0	**3,543**
U.S. Forest Service	86	40	15	18	**159**
National Park Service	15,645	0	0	0	**15,645**
State of Wyoming	74,944	85,754	157,193	100,768	**418,659**
Private	389,742	396,074	765,570	368,270	**1,919,656**
Water	2,548	1,974	6,721	1,400	**12,643**
Totals	**1,664,796**	**984,429**	**1,618,644**	**1,375,849**	**5,644,868**

Source: BLM 2013a

Table 1-2. Acreage of Subsurface Mineral Ownership in Each County of the Planning Area by Jurisdiction

Agency	Big Horn County	Hot Springs County	Park County	Washakie County	Totals
Bureau of Land Management	1,288,238	741,151	1,049,904	1,123,281	**4,203,213**
Other (state, federal, and private)	376,558	243,278	568,739	252,569	**1,441,655**
Totals	**1,664,796**	**984,429**	**1,618,644**	**1,375,849**	**5,644,868**

Source: BLM 2013a

1.2 Purpose and Need for the Resource Management Plan Revision

Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1502.13) require the purpose and need of an EIS to "briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." The purpose and need section of this EIS provides a context and framework for establishing and evaluating the reasonable range of alternatives described in Chapter 2.

1.2.1 Need to Revise Existing Plans

The BLM identified the need, or requirement, to revise the existing plans through formal evaluations, considering the Analysis of the Management Situation (AMS) (BLM 2009a), examining issues identified during the public involvement process known as scoping, and collaborating with cooperating local, state, and federal agencies. Since the RODs for the existing plans were issued, new data have become available, and laws, regulations, and policies regarding management of these public lands have changed. In addition, decisions in existing plans do not satisfactorily address all new and emerging issues in the Planning Area. These changes and potential deficiencies created the need to revise the existing plans.

New Data

Monitoring, the availability of new information, and advances in science and technology provide new data to consider in the Bighorn Basin RMP Revision Project. The following documents and sources provide new data:

- Assessing the Potential for Renewable Energy on Public Lands (BLM and DOE 2003);
- Bighorn Basin Resource Management Plan Revision Project Summary of the Analysis of the Management Situation (BLM 2009a);
- BLM Wyoming Statewide Biological Assessments for Species Regulated by the Endangered Species Act (ESA) (published between 2004 and 2005);
- Cultural Class I Regional Overview (BLM 2009b);
- Energy Policy and Conservation Act of 2000 Scientific Inventory of Onshore Federal Lands Oil and Gas Resources and Reserves and the Extent and Nature of Restrictions or Impediments to their Development (DOI 2006);
- Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (BLM and USFS 2008a);
- Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States (BLM 2005a);
- Lands with Wilderness Characteristics Inventory – 2011 Update (BLM 2011a);
- National Assessment of Oil and Gas Fact Sheet – Assessment of Undiscovered Oil and Gas Resources of the Bighorn Basin Province, Wyoming and Montana, 2008 (U.S. Geological Survey [USGS] 2008b);
- Oil Shale and Tar Sands Final Programmatic Environmental Impact Statement (BLM 2009c);
- Reasonable Foreseeable Development Scenario for Oil and Gas (BLM 2014a);

- Solid Mineral Occurrence and Development Potential Report for the Bighorn Basin Resource Management Plan Revision Project (BLM 2009d);
- Vegetation Treatments Using Herbicides on BLM lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007b);
- Visual Resource Inventory for the Cody Field Office (BLM 2009e); and
- Wyoming Greater Sage-Grouse Conservation Plan (Wyoming Sage-grouse Working Group 2003), Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et al. 2004), and Sage-grouse Conservation Plan for the Big Horn Basin, Wyoming (BHBLWG 2007), A Report on National Greater Sage-Grouse Conservation Measures (Sage-grouse NTT 2011), Greater Sage-Grouse Conservation Objectives Team (COT) Final Report (USFWS 2013a), Sage-Grouse Baseline Environmental Report (Manier et al. 2013).

New and Revised Policies

Numerous policies have been either revised or developed since the RODs for the existing plans. Appendix B identifies relevant policies, including new and revised policies, and their effective dates.

The BLM released Handbook H-8320-1 (*Planning for Recreation and Visitor Services*) on August 22, 2014. The handbook assists BLM staff in the planning and management of recreation and visitor services on public land. The release of the handbook coincided with the final development of the Bighorn Basin Proposed RMP and FEIS. Accordingly, not all recreation and visitor services decisions in this Proposed RMP and FEIS follow the recommended format provided in the handbook. However, the Proposed RMP and FEIS complies with the requirements for establishing desired conditions, allowable uses and actions related to the management of recreation and visitor services as discussed in Handbook H-8320-1.

Emerging Issues and Changing Circumstances

Emerging issues and changes in local, regional, and national circumstances to consider when revising the existing plans include the following:

- Increasing and conflicting demands on Planning Area resources.
- Increasing complexity of resource management issues.
- Changes in the legal status of plants and wildlife occurring or potentially occurring in the Planning Area.
- Increasing conflicts between resource uses and protection of specific wildlife and wildlife habitat.
- Changes in greater sage-grouse habitat management.
- Maintaining public access to public lands.
- The spread of invasive plant and animal species on public lands.
- Changing demand for energy and minerals development.
- Changes in oil and gas leasing and the development of Master Leasing Plan analysis (Instruction Memorandum [IM] 2010-117).
- Management of riparian areas and water quality concerns.
- Fire and fuels management practices.
- Changes in livestock grazing practices and rangeland conditions.

- Changes in recreation and visitor use levels and locations.
- Management and protection of recently discovered cultural and paleontological resources.
- Addressing travel management, including increases in off-highway vehicle (OHV) use.
- The appropriateness of certain withdrawals, tenure adjustments, realty leases, and utility corridor rights-of-way (ROW).
- Increased interest in renewable energy development across the Nation.
- Updated inventories of lands with wilderness characteristics in the Planning Area.
- Identifying unique or sensitive areas that meet the criteria for special designation.
- Increasing air quality issues affecting human health and regulatory compliance.
- Cumulative increase in surface disturbance.
- Interest in the management of wild horses and herd levels.
- Increased interest in wind-energy proposals.
- Changes to visual resource classifications.
- Changes in resource- and resource-condition monitoring tasks and the entities performing the monitoring.
- The need to determine the suitability of the eligible waterway corridors within the Bighorn Basin for inclusion into the Wild and Scenic Rivers System.

In March 2010 the U.S. Fish and Wildlife Service (USFWS) published its listing decision for the greater sage-grouse as "Warranted but Precluded" (USFWS 2010). The listing decision identified the inadequacy of existing regulatory mechanisms as a significant threat to greater sage-grouse now and for the foreseeable future. Further, the USFWS identified conservation measures in RMPs as the principal regulatory mechanism for the BLM. Based on the identified threats to the greater sage-grouse and the USFWS timeline for making a listing decision on this species, the BLM announced a National Greater Sage-grouse Planning Strategy Charter in August 2011 requiring the development of new or revised regulatory mechanisms, through RMPs, to conserve and restore the greater sage-grouse and habitat on BLM-administered lands on a range-wide basis over the long-term (Sage-grouse NTT 2011).

This Proposed RMP and Final EIS incorporates appropriate management actions and practices to conserve greater sage-grouse and its habitats on BLM-administered land.

National Greater Sage-Grouse Planning Strategy

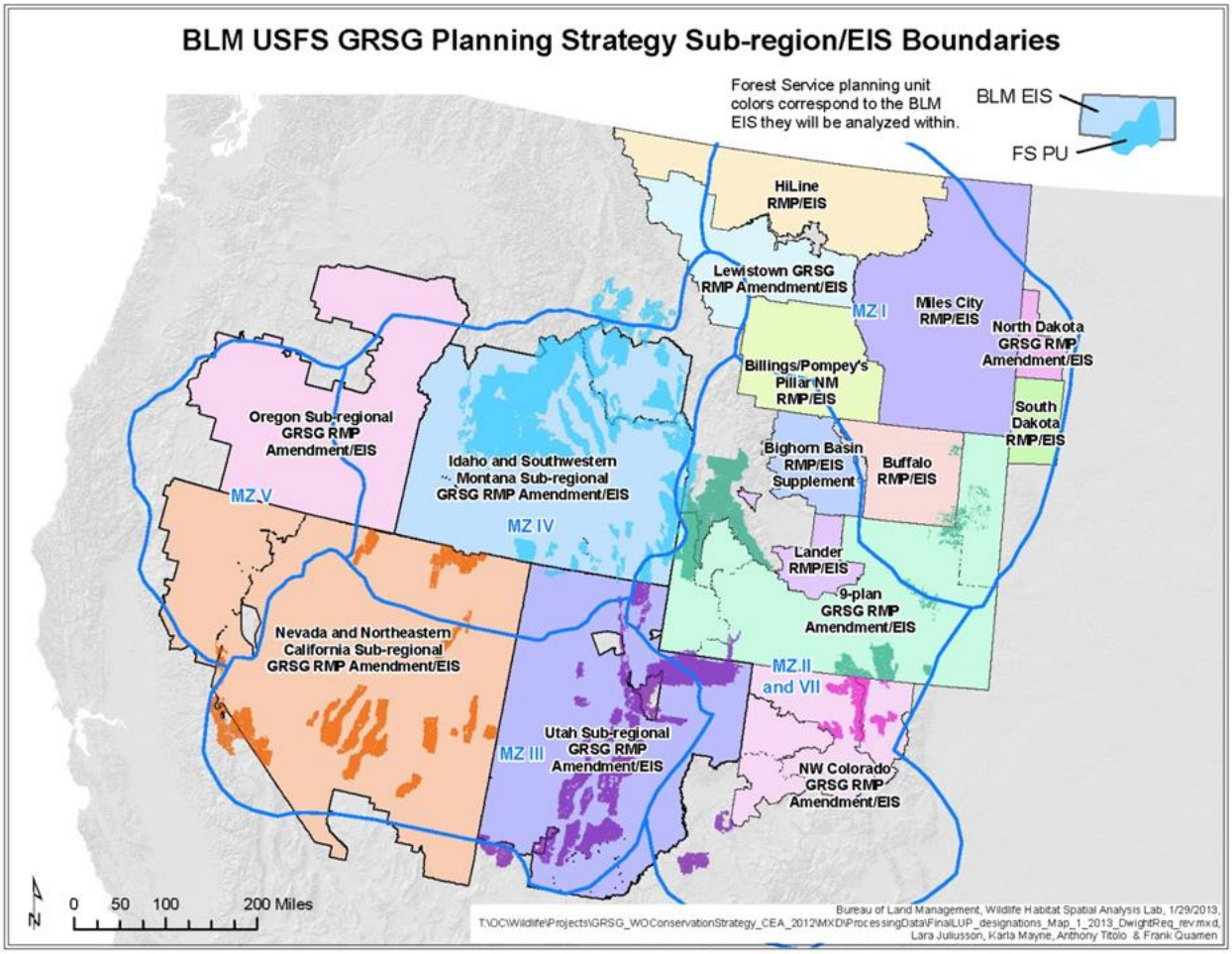
On December 9, 2011, the BLM published a Notice of Intent (NOI) in the *Federal Register* to initiate the BLM and U.S. Forest Service (USFS) greater sage-grouse Planning Strategy across 10 western states, including California, Oregon, Nevada, Idaho, Utah, and Southwest Montana in the Great Basin Region and Northwest Colorado, Wyoming, Montana, South Dakota, and North Dakota in the Rocky Mountain Region (see Figure 1-2). This Proposed RMP and Final EIS is one of 15 separate EISs that are currently analyzing specific conservation measures, in order to incorporate them across the range of the greater sage-grouse, consistent with National BLM and USFS policy.

On December 27, 2011, the BLM Washington Office IM No. 2012-044, which directed all of the planning efforts across the greater sage-grouse range to consider all applicable conservation measures when revising or amending its RMPs in greater sage-grouse habitat, including the measures developed by the National Technical Team that were presented in their December 2011 document – A Report on National Greater Sage-Grouse Conservation Measures. IM-2012-044 directs all planning efforts associated with

the national strategy to consider and analyze (as appropriate) the conservation measures presented in the report.

Along with the applicable measures that were outlined in the National Technical Team Report, planning efforts associated with this National Greater Sage-Grouse Planning Strategy will also analyze applicable conservation measures that were submitted to the BLM and USFS from various state governments and from citizens during the public scoping process.

Figure 1-2. BLM and USFS Greater Sage-Grouse Planning Strategy



Greater Sage-Grouse Conservation Objectives: Priority Areas for Conservation and How They Correlate with Priority and General Habitat Management Areas

In 2012, the Director of the USFWS asked the COT, consisting of state and USFWS representatives, to produce recommendations regarding the degree to which the threats need to be reduced or ameliorated to conserve greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The COT Report (USFWS 2013a) provides objectives based upon the best scientific and commercial data available at the time of its release. The BLM and USFS planning decisions analyzed in land use plans (LUPs)/EISs are intended to ameliorate threats identified in the COT Report and to reverse the trends in habitat condition. The COT Report can be viewed online at the following address:

> http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/COT/COT-Report-with-Dear-Interested-Reader-Letter.pdf

The highest level objective in the COT Report is identified as meeting the objectives of the Western Association of Fish and Wildlife Agencies' (WAFWA) 2006 Greater Sage-grouse Comprehensive Strategy of "reversing negative population trends and achieving a neutral or positive population trend."

The COT Report provides a WAFWA Management Zone and Population Risk Assessment. The report identifies localized threats from sagebrush elimination, fire, conifer encroachment, weed and annual grass invasion, mining, free-roaming wild horses and burros, urbanization, and widespread threats from energy development, infrastructure, grazing, and recreation (USFWS 2013a).

Key areas across the landscape that are considered "necessary to maintain redundant, representative, and resilient populations" are identified within the COT Report. The USFWS in concert with the respective state wildlife management agencies identified these key areas as Priority Areas for Conservation (PACs).

Within the Bighorn Basin RMP Revision Project Planning Area, the PACs consist of a total 1,787,109 acres, regardless of ownership. Under the Proposed RMP, the PACs are comprised of 1,117,290 acres of Priority Habitat Management Areas (PHMAs) managed by the BLM (Map 42 and Map 42a), 1,922,194 acres of General Habitat Management Areas managed by the BLM, and 148,330 acres of non-habitat managed by the BLM.

On November 21, 2014 the USGS published *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Manier et al. 2014). The USGS review provided a compilation and summary of published scientific studies that evaluate the influence of anthropogenic activities and infrastructure on greater sage-grouse populations. The BLM has reviewed this information and examined how lek buffer-distances were addressed through land use allocations and other management actions. The State of Wyoming's Core Area Strategy is designed to protect birds and habitat within core areas using a suite of tools and mechanisms that work in concert to conserve greater sage-grouse by reducing habitat loss and fragmentation through lek buffers, disturbance limits, excluded activities, and a sophisticated mapping utility to monitor the amount and density of disturbance. The USFWS has informed the BLM that the combined effect of these overlapping and reinforcing mechanisms give USFWS confidence that the lek buffer distances in the Core Area Strategy will be protective of breeding greater sage-grouse.

Habitat Delineation

The BLM has identified greater sage-grouse habitat in coordination with the State of Wyoming. This habitat falls into one of the following categories:

- Core Habitat Areas (Priority Habitat Management Areas) – The boundaries of the greater sage-grouse areas that were identified as having the highest conservation value to maintaining sustainable greater sage-grouse populations per version 3 of the State of Wyoming Executive Order (EO) Greater Sage-grouse Core Area of Protection (WY EO 2010-4) (Wyoming Office of the Governor 2010). These areas include breeding, late brood-rearing, and winter concentration areas, and correspond to Washington Office IM No. WO-2012-043 as Preliminary Priority Habitat.
- Key Habitat Areas – The boundaries of the greater sage-grouse areas that were identified as having the highest conservation value to maintaining sustainable greater sage-grouse populations per version 2 of the State of Wyoming EO Greater Sage-grouse Core Area of Protection (WY EO 2008-2) (Wyoming Office of the Governor 2008). These areas include breeding, late brood-rearing, and winter concentration areas, and correspond to Washington Office IM No. WO-2012-043 as Preliminary Priority Habitat. Key Habitat Areas were replaced by Core Habitat Areas, except under alternatives B and E which are based on version 2 of the State of Wyoming EO.
- Non-Core Sage Grouse Habitat – Areas of occupied seasonal or year-round habitat not located within Core Habitat. These areas correspond to Preliminary General Habitat as defined in Washington Office IM No. WO-2012-043.

The COT Report identified PACs based upon the data provided by State Fish and Game agencies. The State of Wyoming manages greater sage-grouse and greater sage-grouse habitats consistent with Governor's Executive Order 2011-05, *Greater Sage-Grouse Core Area Protection* (Core Area Strategy) (Wyoming Office of the Governor 2011), which establishes Core Areas.

In October 2014, the BLM updated the habitat category delineation. In the Proposed RMP and Final EIS greater sage-grouse habitat nomenclature has been changed from Core Areas to PHMA and Non-Core Sage Grouse Habitat to GHMA.

As noted above, alternatives B and E are based on Version 2 of the State of Wyoming EO Greater Sage-grouse Core Area of Protection (WY EO 2008-2) (Wyoming Office of the Governor 2008).

1.2.2 Purpose

An RMP is a land use plan that provides broad multiple-use direction for managing BLM-administered public lands. The FLPMA directs the BLM to develop such land use plans to provide for appropriate uses of public land. Decisions in land use plans guide future land management actions and subsequent site-specific implementation decisions. The RMP establishes goals and objectives (desired outcomes) for resource management and the measures necessary to achieve them. These measures are expressed as management actions and allowable uses (that is lands open or available for certain uses [including any applicable restrictions] and lands closed to certain uses).

The purpose of this RMP revision project is to ensure that public lands are managed according to the principles of multiple-use identified in FLPMA, while maintaining the valid existing rights and other obligations already established. The new RMPs will address changing needs of the Planning Area and create a management strategy that effectively responds to the planning issues within the framework of the planning criteria that best achieves a combination of the following:

- Employ a community-based planning approach to seek broadly supported solutions to issues, and collaborate with federal, state, and local cooperating agencies.
- Establish goals and objectives for managing resources and resource uses in the approximately 3.2 million surface acres and 4.2 million acres of federal mineral estate in the Planning Area administered by the BLM CYFO and WFO in accordance with the principles of multiple use and sustained yield.
- Identify land use plan decisions to guide future land management actions and subsequent site-specific implementation decisions.
- Identify management actions and allowable uses anticipated to achieve the established goals and objectives and reach desired outcomes.
- To provide comprehensive management direction, make land use decisions for all appropriate resources and resource uses the BLM administers in the Planning Area or update existing decisions.
- Provide for compliance with applicable tribal, federal, and state laws, standards, and implementation plans, and BLM policies and regulations.
- Recognize the nation's need for domestic sources of minerals, food, timber, and fiber, and incorporate requirements of the Energy Policy Act of 2005 (Public Law 109-58).
- Retain flexibility to adapt to new and emerging issues and opportunities and to provide for adjustments to decisions over time based on new information and monitoring.
- Strive to be compatible with the plans and policies of adjacent local, state, tribal, and federal agencies and consistent with federal laws, regulations, and BLM policies; and be flexible enough to adapt to future BLM policy and guidance updates.

1.3 Planning Process

The planning process is the result of the FLPMA requirement to manage lands under comprehensive plans and the National Environmental Policy Act (NEPA) requirement to analyze alternatives in an EIS and evaluate and disclose impacts for all major federal actions with the potential to result in significant impacts. Revising an existing plan is a major BLM federal action with the potential to result in significant impacts. Therefore, this EIS analyzes six alternatives, including the NEPA-required No Action Alternative.

1.3.1 Bureau of Land Management Planning Process

Figure 1-3 illustrates the planning process BLM uses to develop and revise RMPs, as required by CFR Title 43, Part 1600 and planning program guidance in BLM Handbook H-1601-1, Land Use Planning Handbook (BLM 2005b). The planning process is designed to help the BLM identify the uses of BLM-administered lands the public desires and to consider these uses to the extent they would be consistent with Congressional laws and Executive Branch policies.

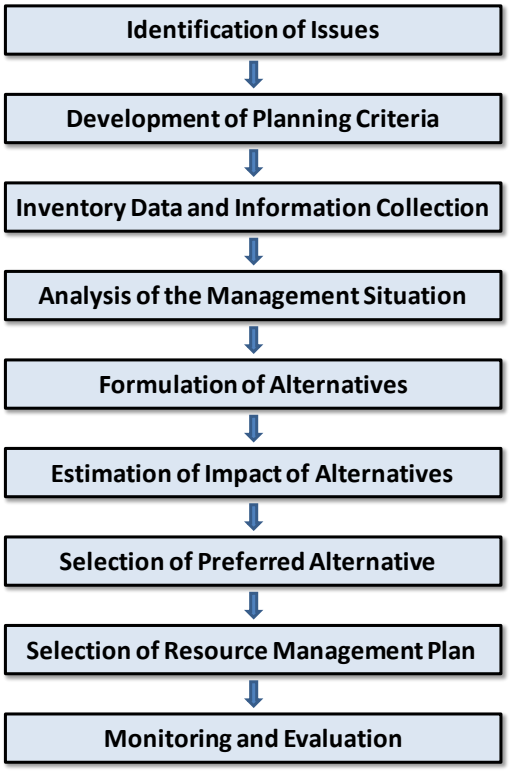
As shown in Figure 1-3, the planning process is issue driven. The BLM utilized the public scoping process (Identification of Issues) to identify planning issues to drive the revision of the existing plans (BLM 2005b). The BLM also used the scoping process to introduce the public to preliminary planning criteria (Development of Planning Criteria), which set limits to the scope of the Bighorn Basin RMP Revision Project.

As appropriate, the BLM collected data to address planning issues and to fill data gaps identified during public scoping (Inventory Data and Information Collection). Using these data, the planning issues, and the planning criteria, the BLM prepared a summary of the Analysis of the Management Situation to describe current management and identify management opportunities to address the planning issues. Current management reflects management under existing plans and management that would continue if the BLM selected the No Action Alternative.

Results of the first steps of the planning process clarified the purpose and need and identified key planning issues the Bighorn Basin RMP Revision Project needs to address. Key planning issues reflect the focus of the Bighorn Basin RMP Revision Project; the Planning Issues section of this chapter describes key planning issues in more detail.

During alternatives formulation, the BLM collaborated with cooperating agencies to identify goals and objectives (desired outcomes) for resources and resource uses in the Planning Area (Formulation of Alternatives). Constrained by the planning criteria, these desired outcomes addressed the key planning issues and incorporated the management opportunities the BLM identified.

Figure 1-3. BLM Planning Process



Source: 43 Code of Federal Regulations 1610.4

The BLM filled in the details of alternatives through the development of management actions and allowable uses anticipated to achieve the desired outcomes. The alternatives represent a reasonable range for managing resources and resource uses in the Planning Area. Chapter 2 of the Proposed RMP and Final EIS describes and summarizes the six alternatives (A, B, C, D, E, and F).

Chapter 4 (Environmental Consequences) includes an analysis of the impacts of each alternative. With input from cooperating agencies and BLM specialists, and considering planning issues, planning criteria, public input, and the impacts of alternatives A through F, the BLM selected Alternative D as the Agency Preferred Alternative (Selection of Preferred Alternative), and published the plan in the Draft RMP and Draft EIS.

A Notice of Availability (NOA) for the Bighorn Basin Draft RMP and Draft EIS was published in the *Federal Register* on April 22, 2011 (76 FR 22721, April 22, 2011). Public comments were solicited for consideration by the BLM review team. Following the closure of the comment period, the BLM published a Notice of Intent (NOI) to begin preparation of EISs and Supplemental EISs to Incorporate Greater Sage-grouse Conservation Measures into Land Use Plans and Land Management Plans

(76 FR 77008, December 9, 2011) in accordance with the BLM National Greater Sage-grouse Planning Strategy Charter released in August 2011 (BLM 2011b). Nominations for greater sage-grouse-related Areas of Critical Environmental Concern (ACEC) were submitted by members of the public in response to the NOI. The BLM reviewed these nominations and found importance and relevance criteria to be met, warranting consideration in the Bighorn Basin RMP Revision Project. Although these ACEC nominations were submitted in response to the December 2011 NOI, ACEC nominations can be submitted by any individual or organization inside or outside of the BLM at any time during the development of a land use plan.

In July 2012, the BLM Rocky Mountain Regional Interdisciplinary Team identified the need to prepare a Supplement to the Bighorn Basin Draft RMP and Draft EIS to consider incorporation of proposed management actions in greater sage-grouse priority habitats and to thoroughly consider the conservation measures identified in the Greater Sage-grouse National Technical Team (NTT) Report on National Greater Sage-Grouse Conservation Measures (Sage-grouse NTT 2011), as referenced in BLM IM 2012-044. These issues were subsequently addressed through the analysis of two additional alternatives (E and F) in the Supplement to the Bighorn Basin Draft RMP and Draft EIS. Alternatives E and F each propose the designation of a greater sage-grouse-related ACEC that simultaneously responds to the needs to consider ACEC nominations submitted by the public and incorporate conservation measures identified in the NTT report. The analysis of alternatives E and F were integrated into this Proposed RMP and Final EIS following receipt and consideration of public comments on the Supplement.

Chapter 5 of this Final EIS describes the public involvement, consultation, and coordination efforts undertaken by the BLM throughout preparation of the Bighorn Basin RMP revision, including public meetings and comment periods on the Draft RMP and Draft EIS and Supplement. The BLM considered all substantive comments received and revised the plan based on certain issues raised in the comments, as presented in this Proposed RMP and Final EIS. The BLM prepared a Comment Analysis Report that summarizes all substantive comments received during the comment periods and the BLM's responses to those comments, including how the RMP and EIS was revised based on the comments. The Comment Analysis Report is presented in Appendix A.

Following review of the public comments on the Draft RMP and Draft EIS and comments on the Supplement to the Draft RMP and Draft EIS, the BLM identified the Proposed RMP. Alternative D is the Proposed RMP and is analyzed in Chapter 4 of this Final EIS.

The publication of the NOA in the *Federal Register* for this Proposed RMP and Final EIS initiated a 30-day protest period and 60-day Governor's consistency review period. The BLM will resolve protests and the Governor's recommended changes and prepare an Approved RMP and ROD for each field office.

Monitoring and evaluation will occur when the selected RMP is being implemented (Monitoring and Evaluation). After the BLM selects the RMP and each affected field office issues a ROD, the BLM will implement the decisions in the RMP and monitor and evaluate RMP decisions, how they have been implemented, and whether they accomplish the desired outcomes identified in the RMP. On a 5-year cycle, the BLM will report the results of monitoring and evaluation to the public. These cyclical evaluations will ensure accountability for implementing RMP decisions and will enable the BLM to propose amendments or revisions to RMP decisions that might be necessary or desirable. Appendix C provides an overview of the Bighorn Basin monitoring and evaluation protocol. The BLM Wyoming State Office (WYSO), in cooperation with the State of Wyoming and the USFWS, has developed a statewide Greater Sage-Grouse adaptive management strategy and monitoring framework (Appendix Y). Refer to Appendix Y for additional details of the Greater Sage-Grouse Monitoring Framework.

1.3.2 Resource Management Plan Implementation

After each field office issues a ROD and Approved RMP, the BLM will develop an Implementation Strategy, which will include an annual coordination meeting between the BLM and the agencies cooperating in the Bighorn Basin RMP Revision Project (Appendix D). The annual coordination meeting will include an update on implementation of the plan, foreseeable activities for the upcoming year, and opportunities for continued collaboration with the RMP cooperating agencies. The BLM could schedule additional coordination meetings as needed. The Implementation Strategy will tie RMP decisions to BLM budget requests, and provide a mechanism through which the BLM can track, fund, and accomplish management actions (Appendix D).

Planning and decision-making for BLM administration of public lands is a tiered, ongoing process. Documents produced during each successive tier are progressively more focused in scope and more detailed in terms of identifying specific measures to be undertaken and their potential impacts. The RMP, the first tier in the process, provides an overall vision of the goals and objectives and includes measurable steps, anticipated management actions, and allowable uses to achieve that vision. Upon RMP approval, the BLM develops activity- or project-level plans to implement RMP decisions. If the BLM develops an activity-level plan, it usually describes multiple projects for a single resource program (such as a habitat management plan) or multiple projects for multiple resource programs. If the BLM develops a project-specific plan, it usually describes a single project or several related projects.

In general, the BLM prepares a planning-level EIS at the RMP tier and prepares a more detailed EIS or Environmental Assessment at the implementation tier. Activity-level or project-level plans reflect management direction and the broad goals and objectives in the Approved RMP. In most cases, activity-level and project-level plans include additional public review and environmental compliance. This Proposed RMP and Final EIS involves only the RMP tier; therefore, it does not further consider activity-level and project-level plans.

The RMP provides basic program direction and establishes goals, objectives, and allowable uses. It focuses on the resource conditions, uses, and visitor experiences the BLM should achieve and maintain over time. The RMP provides a framework for implementation-level decisions for as long as its decisions remain effective, and must take a long-term view that considers the protracted periods associated with natural processes, which can be years, decades, or longer.

1.4 Decision Framework

Identifying planning issues and developing planning criteria are the first steps in narrowing the scope of the RMP revision. Planning issues and planning criteria provide the framework within which the BLM makes RMP decisions (actions determined and established in the Approved RMP). For example, the BLM received nominations (issues) for Areas of Critical Environmental Concern (ACECs) during the scoping process for the Bighorn Basin RMP Revision Project. These issues fall within one of the planning criteria (see Section 1.4.2), the need to identify and analyze areas potentially suitable for ACEC designation. The Bighorn Basin RMP Revision Project will decide whether the BLM will designate any ACECs in the Planning Area. In this example, the land use planning decision is referred to as a special designation.

BLM RMPs provide guidance for land use planning decisions according to the following categories: physical, biological, and heritage resources; resource uses; and special designations. In the context of these categories, the planning team develops management strategies designed to provide viable options for addressing planning issues. Management strategies provide the building blocks upon which the BLM

develops general management scenarios and, eventually, the more detailed resource management alternatives. Resource management alternatives reflect a reasonable range of management options that fall within planning criteria, law, and BLM policy limits. The following sections describe the planning issues and planning criteria the BLM used to revise the existing plans.

1.4.1 Planning Issues

The BLM conducted a public scoping process to determine the scope of issues to be addressed in this RMP and EIS. Scoping is a public involvement process to identify issues to address during the planning process. As part of this public involvement process, the BLM solicited comments and issues (including during six public scoping meetings [see Chapter 5]) from the public, organizations, tribal governments, and federal, state, and local agencies, as well as from BLM specialists. The BLM received 3,367 comment documents, including 291 unique documents and 3,076 form letters. The BLM *Land Use Planning Handbook* (BLM 2005b) defines planning issues as "…disputes or controversies about existing and potential land and resource allocations, levels of resource use, production, and related management practices." Issues identified during scoping for this RMP and EIS comprise two categories:

- Issues within the scope of the EIS and used to develop alternatives or otherwise addressed in the EIS.
- Issues outside the scope of the EIS or that could require policy, regulatory, or administrative actions.

The BLM used issues determined to be within the scope of the EIS to develop one or more of the alternatives or addressed those issues in other parts of the EIS. For example, as it refined planning issues, the BLM collaborated with cooperating agencies to develop a reasonable range of alternatives designed to address or resolve key planning issues, such as which areas should be open to energy and mineral resource development. A reasonable range of alternatives provides various management approaches for the BLM and cooperating agencies to address this and other key planning issues, including management of resources and resource uses in the Planning Area. In other words, key planning issues serve as the rationale for alternatives development. The comment documents provided 1,060 substantive comments that were categorized into the key planning issues the BLM used to develop the alternatives analyzed in this RMP and EIS follow.

Key Planning Issues

Climate Change	How can the BLM incorporate climate change adaptation and/or responses into its land management practices?
Watershed and Air Quality Management	How can the BLM manage the use of public lands while protecting watershed and air quality?
Energy and Minerals Management	Which areas should be open to mineral and energy development, and how should the BLM manage such development while protecting human health and natural and cultural resources?
Fire and Fuels Management	How can the BLM manage fire and fuels to protect public safety and natural and cultural resources?

Invasive and/or Noxious Species	How can the BLM manage the spread of and mitigate impacts associated with invasive species and/or noxious weeds?
Fish, Wildlife, and Special Status Species	How can the BLM manage public land use while maintaining and improving terrestrial and aquatic habitats?
Wild Horses	How can the BLM manage wild horses on public lands while also protecting natural and cultural resources?
Cultural and Paleontological Resources	How can the BLM manage paleontological, cultural, and traditional resources to provide both resource protection and opportunities for public education and study?
Visual Resources	How can the BLM manage public lands for visual qualities?
Lands and Realty	What land tenure and management adjustments are needed to meet access and development needs while also protecting natural and cultural resources?
Comprehensive Travel and Transportation Management, and OHVs	How can the BLM manage travel on public lands?
Lands with Wilderness Characteristics	Should the BLM manage to protect lands with wilderness characteristics? If so, where and how?
Recreation and Visitor Use	How can the BLM provide recreational opportunities on public lands while protecting public safety, and natural and cultural resources?
Livestock Grazing	How can the BLM manage livestock use on public lands while also protecting natural and cultural resources?
Special Designation Management	How can the BLM manage areas that contain unique or sensitive resources?
Socioeconomic Resources	How can the BLM manage public land use with the preservation of local tradition and local economies that rely upon BLM-administered land?

In addition to key planning issues, the BLM identified other issues, themes, and positions during the scoping process. The BLM did not use issues determined to be outside the scope of the EIS or that could require policy, regulatory, or administrative actions to address, to develop alternatives and did not carry such issues forward in this EIS.

The list below summarizes suggestions from the public that the BLM considered but did not carry forward for detailed study in the EIS because they were outside the scope of the Bighorn Basin RMP Revision Project, already required by law or policy, or would require the BLM to exceed its authority.

- Analyze impacts from specific actions or activities that will occur or be addressed during subsequent RMP implementation decisions. See Appendix D for the basic elements of implementing the RMP.

- Adopt or otherwise ensure the revised RMPs are compatible with specific regulations, policies, mandates, guidance, or plans, or integrate one or more of these items into the planning process.
- Change the BLM's planning or public involvement processes.
- Address issues that are outside of the agency's jurisdiction or manage resources outside of the Planning Area.
- Conduct site-specific analyses, inventories, or surveys.
- Vague comments in which the issue or concern was not clear.

For a description of the issues identified during scoping, see the Bighorn Basin RMP Revision Project Scoping Report (BLM 2009f). The scoping report describes the public involvement process and the issues the public identified. The report, which is incorporated here by reference, is available on the Bighorn Basin RMP Revision Project website at the following address: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn/docs.html.

1.4.2 Planning Criteria

Planning criteria are the standards, rules, and guidelines that help guide the RMP planning process. These criteria influence all aspects of the planning process, including inventory and data collection, developing issues to address, formulating alternatives, estimating impacts, and selecting the Agency Preferred Alternative and the Proposed RMP. In conjunction with planning issues, planning criteria ensure that the planning process is focused and incorporates appropriate analyses. The BLM develops planning criteria from appropriate laws, regulations, and policies. The criteria also help guide final RMP selection, and the BLM uses the criteria as a basis for evaluating the responsiveness of planning options.

The planning criteria for the Bighorn Basin RMP Revision Project are as follows:

1. The revised RMPs will recognize valid existing rights.
2. Decisions in the revised RMPs will comply with all applicable laws and regulations. Decisions will comply, as appropriate, with policy and guidance.
3. Impacts from the management alternatives considered in the revised RMPs will be analyzed in an EIS developed in accordance with regulations at 43 CFR 1610 and 40 CFR 1500.
4. The planning process will follow the stages of an EIS-level planning process – conduct scoping, develop an AMS report, formulate alternatives, analyze the alternatives' potential effects, select an agency preferred alternative, publish a Draft RMP and EIS, provide a 90-day public comment period for the draft, prepare and publish a Proposed Plan and Final EIS, provide a 30-day public protest period, and prepare an ROD. For specific information, see the *Land Use Planning Handbook*, H-1601-1.
5. Lands covered in the revised RMPs will be public land and split-estates the BLM administers. The BLM will make no decisions about lands or minerals that are not BLM administered.
6. BLM decisions will not apply to private land with private mineral estate.
7. The impact analysis will include all lands that could affect or be affected by BLM management of public lands in the Planning Area.
8. For program-specific guidance regarding land use planning-level decisions, the process will follow *Land Use Planning Manual* 1601 and *Handbook* H-1601-1, Appendix C.

9. The Bighorn Basin RMP Revision Project planning effort will be collaborative and multi-jurisdictional. The BLM will strive to ensure that its management decisions complement its planning jurisdictions and adjoining properties within the boundaries prescribed by law and regulation.
10. Broad-based public participation will be an integral part of the RMP revision and EIS process.
11. Decisions in the RMP will strive to be compatible with existing plans and policies of adjacent local, state, federal, and tribal agencies as long as the decisions are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands.
12. The planning team will work cooperatively and collaboratively with cooperating agencies and all other interested groups, agencies, and individuals.
13. The BLM and cooperating agencies will jointly develop alternatives for resolution of resource management issues and management concerns.
14. The planning process will use the Wyoming BLM Mitigation Guidelines to develop management options and alternatives and analyze their impacts, and as part of the planning criteria for developing the options and alternatives and for determining mitigation requirements.
15. Planning and management direction will focus on the relative values of resources, not on the combination of uses that would give the greatest economic return or economic output.
16. All proposed management actions will be based on current scientific information, research and technology, and existing inventory and monitoring information.
17. Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the Bureau of Land Management in the State of Wyoming will apply to all activities and uses.
18. The BLM will provide for public safety and welfare related to fire, hazardous materials, and abandoned mine lands.
19. The BLM will analyze and modify visual resource management (VRM) class designations to reflect present conditions and future needs.
20. The BLM will consider current and potential future uses of public lands through the development of reasonably foreseeable future development and activity scenarios based on technical analysis of historical, existing, and projected levels of use.
21. The BLM will develop reasonable foreseeable action scenarios for all land and resource uses (including minerals) and portray them based on historical, existing, and projected levels for all programs. The BLM will consider existing endangered species recovery plans, including plans for reintroduction of endangered and other species.
22. The planning process will involve Native American tribal governments and will provide strategies for the protection of recognized traditional uses.
23. Planning decisions will comply with the ESA and BLM interagency agreements with the USFWS.
24. The BLM will continue implementing The National Sage-grouse Habitat Conservation Strategy that requires impacts to sagebrush habitat and sagebrush-dependent wildlife species be analyzed and considered in BLM land use planning efforts for public lands with sagebrush habitat in the Planning Area.
25. The BLM applied the relevance and importance criteria for ACEC designation (BLM1988b) to BLM-administered public lands in the Planning Area to identify areas that have the potential for ACEC designation. An ACEC designation alone does not change the allowed uses of public lands involved (FLPMA Section 201(a) and 43 CFR 1601.0-5a). In addition, protective measures for

ACECs are not applied or required simply because of the designation. Any protective measures applied to ACECs are based on what is necessary to protect the relevance and importance criteria for which the ACEC was designated. The only automatic requirement associated with an ACEC designation is that a plan of operations must be submitted for any mining claim development in the area (43 CFR 3809.11(c)(3)).

26. During the preparation of the AMS for the Planning Area, the BLM evaluated free-flowing streams using the criteria established by the Wild and Scenic Rivers Act of 1968 to determine their eligibility and suitability for inclusion in the National Wild and Scenic Rivers System (NWSRS). The BLM developed interim management prescriptions for stream segments passing through public lands deemed Wild and Scenic River eligible. To provide a clear basis for comparisons, the No Action Alternative will not consider or include any of the stream segments evaluated in association with preparing the AMS for the RMP revisions.
27. Off-highway vehicle (OHV) use management decisions in the revised RMPs will be consistent with the BLM 2001 National OHV Strategy, BLM Manual 1626 (BLM 2011c), BLM Handbook H-8342-1, 43 CFR 8340, and IM 2008-014. OHV area designations will be "limited" unless otherwise classified as "open" or "closed" to meet land use plan objectives.
28. The BLM will continue to manage Wilderness Study Areas (WSAs) under BLM Manual 6330 – Management of Wilderness Study Areas (BLM 2012a) until Congress either designates all or portions of the WSA as wilderness or releases the lands from further wilderness consideration. It is no longer BLM policy to designate additional WSAs through the RMP process, or to manage any lands other than existing WSAs in accordance with the non-impairment standard prescribed in BLM Manual 6330.
29. Forest management strategies will be consistent with the Healthy Forests Restoration Act.
30. Fire management strategies will be consistent with the *Guidance for Implementation of the Federal Wildland Fire Policy* (USFS et al. 2009).
31. Geographic Information Systems (GIS) and metadata information will meet Federal Geographic Data Committee standards, as required by Executive Order 12906 Coordinating Geographic Data Access, as amended. The BLM will comply with all other applicable BLM data standards.
32. In accordance with the principles of multiple use and sustained yield, this RMP will provide for monitoring and evaluation of RMP decisions over time. To the extent that Adaptive (http://www.doi.gov/initiatives/AdaptiveManagement/index.html) Management, as defined by DOI or BLM guidance, applies, the BLM will apply and assess Adaptive Management in activity-level and project-level plans. This RMP is not a standalone Adaptive Management project.
33. The BLM will utilize the COT Report (USFWS 2013a), the WAFWA Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et al. 2004), and any other appropriate resources, to identify greater sage-grouse habitat requirements and best management practices.
34. While energy development has been identified as the primary threat to the greater sage-grouse within its eastern range, this area is not immune to the threat of wildfire. Within the Rocky Mountain Region wildfire was identified by the COT Final Report (USFWS 2013a) as a present and widespread threat in 7 of 13 PACs and as a present but localized threat in the remaining PACs. While fire is a naturally occurring disturbance in the sagebrush steppe and the incursion of nonnative annual grasses is facilitating an increase in mean fire frequency which can preclude the opportunity for sagebrush to become re-established. As such, the RMP and EIS includes requirements that landscape scale Fire and Invasives Assessments be completed and updated regularly to more accurately define specific areas to be treated to address threats to sagebrush steppe habitat. Within the Rocky Mountain Region, assessments have not yet been completed

but will be scheduled based on the need to identify and address potential threats. Additionally, the Secretary of the Interior issued Secretarial Order 3336 on January 5, 2015 which establishes the protection, conservation and restoration of "the health of the sagebrush-steppe ecosystem and, in particular, greater sage-grouse habitat, while maintaining safe and efficient operations as a critical fire management priority for the Department". The Secretarial Order will result in a final report of activities to be implemented prior to the 2016 western fire season. This will include prioritization and allocation of fire resources and the integration of emerging science, enhancing existing tools to implement the RMP and improve BLM's ability to protect sagebrush-steppe from damaging wildfires.

1.4.3 Major Statutes, Limitations, and Guidelines

Numerous federal and state laws and applicable regulations, policies, and actions affect the alternatives analyzed in this Proposed RMP and Final EIS. The FLPMA is the primary authority for BLM administration of public lands. This law provides the overarching policy by which the BLM administers public lands. The law establishes provisions for land use planning, land acquisition, administration, range management, ROW, designated management areas, and the repeal of certain laws and statutes. The FLPMA also requires that the BLM provide food and habitat for fish, wildlife, and domestic species. FLPMA Sections 201 and 202 establish BLM land use planning requirements. BLM Handbook H-1601-1, *Land Use Planning Handbook* (BLM 2005b), provides guidance for implementing BLM land use planning requirements established in FLPMA Sections 201 and 202 and the land use planning regulations pursuant to 43 CFR 1600.

NEPA stipulates the process through which public officials make decisions that consider the environmental consequences of their actions and work to protect, restore, and enhance the human environment. NEPA provides for public input regarding issue identification and consideration of the environmental impacts of major federal actions that affect the quality of the human environment. Revising an existing RMP is a major federal action for the BLM. NEPA requires federal agencies to prepare an EIS for major federal actions; therefore, this Final EIS accompanies the revisions of the existing plans.

NEPA also created the CEQ, which issued regulations (40 CFR 1500-1508) to ensure proper consideration of environmental concerns in federal decision-making. The DOI and the BLM have published their own regulations (43 CFR Part 46) and guidance related to implementation of the NEPA process and CEQ regulations (DOI Manual Part 516 and Handbook H-1790-1).

Many additional laws, regulations, and policies guide the management of public lands and are therefore relevant to the Bighorn Basin RMP Revision Project. Appendix B provides a list of these laws, regulations, and policies.

1.4.4 Other Related Plans

BLM planning policies require that the BLM review approved or adopted resource plans of other federal, state, local, and tribal governments and, when practicable, be consistent with those plans, to the extent their decisions are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. If the other agencies, tribes, and/or governments do not have officially approved or adopted resource-related plans, then the land use plan must, to the maximum extent practicable, be consistent with their officially approved and adopted resource-related policies and programs. Table 1-3 lists plans related to the management of land and resources that apply to this RMP.

Table 1-3. Related Plans

Plan Type	Plan Name
County Land Use Plans	Big Horn County Land Use Plan (Big Horn County 2009)
	Hot Springs County Land Use Plan (Hot Springs County 2002)
	Park County Land Use Plan (Park County 1998)
	Washakie County Comprehensive Plan (Washakie County 2012)
Conservation District Plans	Cody Conservation District Long Range Plan (Cody Conservation District 2007)
	Hot Springs Conservation District Long Range Plan (Hot Springs Conservation District 2006)
	Meeteetse Conservation District Land Use Management and Resource Conservation Plan (Meeteetse Conservation District 2011)
	Powell-Clarks Fork Conservation District Long Range Plan (Powell-Clarks Fork Conservation District 2006)
	Shoshone Conservation District Long Range Plan (Shoshone Conservation District 2005)
	South Big Horn Conservation District Natural Resource and Land Use Long Range Plan (South Big Horn Conservation District 2012)
	Washakie County Conservation District Natural Resource Land Use Plan (Washakie County Conservation District 2010)
Other Plans	Big Horn County Mountain Community Wildfire Protection Plan (Big Horn County 2005)
	Big Horn River Watershed Management Plan (Washakie County Conservation District 2006)
	Bighorn National Forest Revised Land and Resource Management Plan (USFS 2005a)
	Bitter Creek Watershed Plan (Powell-Clarks Fork Conservation District 2004)
	National Fire Plan (USDA and DOI 2000)
	Sage-Grouse Conservation Plan for the Big Horn Basin, Wyoming (BHBLWG 2007)
	Final Environmental Impact Statement for the Shoshone National Forest Land and Resource Management Plan (USFS 1986)
	Shoshone River Watershed Draft Plan (Shoshone River Watershed Plan Steering Committee 2008)
	South Big Horn County, Wyoming Watershed Plan (South Big Horn Conservation District 2006)
	U.S. Environmental Protection Agency Region 8 Wyoming State Implementation Plans (EPA 1989; EPA 1993; EPA 1999; EPA 2007)
	U.S. Fish and Wildlife Service Mountain Prairie Region Strategic Plan – Wyoming (USFWS 2009)
	Wyoming Department of Agriculture Strategic Plan (WDA 2008)
	Wyoming Game and Fish Commission Final Wyoming Gray Wolf Management Plan (Wyoming Game and Fish Commission 2011)
	Wyoming Greater Sage-Grouse Conservation Plan (Wyoming Sage-grouse Working Group 2003)
	Wyoming Greater Sage-Grouse Core Area Protection Strategy (Wyoming Office of the Governor 2011 and 2013)
	Wyoming State Wildlife Action Plan (WGFD 2010a)
	Wyoming Strategic Habitat Plan (WGFD 2009a)
	Wyoming's Comprehensive Statewide Historic Preservation Plan, 2007-2015 (Wyoming SHPO 2007)
	Wind/Bighorn River Basin Plan Final Report (Wyoming Water Development Commission 2010)
	Wyoming Statewide Comprehensive Outdoor Recreation Plan 2009-2013 (Wyoming Department of State Parks and Cultural Resources 2009)
	Wyoming Statewide Trails Plan 2004 (Wyoming Department of State Parks and Cultural Resources – Trails Program 2004)
	Yellowstone National Park Fire Management Plan (NPS 2004)

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with officially-approved state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where officially-approved state and local plans or policies and programs conflict with the purposes, policies, and programs of federal law applicable to public lands, there will be an inconsistency that cannot be resolved. With respect to officially-approved state and local policies and programs (as opposed to plans), this consistency provision only applies to the maximum extent practical. While county and federal planning processes, under FLPMA, are required to as integrated and consistent as practical, the federal agency planning process is not bound by or subject to state or county plans, planning processes, policies, or planning stipulations.

1.5 Topics Not Addressed in this Analysis

Laws, regulations, policies, and Executive Orders require the examination of specific resource topics during the NEPA process. In some cases, initial evaluation identifies topics not relevant to the Planning Area or that do not require further analysis.

The initial evaluation for the Bighorn Basin RMP Revision Project identified prime and unique farmlands as a topic that does not need further analysis. In accordance with the Farmland Protection Policy Act, the BLM determined that no prime or unique farmlands or farmland of statewide or local importance occur on public lands in the Planning Area. Furthermore, none of the actions proposed would disturb farmlands. Therefore, the Bighorn Basin RMP Revision Project planning process does not analyze impacts to prime and unique farmlands.

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CHAPTER 2 – RESOURCE MANAGEMENT ALTERNATIVES

This chapter presents six alternative resource management plans (RMPs) (A, B, C, D, E, and F) for management of the Bighorn Basin Planning Area. Alternative A, the No Action Alternative, represents the continuation of current management direction. Alternatives E and C represent the "bookends" or the range of action alternatives. The Bureau of Land Management (BLM) identified Alternative D as its Agency Preferred Alternative in the Draft RMP and Draft Environmental Impact Statement (EIS). Based on comments received during the public comment period on the Draft RMP and Draft EIS, the BLM revised the Agency Preferred Alternative. As modified, Alternative D is now presented as the Proposed RMP in the Final EIS. Alternative E is the same as Alternative B outside of greater sage-grouse Key Habitat Areas. Within greater sage-grouse Key Habitat Areas, Alternative E includes additional management actions and designates the area as an Area of Environmental Concern (ACEC). Similarly, Alternative F is the same as Alternative D outside of greater sage-grouse Priority Habitat Management Areas (PHMAs). Within greater sage-grouse PHMAs, Alternative F includes additional management actions and designates these areas as an ACEC. Each alternative has a different emphasis for managing public lands and resources in the Planning Area, and represents a complete and reasonable land use plan that meets the purpose and need described in Chapter 1.

2.1 Alternatives Development Process

To comply with National Environmental Policy Act (NEPA) requirements in the development of alternatives for this RMP and Environmental Impact Statement (EIS), the BLM sought public input and analyzed a reasonable range of alternatives, including the No Action Alternative (Alternative A). Alternative formulation considered existing land use plan decisions and issues and concerns developed internally and solicited from the public during the scoping process. Broadly, the BLM followed six steps to develop alternatives:

Step 1. Receive public input (scoping).

Step 2. Identify current management (Alternative A, No Action Alternative).

Step 3. Develop the range of alternatives (Alternatives B and C).

Step 4. Analyze the effects of the alternatives (Alternatives A, B, and C).

Step 5. Develop the Agency Preferred Alternative (Alternative D).

Step 6. Develop additional alternatives in response to the identified need for a Supplement to the Draft RMP and Draft EIS (Alternatives E and F).

2.1.1 Step 1 – Receive Public Input

The BLM collected and considered public input during the scoping process to develop the alternatives and their management actions. The BLM considers public input throughout the alternatives development process. Chapter 1 and the project Scoping Report (available on the RMP Revision website at http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html) summarize the results of the public scoping process and opportunities for future public involvement.

2.1.2 Step 2 – Identify Current Management

The Cody RMP (BLM 1990), Washakie RMP (BLM 1988a), and Grass Creek RMP (BLM 1998a) (the existing land use plans) are the basis for the No Action Alternative (Alternative A), or current management direction. The BLM Interdisciplinary (ID) Team brought the management decisions from these three plans into one combined table (see Section 2.7 *Detailed Descriptions of Alternatives by Resource*) as Alternative A – Current Management. Alternative A, in conjunction with the planning criteria and the key issues identified during the scoping process, then set the stage for developing the range of alternatives.

2.1.3 Step 3 – Develop the Range of Alternatives

The BLM conducted a series of six alternatives development workshops with an ID Team (BLM and cooperating agency personnel). During the initial workshop, the ID Team shared their knowledge and expertise and collaborated to identify goals and objectives (desired outcomes) for each resource. Each subsequent workshop refined management actions in each alternative and narrowed the scope of alternatives to a reasonable range limited by the planning criteria (see Chapter 1, Planning Criteria). Table 2-1 lists the dates and locations of each workshop. Before each workshop, the BLM specialists prepared preliminary draft alternatives for each resource to be discussed during the upcoming workshop. These preliminary draft alternatives served as the starting point for alternative formulation and the basis for ID Team discussions during the workshops.

Table 2-1. Alternatives Development Workshops

Workshop Number	Dates	Location	Focus
1	March 25 – 27, 2009	Cody, Wyoming	Goals and Objectives
2	April 29 – May 1, 2009	Worland, Wyoming	Range of Alternatives
3	May 27 – 29, 2009	Worland, Wyoming	Range of Alternatives
4	June 24 – 26, 2009	Cody, Wyoming	Range of Alternatives
5	July 29 – 31, 2009	Thermopolis, Wyoming	Range of Alternatives
6	February 17 – 19, 2010	Cody, Wyoming	Agency Preferred Alternative

The ID Team formulated the range of alternatives (alternatives B and C), which was subsequently augmented through the development of the Supplement to the Draft RMP and Draft EIS (alternatives E and F) as discussed in Section 2.1.6, to meet the purpose and need of this RMP and EIS using different approaches to resource use. Broadly put, the alternatives represent the opposite ends of a continuum of resource use from the least (alternatives B and E) to the most (Alternative C). The BLM considered, but did not carry forward for detailed analysis, alternatives that did not meet the planning criteria or the purpose and need (see Chapter 1).

2.1.4 Step 4 – Analyze the Effects of the Alternatives

The fourth step in the process is to analyze the effects of the range of alternatives. This task involved analyzing the impacts of one set of resource management actions on other resources and resource uses. The BLM compiled these data into Chapter 4 and considered them in step five.

2.1.5 Step 5 – Develop the Agency Preferred Alternative

The BLM developed Alternative D, the Agency Preferred Alternative, by considering the impacts analysis (Chapter 4) for alternatives A through C; knowledge of specific issues raised throughout the planning process; planning criteria; and recommendations from cooperating agencies, BLM specialists, and resource experts.

The BLM developed the Agency Preferred Alternative using the following selection criteria:

1. Satisfies statutory requirements (true for all alternatives).
2. Reflects what the BLM believes to be the best combination of decisions to achieve its goals and policies.
3. Represents the best solution for the purpose and need as described in Chapter 1.
4. Provides the best approach to address key planning issues.
5. Considers cooperating agencies' and BLM specialists' recommendations.

2.1.6 Step 6 – Develop Additional Alternatives in Response to the Identified Need for a Supplement to the Draft RMP and Draft EIS

As discussed in Chapter 1 (Purpose and Need for Action), the BLM completed a Supplement to the Bighorn Basin Draft RMP and Draft EIS in July 2013 after the BLM Rocky Mountain Regional Interdisciplinary Team identified the need to consider incorporation of additional management actions for the conservation of greater sage-grouse. Nominations for greater sage-grouse-related ACECs were submitted by members of the public in response to the Notice of Intent (NOI). The BLM reviewed these nominations and found importance and relevance criteria to be met, warranting consideration in the Bighorn Basin RMP Revision Project. These proposed ACECs were subsequently analyzed by incorporating two additional alternatives (E and F) in the Supplement. This Proposed RMP and Final EIS integrates content from the Draft RMP and Draft EIS (alternatives A through D) and the Supplement (alternatives E and F), and incorporates revisions based on comments received during the public comment periods for each of the aforementioned documents.

The Agency Preferred Alternative was identified as the BLM's preliminary preference in the Draft RMP and EIS. Following publication of the Draft RMP and EIS, and the Supplemental RMP and EIS, the BLM revised the Agency Preferred Alternative based on comments received during both public comment periods. As modified, Alternative D is now presented as the Proposed RMP in the Final EIS. Following resolution of protests and the Governor's consistency review, the BLM will prepare two separate RODs and Approved RMPs.

2.2 Alternatives Components

Each alternative comprises two categories of land use planning decisions – (1) goals and objectives (desired outcomes) and (2) allowable uses and management actions.

2.2.1 Goals and Objectives

Goals and objectives direct BLM actions to most effectively meet legal mandates, regulations, and agency policy, as well as local and regional resource needs. Goals are broad statements of desired outcomes that are usually not quantifiable. Objectives identify more specific desired outcomes for

resources and might include a measurable component. Objectives are generally expected to achieve the stated goals. Section 2.7 *Detailed Alternative Descriptions by Resource* describes management goals and objectives for each resource.

2.2.2 Allowable Uses and Management Actions

The BLM developed allowable uses and management actions to achieve the goals and objectives defined for each resource.

Allowable Uses

Allowable uses identify uses that are allowed, restricted, or excluded on BLM-administered surface lands and federal mineral estate. Alternatives can include specific land use restrictions to meet goals and objectives and can exclude certain land uses (such as mineral leasing, locatable mineral development, recreation, forest management, utility corridors, and livestock grazing) to preserve resource values. For example, alternatives considered in this RMP and EIS prohibit surface disturbance (a controlled surface use [CSU] stipulation to prohibit surface-disturbing activities) during development of oil and gas leases within occupied greater sage-grouse leks and associated buffers. Allowable uses often contain a spatial component because the alternatives identify whether particular land uses are allowed, restricted, or excluded. Maps of the Planning Area illustrate these spatial components and define the geographical extent of the management actions.

Management Actions

Management actions are proactive measures (for example, measures the BLM will implement to enhance watershed function and condition), or limitations intended to guide BLM activities in the Planning Area. An example of this type of management action is to prohibit surface-disturbing activities near riparian/wetland areas to achieve proper functioning condition (PFC). The allowable distance (buffer) of surface-disturbing activities from riparian/wetland areas varies by alternative, whereas all alternatives include the action (in this case, limiting surface-disturbing activities near riparian/wetland areas).

Organization of Allowable Uses and Management Actions in the Alternatives

For simplicity, the remainder of this chapter uses the term “management action” to include both allowable uses and management actions. Therefore, when text refers to management actions, it includes both categories. The alternatives include two types of management actions – *management actions common to all alternatives*, which apply regardless of alternative, and *management actions by alternative*, which represent the choice(s) considered across alternatives. Management actions by alternative represent the range of land use management decisions considered. Management actions vary among the alternatives and represent a reasonable range of management options the BLM considered to meet the stated goals and objectives and purpose and need for the Bighorn Basin RMP Revision Project. RMPs are strategic in nature, and, while they provide an overarching vision for managing resources in the Planning Area, they also must be flexible enough to accommodate changing priorities, information, and circumstances.

2.3 Greater Sage-Grouse Habitat Management

On December 9, 2011, a Notice of Intent was published in the Federal Register to initiate the BLM and U.S. Forest Service (USFS) Greater Sage-Grouse Planning Strategy across ten western states, including California, Oregon, Nevada, Idaho, Utah, and Southwest Montana in the Great Basin Region and Northwest Colorado, Wyoming, Montana, South Dakota, and North Dakota in the Rocky Mountain Region. This EIS is one of fifteen separate EISs analyzing incorporation of specific conservation measures across the range of the greater sage-grouse, consistent with BLM policy.

The BLM Washington Office (WO) issued a National Greater Sage-Grouse Planning Strategy on December 27, 2011. Wyoming BLM issued Instruction Memorandum (IM) 2012-019 on February 10, 2012, which provides guidance on greater sage-grouse habitat management and projects proposals until the RMP revision is complete. These policies have been incorporated into the Bighorn Basin Proposed RMP and Final EIS. In August 2011, the BLM convened the Sage-Grouse National Technical Team (NTT), which brought together resource specialists and scientists from the BLM, state fish and wildlife agencies, the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), and the U.S. Geological Survey. The NTT developed a series of science-based conservation measures to be considered and analyzed through the land use planning process. WO IM 2012-044 provides direction to the BLM on how to consider the NTT conservation measures in the land use planning process. The WO IM requires that the applicable and appropriate conservation measures in the NTT report be analyzed in at least one alternative in the land use planning EIS and that a "hard look" be given to the conservation measures, as applicable to local ecological site variability. Alternatives E and F incorporate the national strategy (WO IM-2012–044).

2.3.1 BLM Programs Addressing Greater Sage-Grouse Habitat Threats

The direction for managing greater sage-grouse habitat in this document is focused on responding to the threats identified by the USFWS in their 2010 "warranted but precluded" finding on listing the greater sage-grouse, as well as their Conservation Objectives Team (COT) Report. The USFWS threats do not necessarily align with BLM or USFS resource program areas, and are often integrated into several different resource program areas. Table 2-2 provides a cross-walk between the 2010 warranted but precluded finding, COT identified threats, and the BLM program areas addressing these threats, with references to specific sections of the proposed plan.

Table 2-2. USFWS Threats to Greater Sage-Grouse and Their Habitat, Applicable BLM Resource Program Areas Addressing these Threats

USFWS-Identified Threats to Greater Sage-Grouse and Its Habitat (2010 warranted but precluded finding)	COT Report-Identified Threats to Greater Sage-Grouse and Its Habitat (2013)	Applicable BLM Programs Addressing Threat
Wildland Fire	Fire	Wildland Fire Management (see section 3000)
Invasive Species	Nonnative, Invasive Plants Species	Vegetation Management(see section 4000), Range Management (see section 6000), Wildland Fire Management (see section 3000), and Recreation (see section 6000)
Oil and Gas For wind-energy development, see Infrastructure – Powerlines/pipelines, Roads (below)	Energy Development	Lands and Realty (see section 6000) and Fluid Minerals (see section 2000)
Prescribed Fire	Sagebrush Removal	Vegetation Management (see section 4000) and Wildland Fire Management (see section 3000)
Grazing	Grazing	Range Management (see section 6000), Wild Horse and Burro Management (see section 4000), Special Status Species (see section 4000), and Vegetation Management (see section 4000)
See Grazing (above)	Range Management Structures	Range Management (see section 6000)
No similar threat identified	Free-Roaming Equid Management	Wild Horse and Burro Management (see section 4000)
Conifer Encroachment	Pinyon and/or Juniper Expansion	Wildland Fire Management (see section 3000) and Vegetation Management (see section 4000)
Agriculture and Urbanization	Agricultural Conversion and Ex-Urban Development	Lands and Realty (see section 6000)
Hard Rock Mining	Mining	Lands and Realty (see section 6000), Locatable Minerals (see section 2000), Salable Minerals (see section 2000), and Non-energy Leasable Minerals (see section 2000)
See Infrastructure, Roads	Recreation	Recreation (see section 6000) and Trails and Travel Management (see section 6000)
Infrastructure Powerlines/pipelines Roads Communication sites Railroads Range Improvements (see below)	Infrastructure	Lands and Realty (see section 6000) and Trails and Travel Management (see section 6000)

Table 2-2. USFWS Threats to Greater Sage-Grouse and Their Habitat, Applicable BLM Resource Program Areas Addressing these Threats (Continued)

USFWS-Identified Threats to Greater Sage-Grouse and Its Habitat (2010 warranted but precluded finding)	COT Report-Identified Threats to Greater Sage-Grouse and Its Habitat (2013)	Applicable BLM Programs Addressing Threat
Infrastructure – Range Improvements	Range Management Structures	Range Management (see section 6000)
Water Developments	No similar threat identified	All applicable programs
Climate Change	No similar threat identified	There are no BLM programs in the proposed plan addressing this threat
Weather	No similar threat identified	There are no BLM programs in the proposed plan addressing this threat
Predation	No similar threat identified	All applicable programs
Disease	No similar threat identified	All applicable programs
Hunting	No similar threat identified	There are no BLM programs in the proposed plan addressing this threat
Contaminants	No similar threat identified	Public Health and Safety (see section 8000)

Sources: USFWS 2010, USFWS 2013a

2.3.2 Range of Alternatives for Greater Sage-Grouse Habitat Management

The action alternatives (B, C, D, E, and F) in the Proposed RMP and Final EIS offer a range of management approaches to maintain or increase greater sage-grouse abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which greater sage-grouse populations depend in collaboration with other conservation partners. The relative emphasis given to particular resources and resource uses differs by alternative, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives.

The meaningful differences among the alternatives are described in Table 2-3. This section also provides a complete description of the goals, objectives, and management actions for each alternative. In some instances, varying levels of management of PHMAs and General Habitat Management Areas (GHMAs) overlap a single area, or polygon, due to management prescriptions from different resource programs. In instances where varying levels of management prescriptions overlap a single polygon, the stricter of the management prescriptions would apply.

Table 2-3. Comparative Summary of Allocation Decisions of the Proposed Plan and Draft Alternatives for Greater Sage-Grouse Habitat Management

Resources/Resource Uses	Alternative A (No Action)	Alternative B (Key Area Boundary)	Alternative C	Alternative D Proposed Plan	Alternative E (Key Area Boundary)	Alternative F
Leasable Minerals – Oil and Gas						
Oil and Gas Leasing – Closed (acres)	PHMA: NA GHMA: 224,525	PHMA: 1,220,209 GHMA: 770,963	PHMA: NA GHMA: 142,859	PHMA: 58,842 GHMA: 190,315	PHMA: 1,220,209 GHMA: 779,131	PHMA: 58,842 GHMA: 172,108
Oil and Gas Leasing – Open with Major Constraints (acres)	PHMA: NA GHMA: 675,137	PHMA: 0 GHMA: 583,712	PHMA: NA GHMA: 56,855	PHMA: 685,921 GHMA: 242,143	PHMA: 0 GHMA: 590,772	PHMA: 685,922 GHMA: 242,200
Oil and Gas Leasing – Open with Moderate Constraints (acres)	PHMA: NA GHMA: 673,190	PHMA: 0 GHMA: 249,838	PHMA: NA GHMA: 1,007,438	PHMA: 366,613 GHMA: 892,003	PHMA: 0 GHMA: 255,373	PHMA: 366,613 GHMA: 862,184
Oil and Gas Leasing – Open with Standard Constraints (acres)	PHMA: NA GHMA: 1,057,255	PHMA: 0 GHMA: 284,172	PHMA: NA GHMA: 295,733	PHMA: 0 GHMA: 712,245	PHMA: 0 GHMA: 280,882	PHMA: 0 GHMA: 708,561
Salable Minerals						
Open (acres)	PHMA: NA GHMA: 1,841,405	PHMA: 401,966 GHMA: 625,430	PHMA: NA GHMA: 2,842,829	PHMA: 1,050,700 GHMA: 1,789,793	PHMA: 0 GHMA: 625,430	PHMA: 1,083,174 GHMA: 1,854,755
Closed (acres)	PHMA: NA GHMA: 266,775	PHMA: 820,575 GHMA: 1,268,033	PHMA: NA GHMA: 266,420	PHMA: 61,915 GHMA: 275,507	PHMA: 1,222,540 GHMA: 1,254,950	PHMA: 27,892 GHMA: 143,938
Locatable Minerals						
Open (acres)	PHMA: NA GHMA: 1,906,610	PHMA: 1,146,299 GHMA: 1,733,393	PHMA: NA GHMA: 2,995,631	PHMA: 1,105,380 GHMA: 1,978,937	PHMA: 0 GHMA: 1,728,724	PHMA: 1,056,404 GHMA: 1,918,147
Existing Withdrawals (acres)	PHMA: NA GHMA: 83,163	PHMA: 24,777 GHMA: 21,605	PHMA: NA GHMA: 106,453	PHMA: 1,441 GHMA: 17,611	PHMA: 24,777 GHMA: 21,605	PHMA: 49,521 GHMA: 59,471
Recommended Withdrawals (acres)	PHMA: NA GHMA: 14,281	PHMA: 52,652 GHMA: 139,373	PHMA: NA GHMA: 7,204	PHMA: 5,263 GHMA: 42,887	PHMA: 1,197,763 GHMA: 143,135	PHMA: 5,955 GHMA: 21,965
Land Resources -- Lands and Realty						
Disposal (acres)	PHMA: NA GHMA: 85,792	PHMA: 1,897 GHMA: 21,699	PHMA: NA GHMA: 109,101	PHMA: 0 GHMA: 54,109	PHMA: 1,897 GHMA: 21,699	PHMA: 11,331 GHMA: 52,477
Retention (acres)	PHMA: NA GHMA: 1,936,145	PHMA: 1,224,697 GHMA: 1,892,900	PHMA: NA GHMA: 3,024,609	PHMA: 1,112,593 GHMA: 2,011,309	PHMA: 1,224,697 GHMA: 200,600	PHMA: 1,101300 GHMA: 1,973,687

Table 2-3. Comparative Summary of Allocation Decisions of the Proposed Plan and Draft Alternatives for Greater Sage-Grouse Habitat Management (Continued)

Resources/Resource Uses	Alternative A (No Action)	Alternative B (Key Area Boundary)	Alternative C	Alternative D Proposed Plan	Alternative E (Key Area Boundary)	Alternative F
Land Resources – Rights-of-Way						
Open (acres)	PHMA: NA GHMA: 2,161,303	PHMA: 31 GHMA: 245,500	PHMA: NA GHMA: 1,961,517	PHMA: 0 GHMA: 743,533	PHMA: 0 GHMA: 245,500	PHMA: 0 GHMA: 747,635
Avoidance Areas (acres)	PHMA: NA GHMA: 912,927	PHMA: 1,094,914 GHMA: 1,580,334	PHMA: NA GHMA: 1,164,657	PHMA: 1,112,895 GHMA: 1,292,083	PHMA: 0 GHMA: 1,580,333	PHMA: 1,112,003 GHMA: 1,236,780
Exclusion Areas (acres)	PHMA: NA GHMA: 59,493	PHMA: 131,401 GHMA: 88,518	PHMA: NA GHMA: 7,549	PHMA: 2,087 GHMA: 35,001	PHMA: 1,226,345 GHMA: 88,518	PHMA: 289 GHMA: 37,520
Land Resources – Rights-of-Way and Corridors						
Existing (acres)	PHMA: NA GHMA: 782,240	PHMA: 264,050 GHMA: 518,251	PHMA: NA GHMA: 782,184	PHMA: 31,144 GHMA: 100,331	PHMA: 264,050 GHMA: 518,251	PHMA: 200,874 GHMA: 581,368
Proposed (acres)	PHMA: NA GHMA: NA	PHMA: 28,356 GHMA: 61,495	PHMA: 132,420 GHMA: NA	PHMA: 0 GHMA: 0	PHMA: 28,356 GHMA: 61,495	PHMA: 31,144 GHMA: 100,331
Land Resources – Renewable Energy						
Open (acres)	PHMA: NA GHMA: NA	PHMA: 31 GHMA: 245,500	PHMA: NA GHMA: 1,378,109	PHMA: 0 GHMA: 1,313,371	PHMA: 31 GHMA: 245,500	PHMA: 0 GHMA: 598,443
Avoidance Areas (acres)	PHMA: NA GHMA: NA	PHMA: 698,821 GHMA: 963,966	PHMA: NA GHMA: 1,595,036	PHMA: 1,002,408 GHMA: 493,843	PHMA: 698,821 GHMA: 963,966	PHMA: 1,035,097 GHMA: 1,209,990
Exclusion Areas (acres)	PHMA: NA GHMA: NA	PHMA: 527,494 GHMA: 704,887	PHMA: NA GHMA: 147,692	PHMA: 110,207 GHMA: 225,085	PHMA: 527,494 GHMA: 704,887	PHMA: 77,195 GHMA: 214,530
Land Resources – Travel and Transportation						
Open (acres)	PHMA: NA GHMA: 1,310	PHMA: 0 GHMA: 3,132	PHMA: NA GHMA: 14,829	PHMA: 0 GHMA: 5,884	PHMA: 0 GHMA: 3,132	PHMA: 0 GHMA: 5,884
Limited (acres)	PHMA: NA GHMA: 3,065,695	PHMA: 1,177,366 GHMA: 1,791,531	PHMA: NA GHMA: 3,095,898	PHMA: 1,109,645 GHMA: 1,996,971	PHMA: 1,177,366 GHMA: 1,791,531	PHMA: 1,109,645 GHMA: 1,958,504
Closed (acres)	PHMA: NA GHMA: 67,749	PHMA: 49,214 GHMA: 120,142	PHMA: NA GHMA: 9,274	PHMA: 2,746 GHMA: 58,567	PHMA: 49,038 GHMA: 120,142	PHMA: 2,746 GHMA: 57,899

Table 2-3. Comparative Summary of Allocation Decisions of the Proposed Plan and Draft Alternatives for Greater Sage-Grouse Habitat Management (Continued)

Resources/Resource Uses	Alternative A (No Action)	Alternative B (Key Area Boundary)	Alternative C	Alternative D Proposed Plan	Alternative E (Key Area Boundary)	Alternative F
Livestock Grazing Management						
Open for all classes of livestock grazing (acres)	PHMA: NA GHMA: NA	PHMA: 0 GHMA: 1,184,047	PHMA: NA GHMA: NA	PHMA: 1,111,970 GHMA: 2,056,377	PHMA: 0 GHMA: 1,184,047	PHMA: 1,111,970 GHMA: 2,017,277
Not allocated to livestock grazing (acres)	PHMA: NA GHMA: NA	PHMA: 1,226,343 GHMA: 730,304	PHMA: NA GHMA: NA	PHMA: 322 GHMA: 4,661	PHMA: 1,226,343 GHMA: 730,305	PHMA: 322 GHMA: 4,660

Source: USFWS 2013a

Note: The BLM National Operations Center calculated the acreages in this table.

ACEC Area of Critical Environmental Concern
BLM Bureau of Land Management
GHMA General Habitat Management Area
NA Not applicable
PHMA Priority Habitat Management Area

2.3.3 Development of the Proposed Plan for Greater Sage-Grouse Habitat Management

Changes Between the Draft RMP and Draft EIS and the Proposed RMP and Final EIS

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft EIS and the Supplement, the BLM has developed the Proposed RMP and Final EIS for managing BLM-administered land within the Bighorn Basin Planning Area. The Proposed RMP and Final EIS focuses on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed RMP and Final EIS is a variation of the Preferred Alternative (D) and is within the range of alternatives analyzed in the Draft RMP and Draft EIS and Supplement.

Changes made to the Proposed RMP and Final EIS from the Preferred Alternative (D) in the Draft RMP and Draft EIS and Supplement are the following:

- Allocations for PHMAs and GHMAs – allocations in the Proposed RMP and Final EIS provide more opportunities for uses in GHMAs, while still maintaining conservation management by establishing screening criteria for project/activity review in greater sage-grouse habitat. Examples of changes made from the Preferred Alternative (D) to the Proposed RMP (D) include:
    - The Draft EIS Alternative D analyzed the application of a CSU stipulation within 0.6 mile of an occupied or undetermined lek. The FEIS has been updated to establish a No Surface Occupancy (NSO) stipulation within 0.6 mile of an occupied lek, as analyzed in Alternative F of the SEIS.
    - Timing limitation stipulations (TLS) have been updated for nesting and early brood-rearing habitat. The Draft EIS utilized dates from March 1-June 30. The FEIS has updated those dates to March 15-June 30. In addition, the TLS for winter concentration habitats has been updated from November 15-March 14 in the Draft EIS to December 1-March 14 in the FEIS.
- On November 21, 2014 the USGS published Conservation Buffer Distance Estimates for Greater Sage- Grouse – A Review (Manier et al. 2014). The USGS review provided a compilation and summary of published scientific studies that evaluate the influence of anthropogenic activities and infrastructure on greater sage-grouse populations. The BLM has reviewed this information and examined how lek buffer distances were addressed through land use allocations and other management actions. The State of Wyoming's Core Area Strategy is designed to protect birds and habitat within core areas using a suite of tools and mechanisms that work in concert to conserve greater sage-grouse by reducing habitat loss and fragmentation through lek buffers, disturbance limits, excluded activities, and a sophisticated mapping utility to monitor the amount and density of disturbance. The USFWS has informed the BLM that the combined effect of these overlapping and reinforcing mechanisms give USFWS confidence that the lek buffer distances in the Core Area Strategy will be protective of breeding greater sage-grouse.
- Adaptive management – Identification of hard and soft adaptive management triggers for population and habitat and identified appropriate management responses. Chapter 2 of the Draft EIS identified that the BLM would further develop the adaptive management approach by identifying hard and soft triggers and responses. All of the adaptive management hard trigger responses were analyzed within the range of alternatives.
- Monitoring and Disturbance – The monitoring framework was further refined in the Proposed RMP and Final EIS, and further clarification as to how disturbance cap calculations would be

measured were developed for the Proposed RMP and Final EIS. During the public comment periods, BLM received comments on how monitoring and disturbance cap calculations would occur at implementation. The Draft EIS outlined the major components of the monitoring strategy, as well as provided a table portraying a list of anthropogenic disturbances that would count against the disturbance cap. A BLM Disturbance and Monitoring Sub-team further enhanced the two Appendices (Appendix L and Y) in the Proposed RMP and Final EIS.

- Mitigation Strategy; Net Conservation Gain – The net conservation gain strategy is in response to the overall landscape-scale goal which is to enhance, conserve, and restore greater sage-grouse and its habitat. All of the action alternatives provided management actions to meet the landscape-scale goal (see Chapter 2, Management Actions 6061 and 6017).
- Western Association of Fish and Wildlife (WAFWA) Management Zone Cumulative Effects Analysis on Greater Sage-Grouse – a quantitative cumulative effects analysis for greater sage-grouse is included in the Proposed RMP and Final EIS. This analysis was completed to analyze the effects of management actions on greater sage-grouse at a biologically significant scale which as determined to be at the WAFWA Management Zone. The Supplement, in Chapter 4, included a qualitative analysis and identified that a quantitative analysis would be completed for the Proposed RMP and Final EIS at the WAFWA Management Zone.
- Public Comment on the Draft RMP and Draft EIS and Supplement – The Proposed RMP and Final EIS were updated based on public comment received on the Draft RMP and Draft EIS and Supplement (see Appendix A, Comment Analysis Report.)

The BLM has reviewed each of these subsequent publications, and determined that none constitute "significant new information relevant to environmental concerns and bearing on the proposed action or its impacts" such that supplementation of the Bighorn Basin RMP Final EIS is required. See 40 CFR 1502.9(c)(1).

NEPA requires agencies to prepare a supplement to the Draft EIS if 1) the agency makes substantial changes in the proposed action that are relevant to environmental concerns; or 2) if there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. A supplement is not necessary if a newly formulated alternative is a minor variation of one of the alternatives and is qualitatively within the spectrum of alternatives analyzed in the Draft EIS.

The Proposed Land Use Plan (LUP) Amendments include components of the alternatives analyzed in the Draft EIS. Taken together, these components present a suite of management decisions that present a minor variation of alternatives identified in the Draft LUP Amendments/Draft EIS and are qualitatively within the spectrum of alternatives analyzed.

As such, the BLM has determined that the Proposed LUP Amendments is a minor variation of the preferred alternative and that the impacts of the Proposed LUP Amendments would not affect the human environment in a substantial manner or to a significant extent not already considered in the EIS. The impacts disclosed in the Proposed LUP Amendments/Final EIS are similar or identical to those described Draft LUP Amendments/Draft EIS.

In developing the Proposed Plan for greater sage-grouse management, the BLM made modifications to the Agency Preferred Alternative identified in the Draft RMP and Draft EIS. The modifications are based on public comments received on the Draft RMP and Draft EIS, internal BLM review, new information and best available science, the need for clarification in the plans, and ongoing coordination with stakeholders across the range of the greater sage-grouse. As a result, the Proposed Plan provides

consistent greater sage-grouse habitat management across the range, prioritizes development outside of greater sage-grouse habitat, and focuses on a landscape-scale approach to conserving greater sage-grouse habitat.

The BLM modified the Agency Preferred Alternative identified as Alternative D in the Draft RMP and Draft EIS, which is now considered the Proposed RMP for managing BLM-administered lands within the Bighorn Basin RMP Planning Area.

Since release of the Draft RMP and Draft EIS, the BLM has continued to work closely with a broad range of governmental partners, including Governors, state fish and game agencies, the USFWS, Indian tribes, county commissioners, and many others. Through this cooperation, the BLM has developed a Proposed Plan that is consistent with state, Tribal, and local strategies in accordance with applicable law and contributes to the long-term conservation of the greater sage-grouse. The BLM also received many substantive public comments on the Draft RMP and Draft EIS (see Appendix A), which greatly informed the BLM's development of the Proposed Plan for greater sage-grouse management.

The BLM's Proposed Plan considers documents related to the conservation of Greater Sage-Grouse that were released after the publication of the Draft RMP and Draft EIS. For example, this Proposed Plan considers the USGS' 2014 report *"Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review"* (Manier et al. 2014). The State of Wyoming's Core Area Strategy is designed to protect greater sage-grouse and its habitat within core areas using a suite of tools and mechanisms to reduce habitat loss and fragmentation through lek buffers, disturbance limits, excluded activities, and a sophisticated mapping utility to monitor the amount and density of disturbance. The BLM also updated the Proposed Plan to reflect new greater sage-grouse state conservation strategies, including executive orders.

The BLM has refined the Proposed Plan to provide a layered management approach that offers the highest level of protection for greater sage-grouse in the most valuable habitat. Land use allocations in the Proposed Plan would limit or eliminate new surface disturbance in PHMAs, while minimizing disturbance in GHMA. In addition to establishing protective land use allocations, the Proposed Plan for greater sage-grouse management would implement a suite of management tools, such as disturbance limits (see Table 2-9, Management Action 4119), greater sage-grouse habitat objectives and monitoring (see Table 2-9, Management Actions 7178, and 7287), mitigation approaches (see Table 2-9, Management Action 7178), adaptive management triggers and responses (see Table 2-9, Management Action 7287), and lek buffer-distances (see Table 2-9, Management Actions 4116, 4117, and 4121). These overlapping and reinforcing conservation measures are intended to work in concert to improve greater sage-grouse habitat condition and provide clarity and consistency on how the BLM will manage activities in greater sage-grouse use habitat.

2.3.4 BLM Proposed Plan for Greater Sage-Grouse Habitat Management

Many of the proposed plan goals, objectives, management actions and allowable uses identified in this section originate from specific BLM resource and/or program areas (e.g., Physical Resources) and have been determined to be applicable to the proposed management of greater sage-grouse habitat. The record numbers in Table 2-4 are the same as those presented in the Detailed Alternative Descriptions (Table 2-9) of this chapter and have simply been consolidated in Table 2-4 to depict how the agency proposes to manage greater sage-grouse habitat.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management

Record #	Alternative D (Proposed RMP)
MANAGEMENT ACTIONS COMMON TO ALL RESOURCES	
0001	Surface-disturbing activities are subject to the *Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities, the Wyoming BLM Reclamation Policy, and the Wyoming DEQ*-WQD's Storm Water Permitting Program.
0002	The BLM may pursue a withdrawal from appropriation under the mining laws for locatable minerals within ACECs, recommended WSR suitable waterway segments, and special status species habitat on a case-by-case basis.
0003	Utilize recommendations found in WGFD documents Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats (WGFD 2010b), *Wildlife Protection Recommendations for Wind Energy Development in Wyoming* (WGFD 2010c), and similar documents updated over time where determined applicable and consistent with valid existing rights.
PHYSICAL RESOURCES – SOIL	
GOAL PR:3	Maintain or improve soil health (e.g., chemical, physical, and biotic properties) while focusing on making significant progress toward meeting the *Wyoming Standards for Healthy Rangelands* (Appendix N). **Objective:** **PR:3.** Apply guidelines and appropriate measures to all management actions (including reclamation) affecting soil health to decrease erosion and sedimentation, to achieve and maintain stability, and to support the hydrologic cycle by providing for water capture, storage, and release.
1008	Develop appropriate mitigation for surface-disturbing and disruptive activities associated with wildlife and fish management through use of the mitigation guidelines described in Appendix H.
1016	Allow seeding of areas disturbed by surface-disturbing activities (as part of interim and final reclamation) and areas not meeting resource objectives using approved BLM seed mixtures.
1017	In disturbed areas, reestablish healthy native or desired plant communities based on pre-disturbance/desired plant species composition.
1019	Interim and final reclamation will begin at the earliest feasible time. Successful final reclamation of the desired vegetative cover will be considered achieved if conditions are equal to or better than pre-disturbance site condition. Require reclamation in compliance with BLM policy, including Wyoming BLM Reclamation Policy and similar guidance updated over time.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
MINERAL RESOURCES	
GOAL MR:1	Provide opportunities for mineral extraction and energy exploration and development to meet national and local needs, while avoiding or mitigating impacts on other resources.
	Objective:
	MR:1.2 Encourage sound, balanced exploration and development of mineral resources in the Planning Area.
GOAL MR:2	Manage leasable fluid mineral resources (oil, gas, CBNG, geothermal) in the Planning Area to meet the Nation's energy needs, without compromising long-term health and diversity of public lands and resources.
	Objectives:
	MR:2.1 Provide opportunities to explore and develop federal oil and gas resources and other leasable minerals.
	MR:2.2 Provide opportunities for collection of subsurface geological (geophysical) data to aid in the exploration of oil and gas resources in areas open to leasing.
	MR:2.3 Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of greater sage-grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for greater sage-grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).
	MR:2.4 Where a proposed fluid mineral development project on an existing lease could adversely affect greater sage-grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to sage-grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such Federal leases.
GOAL MR:3	Manage solid leasable mineral resources (coal, oil shale, tar sands, phosphate, sodium, etc.) to help meet local and regional needs, while avoiding or mitigating effects on other resources.
	Objective:
	MR:3.1 Provide opportunities for exploration, leasing, and development of solid leasable minerals consistent with goals and objectives of other natural and cultural resources and values.
GOAL MR:4	Manage salable mineral materials to meet local and regional needs, while avoiding or mitigating effects on other resources.
	Objective:
	MR:4.2 Provide opportunities for exploration and development of salable minerals in suitable locations while avoiding or mitigating effects to other resources.
GOAL MR:5	Manage locatable minerals activities on lands open to mineral entry, while preventing unnecessary and undue degradation of public lands as defined in 43 CFR 3809.5, and while avoiding or mitigating effects of exploration and production on other resources.
	Objective:
	MR:5.1 Provide opportunities for exploration and development of locatable minerals while reducing and mitigating effects of mining on other natural resources.
LEASABLE MINERALS – COAL	
2004	Consider interest in exploration for, or leasing of, federal coal (Map 6), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the Wyoming BLM Standard Oil and Gas-Lease Stipulations (Appendix I). Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socio-economic environment of the affected area. If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
LEASABLE MINERALS – GEOTHERMAL	
2005	Unless otherwise noted, BLM-administered land in the Planning Area that is open to oil and gas leasing is open to geothermal leasing, subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix H. Unless otherwise noted, those lands identified as closed to oil and gas leasing are closed to geothermal leasing.
2007	Protect important resources, including in areas closed to leasing on existing leases (Map 7) to the extent this restriction does not violate the leaseholder/operator lease rights, by applying an NSO restriction and prohibiting surface-disturbing activities. In areas identified as available for leasing, additional planning, analysis, and decision making may be necessary prior to lease issuance under the following criteria: 1) when oil and gas development is resulting in unacceptable multiple-use or natural/cultural resources conflicts, 2) new information evidences increased oil and gas development densities or surface disturbance, or 3) at the discretion of the Field Manager, District Manager, or State Director. Areas closed for oil and gas leasing may be leased with a NSO stipulation to deal with drainage of these resources from federal mineral estate.
LEASABLE MINERALS – OIL AND GAS/CBNG EXPLORATION AND DEVELOPMENT	
2008	Determine the routing of access roads and location of well pads after considering the views of the surface owner on split-estate lands (private surface-federal minerals/oil and gas), where possible. Where the federal government owns the mineral estate, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government owns the surface and the mineral estate is in non-federal ownership, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.
2010	Unless otherwise noted, areas that are open to oil and gas leasing are open to geophysical exploration subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix I. Areas closed to oil and gas leasing are closed to geophysical exploration. However, geophysical exploration may be permitted on a case-by-case basis so long as the resource goals and objectives under which the area was closed are not compromised.
2011	In cases where federal oil and gas leases are or have been issued without stipulated restrictions or requirements that are later found to be necessary, or with stipulated restrictions or requirements that are later found to be insufficient, consider their inclusion before approving subsequent exploration and development activities. Include these restrictions or requirements only as reasonable measures or as conditions of approval in authorizing APDs or Master Development Plans. Conversely, in cases where leases are or have been issued with stipulated restrictions or requirements that are later found to be excessive or unnecessary, the stipulated restrictions or requirements may be appropriately modified, excepted or waived in authorizing actions. Both the application of reasonable measures or COAs and the modification, exception, or waiver of stipulated restrictions or requirements must first be based upon site-specific analysis including the necessary supporting NEPA compliance.
2013	Utilize BMPs in the exploration, development, production, and abandonment of oil and gas resources.
LEASABLE MINERALS – OTHER SOLID LEASABLE MINERALS	
2015	Lease solid minerals such as phosphates or sodium, consistent with other resources, on a case-by-case basis.
SALABLE MINERALS	
2016	Existing BLM-approved mineral material sites (Map 8) are open to mineral materials disposal. New mineral material disposal sites in areas open to mineral materials disposal are subject to site-specific analysis prior to approval. Ensure that each community pit has an updated site-specific reclamation fee based on a current mining and reclamation plan. Ensure that reclamation occurs in mined-out areas of community pits.
2017	Dispose of mineral materials on a case-by-case basis, subject to site-specific analysis and appropriate mitigation prior to approval, in areas open to mineral materials disposal.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
LEASABLE MINERALS – OIL AND GAS MANAGEMENT AREAS, MASTER LEASING PLAN AREAS, AND OTHER AREAS	
2029	Delineate Oil and Gas Management Areas (Map 25) (441,662 acres of federal mineral estate) around the existing intensively-developed fields, applying a 2-mile buffer from the outer boundary of the existing field (Map 26); adding enhanced oil recovery areas identified by the Governor's Office Enhanced Oil Recovery Institute and excluding greater sage-grouse PHMAs. Manage these areas primarily for oil and gas exploration and development. Oil and gas development within Oil and Gas Management Areas is allowed to take place at the same level and density of the existing field development and will include enhanced oil recovery research and development operations, except in the Oregon Basin Oil Field, where new development will not exceed the current disturbance levels. Levels and densities beyond the existing field development may require additional NEPA analysis, reclamation, or compensatory off-site mitigation. As oil and gas fields expand or exploration reaches beyond the Oil and Gas Management Areas depicted on Map 25, Oil and Gas Management Areas may be enlarged as appropriate. To enlarge Oil and Gas Management Areas, the expansion area would: i) have to be adjacent to the field and under valid oil and gas lease(s) with stipulations allowing surface occupancy and development; ii) have to have a surface density of, on average, at least four well pads per 640-acres; a determination that additional well density is required to efficiently and adequately produce the oil or gas resource; iii) have a project-specific environmental analysis prepared to analyze the impacts and determine operating methods, mitigation, and BMPs to be used in the efficient and comprehensive development of the field; and iv) need surface resources to be satisfactorily mitigated; v) need commitment to accelerate reclamation as required by the authorized officer.
FIRE AND FUELS MANAGEMENT	
GOAL FM:1	Reducing risk to firefighters and the public is the first priority in every fire management activity. Protect life, property, and resource values by responding to wildland fires based on ecological and social consequences of the fire and the circumstances under which it occurs. **Objectives:** **FM:1.3** Manage fuels to restore and maintain landscapes, and promote fire-adapted communities and infrastructure. Fire and fuels management actions will focus on restoring natural fire regimes and frequencies, and accomplishing DPC objectives. **FM:1.5** Following wildland fires, conduct appropriate emergency stabilization and rehabilitation when and where needed. In priority sage-grouse habitat areas, prioritize suppression immediately after life and property to conserve the habitat. In general sage-grouse habitat, prioritize suppression where wildfires threaten priority sage-grouse habitat.
GOAL FM:2	Restore natural fire regimes and frequencies to the landscape, and utilize fire and vegetation treatments to accomplish DPC objectives. **Objectives:** **FM:2.1** Consult and cooperate with adjacent landowners, state and local governments, and other stakeholders to plan and implement prescribed fire and other vegetation treatments across the landscape. In areas of general sage-grouse habitat, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. **FM:2.2** Implement and maintain a FMP for the Planning Area; the FMP identifies the site-specific fire management practices and fuels treatment actions needed to meet this RMP's goals and objectives and includes a focus on restoring natural fire regimes and frequencies or accomplishing DPC objectives.
3002	Implement the BLM Emergency Stabilization and Rehabilitation standards located in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a).

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
3008	Suppress fires threatening greater sage-grouse habitats and crucial winter wildlife habitat within Wyoming big sagebrush communities. Where fire would be utilized to meet resource objectives, work closely with resource specialists to protect and improve greater sage-grouse habitat. If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable option; • how Greater Sage-Grouse goals and objectives would be met by its use; • how the COT Report objectives would be addressed and met; and • a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.
3015	Utilize wildland fires (wildfires managed for resource benefit and prescribed fires) and other vegetation treatments to restore fire-adapted ecosystems, reduce hazardous fuels, and accomplish resource management objectives.
BIOLOGICAL RESOURCES – VEGETATION - FORESTS, WOODLANDS, AND FOREST PRODUCTS	
GOAL BR:2	Manage vegetation resources to meet DPC objectives. **Objectives:** **BR:2.1** Manage native plant communities to restore, maintain, or enhance vegetation community health, composition, and diversity to provide a mix of successional stages that incorporate diverse structure and composition into the desired vegetation types. **BR:2.2** Maintain, improve, enhance, or restore native plant communities to facilitate the conservation, recovery, and maintenance of populations of native and desirable nonnative plant species and wildlife habitat. **BR:2.3** Maintain, improve, or enhance areas of ecological importance, priority plant species and habitats, and unique plant associations with native plant communities. **BR:2.4** Manage native plant communities across landscapes through cooperation with adjacent landowners, state and local governments, and other stakeholders. **BR:2.5** Coordinate with local, state, and federal agencies, and stakeholders to protect and recover native plant communities, and their included vegetative resources and habitat components affected by extreme environmental conditions. **BR:2.6** In PHMAs, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6 [BLM2005c]).
4014	Manage species including limber pine, subalpine fir, whitebark pine, cottonwood, willow, Rocky Mountain juniper, Utah juniper, and aspen, to enhance resources or resource uses, such as wildlife habitat, recreation opportunities, livestock grazing, watersheds, and scenic values.
4028	Manage native plant communities (Map 36) in accordance with Wyoming Standards for Healthy Rangelands. Continue to use ecological site descriptions, resource objectives, and specific management practices to maintain or achieve the standards that consider all reasonable and practical options available to achieve desired results.
4029	Continue to monitor and evaluate climatic and vegetative data. Compile and share data with other land management agencies and partners within the Planning Area using a cooperative collaborative approach. Should the analysis of data indicate that the vegetative resource is either not meeting or making significant progress towards meeting the Wyoming Standards for Healthy Rangelands or other site specific vegetative objectives, specific management practices will be developed and would consider all reasonable and practical options available to achieve desired results.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
4030	In plant communities determined to be meeting Wyoming Standards for Healthy Rangelands, manage to maintain or improve those communities. The appropriate functional structural plant groups must be present for the site. Potentially manage some areas for a higher plant community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable. In these areas the desired plant community states or phases will be determined on a site-specific basis at the implementation level. Potentially manage some areas for lower plant community states or phases to provide preferred habitat for species.
4031	Manage to maintain contiguous blocks of native plant communities and minimize fragmentation; allow for appropriate mosaic of interrelated plant communities while allowing for other resource uses.
CONIFER ENCROACHMENT	
4106	Reintroduce appropriate fire regimes to limit conifer encroachment into the sagebrush plant communities. Take into account invasive herbaceous species and Fire Regime Group and FRCC (measure of departure from historic fire regime) with treatments. Where possible, achieve a balance between treating areas that have significantly departed from the historic fire regime (Condition Class 3) and areas that are functioning within an appropriate fire regime (Condition Class 1).
4107	Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the Fire and Invasives Assessment Team report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.
4024	Manage conifer encroachment to improve wildlife habitat and forest health conditions, use Ecological Site Descriptions to help determine potential natural communities.
BIOLOGICAL RESOURCES – INVASIVE SPECIES AND PEST MANAGEMENT	
GOAL BR:4	Manage for healthy native plant communities by reducing, preventing expansion of, or eliminating the occurrence of undesirable invasive, nonnative species, undesirable, nonnative, or noxious weeds (predatory plant pests or disease) by implementing management actions consistent with national guidance and state and local weed management plans.
4038	Manage invasive plant species in the Planning Area in conjunction with local counties and other stakeholders consistent with the ROD for the Final PEIS addressing Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007b), and current with policy and similar guidance updated over time.
4039	Manage invasive plant species using an Integrated Pest Management approach consistent with DOI Manual 517, Integrated Pest Management (DOI 2007).
4042	Use certified noxious weed-seed free vegetation products on all BLM-administered land in the Planning Area.
4045	Reduce and prevent the expansion of cheatgrass through cooperation with other agencies, organizations, and interested stakeholders.
4044	Develop and maintain an invasive species and pest management plan. If necessary, review and update this plan annually based on available funding and input from other agencies, organizations, and interested stakeholders.
BIOLOGICAL RESOURCES – VEGETATION - RIPARIAN/WETLAND RESOURCES	
GOAL BR:3	Manage riparian/wetland areas to provide a natural combination of vegetation and landform to provide the habitat and the water conditions necessary for aquatic and terrestrial species. **Objectives:** **BR:3.1** Manage vegetation, soil, landform, and water to meet PFC. **BR:3.2** Manage priority riparian/wetland areas to attain desired future conditions unique to the landscape setting.
4035	Manage all riparian/wetland areas to meet or make progress towards PFC giving priority to those areas that are functioning at risk with a downward trend or that are in non-functioning condition, plus manage streams with unique recreational or aquatic values to obtain PFC.
4036	Prohibit surface-disturbing activities within 500 feet of surface water and riparian/wetland areas (70,715 acres) except when such activities are necessary and when their impacts can be mitigated.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
BIOLOGICAL RESOURCES – FISH AND WILDLIFE RESOURCES - WILDLIFE	
4060	Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management (Wyoming Interagency Vegetation Committee 2002) and the Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing Activities (Appendix H), and similar guidance updated over time.
4071	In cooperation with the WGFD and other stakeholders, work to develop water sources for wildlife and special status species in coordination with the WGFD and the BLM Water Development Handbook (H-1741-2).
4073	Modify identified hazard fences, and analyze and construct new fences in accordance with appropriate wildlife needs, the BLM Fencing Handbook 1741-1, and WO IM 2010-022 Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser Prairie-chicken, and similar guidance and policy as updated over time.
4075	Pursue exchanges to enhance public access or improve management of important wildlife habitat areas by consolidating public land. Emphasize the acquisition of access to public lands on the Bighorn, Shoshone, Clarks Fork of the Yellowstone, and Greybull rivers; Gooseberry Creek; the upper portions of Cottonwood and Grass Creeks; and on lands where other riparian areas occur. Plus in cooperation with willing sellers and other stakeholders, pursue all land tenure adjustment authorities for the acquisition of, and interest in, lands for the improved management of important wildlife habitat.
4078	Allow water development projects in crucial elk winter range and in greater sage-grouse nesting habitat with 10 inches or less annual precipitation only when adverse effects can be avoided or mitigated based on site-specific analysis. Allow existing uses pending site-specific analysis on a priority basis.
4082	Avoid wind energy projects in big game crucial winter range and raptor concentration areas. Wind-energy development would be avoided in sage-grouse PHMAs (Map 42), unless it can be sufficiently demonstrated that the development activity would not result in declines of sage-grouse PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS.
4083	At the discretion of the BLM and its stakeholders, use produced water to develop and enhance waterfowl, special status species, and other wildlife habitats in accordance with federal, state, and local laws and regulations.
BIOLOGICAL RESOURCES – FISH AND WILDLIFE RESOURCES – SPECIAL STATUS SPECIES	
4085	Postpone or modify projects that may affect special status species to protect these species. Consult with USFWS in such cases, as required by the Endangered Species Act.
4086	Consult with stakeholders early in the permitting process to design projects in a manner that would minimize or avoid potential adverse effects to special status species.
4087	Assist authorized agencies in the restoration, reintroduction, augmentation, or re-establishment of threatened, endangered, and other special status species populations and/or habitats.
BIOLOGICAL RESOURCES – GREATER SAGE-GROUSE	
4089	Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be effective in minimum doses in greater sage-grouse brood-rearing areas. Field Offices may implement treatments within sage-grouse habitat utilizing reduced agent-area treatments (RAATS) protocols.
4090	Avoid aerial pesticide spraying in favor of ground applications to minimize drift into non-target areas in greater sage-grouse habitat unless benefits of treatments are likely to outweigh impacts.
4091	Avoid applying pesticides to greater sage-grouse breeding habitat during the nesting and early brood-rearing season (March 15 through June 30) to reduce the loss of food supply to chicks and avoid the chance of secondary poisoning unless benefits of treatments are likely to outweigh impacts.
4092	Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young greater sage-grouse and other species that depend on forbs and insects associated with these areas. Consider management actions if desirable green vegetation associated with these wet areas is not available, accessible, or cannot be maintained with current livestock, wildlife, or wild horse use, and the impacts are outweighed by the improved habitat quality.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
4093	Restore greater sage-grouse brood-rearing habitats in riparian/wetland areas.
4094	Restore lost riparian functioning systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within greater sage-grouse habitat.
4095	Manage vegetation diversity and structure to provide suitable habitat and adequate cover for greater sage-grouse during nesting periods, determined by ecological site description.
4096	Maintain sagebrush and understory diversity (relative to ecological site description) in crucial seasonal greater sage-grouse habitats unless such removal is necessary to achieve greater sage-grouse habitat management objectives. For example, thinning small patches of dense sagebrush may increase desirable forbs in early brood-rearing habitat.
4097	Increase the composition and canopy cover of Wyoming big sagebrush, within existing nonnative grass seedings with less than 5 percent sagebrush canopy cover, to greater than or equal to neighboring sagebrush communities or historical levels. (See Shrubland-Salt Desert/Salt Bottom on Map 36; deeper soiled, and gentler sloped portions of the Shrubland-Salt Desert/Salt Bottom, colored in pink, would be those areas where sagebrush restoration efforts could be conducted.)
4098	Investigate opportunities to increase sagebrush in lower precipitation zones.
4099	Plan and construct mining and mineral development activities, to the degree possible given state water rights, to minimize disturbances that would result in alterations to springs and riparian greater sage-grouse habitat. Alternative water sources may be developed to replace natural sources that have been affected or destroyed during these development activities.
4100	Treat constructed or non-natural water storage impoundments to control mosquito breeding (and the associated spread of West Nile virus), to prevent disease spread to greater sage-grouse on priority basis.
4101	In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs needed by greater sage-grouse for seasonal food and concealment.
4102	In cooperation with stakeholders, design and locate fences so as not to disturb important greater sage-grouse habitat areas. Increase the visibility of existing fences in these areas to reduce hazards to flying greater sage-grouse.
4103	Conduct fire management activities to minimize overall wildfire size and frequency in sagebrush plant communities where greater sage-grouse habitat objectives are at risk. General priorities for habitat protection: Priority # 1 - Protection of greater sage-grouse PHMAs. Priority # 2 - Wyoming big sagebrush communities outside greater sage-grouse PHMAs and habitats recovering from disturbance within or adjacent to greater sage-grouse PHMAs.
4104	Annually Maintain FMPs to incorporate updated sagebrush habitat information as well as fire suppression priorities in sagebrush habitats. Incorporate fire management objectives for the management of sagebrush ecosystems into FMPs. Provide fire management objectives for sagebrush ecosystems to initial attack personnel at the beginning of each fire season.
4105	Establish fuels treatment projects at strategic locations to minimize size of wildfires and limit loss of greater sage-grouse habitat.
4106	Reintroduce appropriate fire regimes to limit conifer encroachment into late brood-rearing habitats within Mountain sagebrush plant communities. Take into account invasive herbaceous species and Fire Regime Group and FRCC (measure of departure from historic fire regime) with treatments. Where possible, achieve a balance between treating areas that have significantly departed from the historic fire regime (Condition Class 3) and areas that are functioning within an appropriate fire regime (Condition Class 1).
4107	Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the Fire and Invasives Assessment Team report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.
4108	The BLM will collaborate with appropriate Federal agencies, and the State of Wyoming as contemplated under Governor Executive Order 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where greater sage-grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and greater sage-grouse conservation objectives; and 3) identify appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
4117	**Inside PHMAs** The BLM's goal inside sage-grouse PHMAs is to maintain or enhance seasonal habitats thereby providing support for sage-grouse population management objectives of the State of Wyoming. Surface occupancy and surface-disturbing activities would be prohibited on or within 0.6-mile radius of the perimeter of occupied sage-grouse leks. The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of greater sage-grouse (Map 42). Leases should be a minimum of 640 contiguous acres of federal mineral estate. Smaller parcels may be leased only when 640 contiguous acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. Preliminary parcels reviewed for possible offering in a lease sale should comply with this minimum lease size. Expressions of interest that are less than this minimum lease size would be evaluated and modified by the BLM to meet the minimum lease size, where possible, prior to review for possible offering in a lease sale. **Outside PHMAs** Outside sage-grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the sage-grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states. Apply a NSO stipulation to prohibit or restrict surface-disturbing activities or surface occupancy within ¼-mile radius of the perimeter of occupied sage-grouse leks (Map 42).
4118	**Inside PHMAs** Apply a TLS to restrict disruptive activity within 0.6-mile radius of the perimeter of occupied sage-grouse leks from March 15 to June 30. **Outside PHMAs** Apply a TLS to restrict disruptive activity within ¼ mile of occupied sage-grouse leks from March 15 to June 30. **Inside PHMAs** Apply a TLS to prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within PHMAs, regardless of distance from the lek from March 15 to June 30. **Outside PHMAs** Apply a TLS to prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within 2 miles of the lek or lek perimeter of any occupied lek from March 15 to June 30.
4119	Apply a TLS to prohibit or restrict surface-disturbing and disruptive activities in mapped sage-grouse winter habitats/concentration areas from December 1 to March 14.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
4120	**Density of Disturbances** In greater sage-grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights. The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat. Utilize the greater sage-grouse density disturbance calculation tool as described in Appendix Y. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5% within the DDCT area using the DDCT process. Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within greater sage-grouse nesting habitat. Manage PHMAs (1,232,583 acres) as ROW avoidance areas. Work with proponents to design ROW applications to protect greater sage-grouse. Buried utilities constructed in designated utility corridors would not require that a DDCT be conducted. Sagebrush Treatment: Sagebrush eradication is considered disturbance and will contribute to the 5% disturbance factor. In stands with less than 15% cover, treatment should be designed to maintain or improve sagebrush habitat. Sagebrush treatments that maintain sagebrush canopy cover at or above 15% total canopy cover within the treated acres will not be considered disturbance. Treatments that reduce sagebrush canopy cover below 15% will be allowed if all such treated areas make up less than 20% of the suitable sagebrush habitat within the DDCT, and any point within the treated area is within 60 meters of sagebrush habitat with 5% or greater canopy cover. Treatments to enhance sagebrush/grassland will be evaluated based upon the existing habitat quality and the functional level post-treatment. Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. Although seasonal restrictions on activities may apply, vegetation treatments that do not make the habitat unsuitable for greater sage-grouse are not considered in the density calculation.
4121	The BLM would work with proponents to limit project-related noise where it would be expected to reduce functionality of habitats that support PHMA populations. The BLM would evaluate the potential or limitation of new noise sources on a case-by-case basis as appropriate. The BLM's near-term goal would be to limit noise sources that would be expected to negatively impact PHMA sage-grouse populations and to continue to support the establishment of ambient baseline noise levels for occupied PHMA leks. As additional research and information emerges, specific new limitations appropriate to the type of projects being considered would be evaluated and appropriate limitations would be implemented where necessary to minimize potential for noise impacts on sage-grouse PHMA population behavioral cycles. As new research is completed, new specific limitations would be coordinated with the WGFD and partners. Noise levels at the perimeter of the lek should not exceed 10 dBA above ambient noise.
4122	Allow motorized vehicle use in greater sage-grouse PHMAs consistent with other resource objectives, and locate new roads that will have relatively high levels of activity (i.e., accessing multiple wells, housing developments, etc.) greater than 1.9 miles from the perimeter of occupied sage-grouse leks within PHMAs. Locate other new roads greater than 0.6 miles from the perimeter of occupied sage-grouse leks within PHMAs. Construct roads to minimum design standards needed for production activities.
BIOLOGICAL RESOURCES – RAPTORS	
4110	Work with proponents to design powerlines following USFWS guidelines to protect raptors from electrocution and to reduce predation on other special status species. Work with ROW holders to retrofit existing lines.
BIOLOGICAL RESOURCES – WILD HORSES	
GOAL BR:11	Manage and maintain healthy wild horses and herds inside HMAs in a thriving natural ecological balance within the productive capacity of their habitat while preserving multiple use relationships.
4145	Base future adjustments to the appropriate management level on monitoring information and multiple use considerations through development of and/or revisions to HMA Plans. Update HMA plans to include greater sage-grouse objectives.
4146	Manage BLM-administered land within the Fifteenmile and McCullough Peaks HMAs to maintain or enhance conformance with the *Wyoming Standards for Healthy Rangelands*.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
LAND RESOURCES – LANDS AND REALTY	
GOAL LR:1	Manage the acquisition, disposal, withdrawal, and use of public lands to meet the needs of internal and external customers and to preserve important resource values. **Objectives:** **LR:1.2** Use appropriate actions such as disposal and acquisition to resolve issues related to intermixed land-ownership patterns and to acquire non-federal land having high resource/recreation value(s). **LR:1.3** Maintain availability of public lands to meet the habitation, trade, mineral development, recreation, and manufacturing needs of external customers and the general public.
6001	Consider land use authorizations (permits, leases, etc.) on a case-by-case basis consistent with other resource objectives. Do not classify, open, or make available any BLM-administered lands for agricultural leasing or agricultural entry under the Desert Land Entry for one of more of the following reasons: unsuitable topography, presence of sensitive resources or resource conflicts, lack of water or access, small parcel size, or unsuitable soils.
6010	Acquire private or state lands or interest in land from willing sellers on a case-by-case basis to consolidate land ownership and enhance the ability to manage important recreation opportunities and wildlife habitats such as migration corridors, crucial big game habitat, and riparian/wetland areas. Except for lands acquired using monies from the Westside Irrigation project conveyance described below, exchange is the preferred method of acquisition.
6017	Retain approximately 3,121,558 acres of BLM-administered land. 66,363 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 54) (Appendix M). Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate. Lands classified as PHMA for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. For lands in GHMA that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase greater sage-grouse abundance and distribution. Note: All land actions to acquire or dispose of lands would require a site-specific analysis under NEPA.
LAND RESOURCES – RIGHTS-OF-WAY AND CORRIDORS	
6033	Designate ROW corridors as shown on Map 66. In PHMA, major overhead powerlines will not be authorized unless co-located with an existing 115 kilovolt or greater powerline, as close as technically feasible, not to exceed 0.5 miles or within a designated corridor authorized for overhead powerlines. Distribution lines may be authorized when effectively mitigated to protect greater sage-grouse and the Authorized Officer determines that overhead installation is the action alternative with the fewest adverse impacts. Agricultural and residential lines will be considered to be adequately mitigated for greater sage-grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and installation of raptor deterrents. These ROW authorizations will be subject to approval by the State Director.
6036	Avoid placement of above-ground powerlines within one mile on each side of the Greybull Highway (14-16-20) from the City of Cody to the intersection with Highway 32 near the community of Emblem. Avoid placement of above-ground powerlines within one mile on each side of Highway 32 between Emblem and the BLM-BOR boundary to the north. Avoid placement of above-ground powerlines within one mile on each side of Highway 120 between the City of Cody and the Wyoming-Montana state line. Avoid placement of above-ground powerlines within one mile on each side of Highway 120 between the City of Cody and the Meeteetse Rim to the south. Avoid placement of above-ground powerlines within one mile on each side of Highway 14-16-20 between the City of Cody and the community of Wapiti.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
LAND RESOURCES – COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT	
6038	Unless otherwise specified in other management actions, motorized vehicle use on BLM-administered land is limited to existing roads and trails on an interim basis until completion of travel management planning. Designation changes from "limited to existing roads and trails" to "limited to designated roads and trails" upon the completion of a travel management plan. Terms "interim existing roads and trails", or "existing roads and trails" are used throughout the document to identify areas of low travel management planning priority. Interim existing roads and trails may be maintained for continued access until completion of a travel management plan.
6047	Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent. In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.
6051	To protect resource values, until each route is designated as open or closed in a corresponding travel management plan, motorized vehicle use is limited to existing roads and trails on approximately 1,955,943 acres of BLM-administered land in the Planning Area (Map 72).
LAND RESOURCES – RECREATION	
6059	Manage recreational use to maintain or improve wetland habitat conditions along intensively used streams and reservoirs, consistent with the *Wyoming Standards for Healthy Rangelands* or other guidance (see Appendix N).
6061	Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. In PHMAs, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development would have a net conservation gain to Greater Sage-Grouse habitat (such as concentrating recreation, diverting use away from important habitat areas, etc.), or unless the development is required for visitor health and safety or resource protection.
LAND RESOURCES – LIVESTOCK GRAZING MANAGEMENT	
6267	In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the Wyoming Guidelines for Livestock Grazing Management, other appropriate BMPs (see Appendices L and W), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.
6271	Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse Habitat Objectives Table and Land Health Standards (43 CFR 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.
6274	Vary the intensity of livestock grazing monitoring, with higher priority given to "I" category allotments and those allotments not meeting land health standards due to livestock grazing.
6276	Apportion additional sustained yield forage, based on monitoring, to satisfy suspended permitted use of permittees/lessees in the allotment and to meet multiple-use objectives where the forage is available.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
6277	On a case-by-case basis, allow issuance of permits/leases for livestock grazing for parcels that are not included in a grazing allotment, and where such permits/leases are not issued, allocate forage on such parcels to meet other multiple-use objectives.
6278	Establish and manage future reserve common allotments as opportunities arise within the Planning Area on a voluntary basis, plus establish and manage reserve common allotments on abandoned allotments on a case-by-case basis and attempt to utilize each allotment at least every five years. At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks.
6279	Prohibit the placement of salt, mineral, or forage supplements within ¼ mile of water, wetlands, riparian areas, reclaimed or reforested areas, or as determined by the authorized officer.
6281	Design range improvement projects, including vegetation treatments, to meet multiple-use objectives, mitigate impacts to other resource values, and meet allotment management objectives.
6283	Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.
SPECIAL DESIGNATIONS – ACECS – PROPOSED GREATER SAGE-GROUSE PRIORITY HABITAT AREA ACECS	
7179	No ACEC would be designated, however, implement mitigation and minimization guidelines and required design features, including specific measures for greater sage-grouse (refer to Appendix L). Incorporate greater sage-grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership. Require the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations and/or habitat on a case-by-case basis.
7230	No ACEC would be designated, except using the following travel management criteria: • During subsequent travel management planning, all routes within PHMAs would undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route would be considered for closure or considered for relocation outside of sensitive greater sage-grouse habitat. • During implementation-level travel planning, threats to greater sage-grouse and their habitat would be considered when evaluating route designations and/or closures. • During subsequent travel management planning, routes within PHMAs that do not have a purpose or need would be considered for closure. • During subsequent travel management planning, routes within PHMAs that are duplicative parallel, or redundant would be considered for closure. • During subsequent travel management planning, OHV timing limitations would be considered in important seasonal habitats where OHV use is a threat. • During subsequent travel management planning, consider limiting snow machine travel to designated routes or consider seasonal closures in greater sage-grouse wintering areas from November 1 through March 31. • During subsequent travel management planning, routes in PHMAs not required for public access or recreation with a current administrative/agency purpose or need would be evaluated for administrative access only. • During subsequent travel management planning, prioritize restoration of routes not designated in a Travel Management Plan within PHMAs. • During subsequent travel management planning, consider using seed mixes or transplant techniques that will maintain or enhance greater sage-grouse habitat when rehabilitating linear disturbances. • During subsequent travel management planning, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Use time of day limits (after 10:00 AM to 7:00 PM) to reduce impacts on greater sage-grouse during breeding and nesting periods.

Table 2-4. BLM Proposed Plan for Greater Sage-Grouse Habitat Management (Continued)

Record #	Alternative D (Proposed RMP)
7287	The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to sage-grouse, all regulatory entities in Wyoming, including the BLM and FS, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See Appendix Y for more information on soft and hard triggers. **Soft Triggers Response** Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM and/or FS) and the adaptive management working group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. **Hard Trigger Response** Upon determination that a hard trigger has been tripped, the BLM and/or USFS will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the AMWG will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment).

ACEC	Area of Critical Environmental Concern	GHMA	General Habitat Management Area
APD	Application for Permit to Drill	HMA	Herd Management Area
BLM	Bureau of Land Management	NEPA	National Environmental Policy Act
BOR	Bureau of Reclamation	NSO	no surface occupancy
CBNG	coalbed natural gas	OHV	off-highway vehicle
CFR	Code of Federal Regulations	PFC	Proper Functioning Condition
COA	Conditions of Approval	PHMA	Priority Habitat Management Area
COT	Conservation Objectives Team	TLS	timing limitations
DDCT	Density of Disturbance Calculation Tool	U.S.C.	United States Code
DEQ	Department of Environmental Quality	USFS	United States Forest Service
DOI	Department of the Interior	USFWS	United States Fish and Wildlife Service
DPC	desired plant community	WGFD	Wyoming Game and Fish Department
FMP	Fire Management Plan	WQD	Water Quality Division
FRCC	Fire Regime Condition Class	WSR	Wild and Scenic River

2.3.5 Adaptive Management Strategy for Greater Sage-Grouse Habitat Management

Adaptive Management is a decision process that promotes flexible resource management that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes advances scientific understanding and guides subsequent refinements in resource management as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. On February 1, 2008, the Department of the Interior (DOI) published its Adaptive Management Implementation Policy (522 DM 1).

In relation to the BLM's National Greater Sage-grouse Planning Strategy, adaptive management will help identify if greater sage-grouse conservation measures presented in this EIS contain the needed level of certainty for effectiveness. Principles of adaptive management have been incorporated into the conservation measures provided in this EIS, thereby increasing the likelihood that they will be effective in reducing threats to greater sage-grouse in light of changing environmental and regulatory conditions. Appendix Y and Management Action 7287 provide the BLM's adaptive management strategy for the Bighorn Basin RMP.

In making amendments to this plan, the BLM will coordinate with the USFWS as BLM continues to meet its objective of conserving, enhancing and restoring greater sage-grouse habitat by reducing, minimizing or eliminating threats to that habitat.

2.3.5.1 Adaptive Management and Monitoring

This EIS contains a monitoring framework plan (Appendix Y) that includes an effectiveness monitoring component. The agencies intend to use the data collected from the effectiveness monitoring to identify any changes in habitat conditions related to the goals and objectives of the plan and other range-wide conservation strategies (BLM 2004a; Stiver et al. 2006; USFWS 2013a). The information collected through the Monitoring Framework Plan outlined in Appendix Y will be used by the BLM to determine when hard and soft adaptive management triggers, as described below, have been met.

Adaptive Management Triggers

Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting greater sage-grouse conservation objectives. With respect to greater sage-grouse, all regulatory entities in Wyoming, including the BLM and USFS, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts.

Soft Triggers

Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. BLM and/or USFS

field offices, with the assistance of their respective land and resource management plan implementation groups, local Wyoming Game and Fish Department offices, and local sage-grouse working groups will evaluate the metrics with the Adaptive Management Working Group (AMWG) on an annual basis. The purpose of these strategies is to address localized greater sage-grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold.

Hard Triggers

Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect.

Within the range of normal population variables, hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a three year time period within a five-year range of analysis. A minimum of three consecutive years in a five-year period is used to determine trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5).The hard trigger and the proposed management response to this trigger are presented in Management Action 7287 and in Appendix Y.

Adaptive Management Response

Soft Triggers Response

Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short- or long-term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM and/or USFS) and the AMWG will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or state-wide level.

Hard Trigger Response

Upon determination that a hard trigger has been tripped, the BLM and/or USFS will immediately defer issuance of discretionary authorizations for new actions for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the AMWG will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment).

An interim response strategy will be developed, and implemented to the extent permitted by law, within 90 days of determination that a hard trigger has been tripped. The technical team (see Appendix Y) will be consulted to identify the scope and scale of the interim strategy. Based on the recommendation of the AMWG, the BLM and/or USFS will implement an interim response strategy through an Instruction Memorandum or other management mechanisms to direct management until the causal factor(s) and appropriate response(s) can be determined. The interim response strategy will consist of appropriate management measures undertaken at the project stage, supported by the best available science, to address the specific metric which has been tripped and may include deferral of some activities as appropriate. Measures that were analyzed in this EIS and the COT, NTT reports, and National Policy Team guidance will be reviewed in addition to current science to identify the most appropriate measures to be implemented as part of the interim response strategy. The BLM and/or

USFS will comply with all applicable law in implementing such response(s), and, if applicable, will undertake a plan amendment or revision under BLM and/or USFS's planning regulations and policies.

2.3.6 Regional Mitigation for Greater Sage-Grouse Habitat Management

Consistent with the proposed plan's goal outlined in Table 2-4 – BLM Proposed Plan for Greater Sage-Grouse Habitat Management, the intent of the Proposed Plan is to provide a net conservation gain to the species. To do so, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation in PHMA, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. This is also consistent with BLM Manual 6840 – Special Status Species Management, Section 02B, which states "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of the need for listing of these species under the ESA (BLM2008e)."

2.3.6.1 Mitigation Standards

In implementing BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation in PHMA, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g., avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy. If impacts from BLM management actions and authorized third party actions that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation (see the concepts of durability, timeliness, and additionality, as described further in Appendix Y).

2.3.6.2 Greater Sage-Grouse Conservation Team

The BLM will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of greater sage-grouse within 90 days of the issuance of the Record of Decision. This Team will develop a WAFWA Management Zone Regional Mitigation Strategy (hereafter, Regional Mitigation Strategy). The Team will also compile and report on monitoring data (including data on habitat condition, population trends, and mitigation effectiveness) from States across the WAFWA Management Zone (see Monitoring section). Subsequently, the Team will use these data to either modify the appropriate Regional Mitigation Strategy or recommend adaptive management actions (see Adaptive Management section).

The BLM will invite governmental and Tribal partners to participate in this Team, including the State Wildlife Agency and U.S. Fish and Wildlife Service, in compliance with the exemptions provided for committees defined in the Federal Advisory Committee Act and the regulations that implement that Act. The BLM will strive for a collaborative and unified approach between Federal agencies (e.g., FWS, BLM,

and USFS), Tribal governments, state and local government(s), and other stakeholders for greater sage-grouse conservation. The Team will provide advice, and will not make any decisions that impact Federal lands. The BLM will remain responsible for making decisions that affect Federal lands.

2.3.6.3 Developing a Regional Mitigation Strategy

The Team will develop a Regional Mitigation Strategy to inform the mitigation components of NEPA analyses for BLM management actions and third party actions that result in habitat loss and degradation. The Regional Mitigation Strategy will be developed within one year of the issuance of the Record of Decision. The BLM's Regional Mitigation Manual MS-1794 will serve as a framework for developing the Regional Mitigation Strategy. The Regional Mitigation Strategy will be applicable to the States/BLM Field Offices/ USFS-administered land within the WAFWA Management Zone's boundaries.

Regional mitigation is a landscape-scale approach to mitigating impacts to resources. This involves anticipating future mitigation needs and strategically identifying mitigation sites and measures that can provide a net conservation gain to the species. The Regional Mitigation Strategy developed by the Team will elaborate on the components identified above (i.e., avoidance, minimization, and compensation; additionally, timeliness, and durability) and further explained in Appendix Y.

In the time period before the Regional Mitigation Strategy is developed, BLM will consider regional conditions, trends, and sites, to the greatest extent possible, when applying the mitigation hierarchy and will ensure that mitigation is consistent with the standards set forth in the first paragraph of this section.

2.3.6.4 Incorporating the Regional Mitigation Strategy into NEPA Analyses

The BLM will include the avoidance, minimization, and compensatory recommendations from the Regional Mitigation Strategy in one or more of the NEPA analysis' alternatives for BLM management actions and third party actions that result in habitat loss and degradation. The appropriate mitigation actions will be carried forward into the decision.

2.3.6.5 Implementing a Compensatory Mitigation Program

Consistent with the principles identified above, the BLM needs to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. In order to align with existing compensatory mitigation efforts, this compensatory mitigation program will be implemented at a state level (as opposed to a WAFWA Management Zone, a BLM Field Office, or USFS-administered land), in collaboration with our partners (e.g., federal, tribal, and state agencies).

To ensure transparent and effective management of the compensatory mitigation funds, the BLM will enter into a contract or agreement with a third-party to help manage the state-level compensatory mitigation funds, within one year of the issuance of the Record of Decision. The selection of the third-party compensatory mitigation administrator will conform to all relevant laws, regulations, and policies. The BLM will remain responsible for making decisions that affect federal lands.

2.3.7 Greater Sage-Grouse Habitat Objectives

The Habitat Objectives for Greater Sage-Grouse (Table 2-5) are a list of indicators and values that describe greater sage-grouse seasonal habitat conditions. The values for the indicators were derived using a synthesis of current local and regional greater sage-grouse habitat research and data and reflect variability of ecological sites. The habitat cover indicators are consistent with existing indicators used by the BLM.

When determining if a site is meeting habitat objectives, the measurements from that particular site will be assessed based on the range of values for the indicators in the habitat objectives table. The habitat objectives table is one component of greater sage-grouse multi-scale habitat assessment (see Monitoring Framework, Appendix Y). The results of the habitat assessment will be used during the land health evaluation to ascertain if the land health standard applicable to greater sage-grouse habitat (e.g., special status species habitat standard) is being met.

When authorizing activities in greater sage-grouse habitat, the BLM will consider if habitat objectives are being achieved. If the habitat objectives are not being achieved, and the site has the potential for achieving these objectives, the BLM will determine the causal factor(s) and make the necessary management adjustments to address the causal factor(s), following current BLM regulations and policy.

Incorporate Greater Sage-Grouse Seasonal Habitat Objectives (Table 2-5) into the design of projects or activities, as appropriate, based on ecological site potential unless the NEPA analysis associated with the specific project can demonstrate other appropriate habitat conditions based on other factors such as:

- A specific objective is not applicable to the site-specific conditions of the project or activity;
- An alternative objective is determined to provide equal or better protection for greater sage-grouse or its habitat (based on appropriate scientific findings);
- Analysis concludes that following a specific objective would provide no more protection to greater sage-grouse or its habitat than not following it, for the project being proposed; or
- Achievement of fuels management objectives require additional reduction in sagebrush cover to meet strategic protection of greater sage-grouse habitat and conserve habitat quality for the species.

The habitat objectives in Table 2-5 summarize the characteristics that research has found represent the seasonal habitat needs for greater sage-grouse. The specific seasonal components identified in Table 2-5 were adjusted based on local science and monitoring data to define the range of characteristics used in this subregion. Thus, the habitat objectives provide the broad vegetative conditions we strive to obtain across the landscape that indicate the seasonal habitats used by sage-grouse. These habitat indicators are consistent with the rangeland health indicators used by the BLM.

The habitat objectives will be part of the sage-grouse habitat assessment to be used during land health evaluations (see Monitoring Framework, Appendix Y). These habitat objectives are not obtainable on every acre within the designated greater sage-grouse habitat management areas. Therefore, the determination on whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in the table.

All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made towards meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a cause, the use will be adjusted by the response specified in the instrument that authorized the use.

This information should not be viewed as providing standards by which to judge the overall quality of sagebrush habitats. Instead, these sage-grouse habitat characteristics should be used as one tool for assessing habitats and guiding management actions. There is a tendency to review each indicator and its suitability category independently, but site suitability is determined by the relationship among the several indicator values in each matrix and the relative abundance of habitat types across the landscape. It is important to understand that the desired conditions described for these habitat types are based on average plant productivity and structural data and expert opinion relative to sage-grouse use of a subset of sagebrush communities and they may not apply to all sagebrush communities in the planning area variation (Davies et al. 2006). These measures also do not account for inter-annual climate variation (Davies et al. 2006). Individual indicator values do not define site suitability and overall site suitability descriptions require an interpretation of the relationships between the indicators and other factors. Professional expertise and judgment are required. Measurement of these objectives will follow the steps described in the Habitat Assessment Framework for Fourth Order Habitat Descriptions (Appendix Y).

As described above the identified habitat objectives are averages and will vary based on the individual ecological sites and their potential. Ecological sites are the basic component of a land-type classification system that describes ecological potential and ecosystem dynamics of land areas. All land/land use types are identified within the ecological site system, including rangeland, pasture, and forest land. An ecological site is defined as a distinctive kind of land with specific soil and physical characteristics that differ from other kinds of land in its ability to produce a distinctive kind and amount of vegetation and its ability to respond similarly to management actions and natural disturbances. Lands are classified considering discrete physical and biotic factors. Physical factors include soils, climate, hydrology, geology, and physiographic features. Biotic factors include plant species occurrence, plant community compositions, annual biomass production, wildlife-vegetation interactions, and other factors. Ecological dynamics, primarily disturbance regimes, such as grazing; fire; drought; management actions; and all resulting interactions are also a primary factor of ecological sites. Information and data pertaining to a particular ecological site is organized into a reference document known as an Ecological Site Description (ESD). ESDs function as a primary repository of ecological knowledge regarding an ecological site. ESDs are maintained on the NRCS Ecological Site Information System, which is the repository for information associated with ESDs and the collection of all site data (https://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx). The ESD can help interpret if a site's potential is less than or greater than the identified habitat objectives.

In addition to the references identified in Table 2-5, the Conservation Plans developed for each of the Wyoming Local Sage-Grouse Working Groups will be consulted to identify specific habitat objectives appropriate for site-specific conditions. The Conservation Plans, updated in March 2014, are available on the Wyoming Game and Fish Department website at: https://wgfd.wyo.gov/web2011/wildlife-1000817.aspx.

Table 2-5. Greater Sage-Grouse Seasonal Habitat Objectives

Attribute	Indicators	Desired Condition	Reference
Breeding and Nesting (Seasonal Use Period March 1-June 15)			Doherty. 2008. Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts. Holloran and Anderson. 2005. Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats.
Lek Security	Proximity of trees	Trees absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approximately 3 km) of occupied leks.	Baruch-Mordo, S., J.S. Evans, J.P. Severson, D.E. Naugle, J.D. Maestas, J.M. Kiesecker, M.J. Falkowski, C.A. Hagen, and K.P. Reese. 2013. Saving sage-grouse from trees. Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference XXXX-X. U.S. Bureau of Land Management, Denver, Colorado.
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 330 feet (approx. 100 m) of an occupied lek.	Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference XXXX-X. U.S. Bureau of Land Management, Denver, Colorado.
Cover	Percent of seasonal habitat meeting desired conditions	Greater than 80 percent of the nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
	Sagebrush cover[2]	5 to 25 percent	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985. Connelly, J.W., K.P. Reese, and M.A. Schroeder. 2003. Monitoring of Greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin 80. University of Idaho, Moscow, ID. Hagen, C.A., J.W. Connelly, and M.A. Schroeder. 2007. A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood-rearing habitats. Wildlife Biology 13 (Supplement 1):42-50.
	Sagebrush height Arid sites[3] Mesic sites[4]	4-31 inches (10.6-80 cm) 12-31 inches (30.5-80 cm)	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
	Predominant sagebrush shape	Predominantly spreading shape[5]	Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference XXXX-X. U.S. Bureau of Land Management, Denver, Colorado.

Table 2-5. Greater Sage-Grouse Seasonal Habitat Objectives (Continued)

Attribute	Indicators	Desired Condition	Reference
	Perennial grass cover[2] Arid sites[3] Mesic sites[4]	Greater than or equal to 10 percent Greater than or equal to 15 percent Cool-season bunchgrasses preferred	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985. Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference XXXX-X. U.S. Bureau of Land Management, Denver, Colorado. Cagney J., E. Bainter, B. Budd, T. Christiansen, V. Herren, M. Holloran, B. Rashford, M. Smith and J. Williams. 2010. Grazing influence, objective development, and management in Wyoming's greater sage-grouse habitat. University of Wyoming College of Agriculture Extension Bulletin B-1203. Laramie.
	Perennial grass and forb height	Adequate nest cover greater than or equal to 6 inches or as determined by ESD site potential and local variability.	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985. Connelly, J.W., K.P. Reese, and M.A. Schroeder. 2003. Monitoring of Greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin 80. University of Idaho, Moscow, ID. Doherty, K.E., D.E. Naugle, J.D. Tack, B.L Walker, J.M. Graham and J.L. Beck. 2014. Linking Conservation Actions to Demography: Grass Height Explains Variation in Greater Sage-grouse Nest Survival. Wildlife Biology, 20(6): 320-325. Hagen, C.A., J.W. Connelly, and M.A. Schroeder. 2007. A meta-analysis of greater sage-grouse Centrocercus urophasianus nesting and brood-rearing habitats. Wildlife Biology 13 (Supplement 1):42-50. Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference XXXX-X. U.S. Bureau of Land Management, Denver, Colorado.
	Perennial forb cover[2] Arid sites[3] Mesic sites[4]	Greater than or equal to 5 percent Greater than or equal to 10 percent	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Table 2-5. Greater Sage-Grouse Seasonal Habitat Objectives (Continued)

Attribute	Indicators	Desired Condition	Reference
Brood Rearing/Summer (Seasonal Use Period June 16-October 31)[1]			
Cover	Percent of seasonal habitat meeting desired condition	Greater than 40 percent of the summer/brood habitat meets recommended brood habitat characteristics where appropriate (relative to ecological site potential, etc.).	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
	Sagebrush cover[2]	5-25 percent	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
	Sagebrush height	4 to 32 inches (10.6-80 cm)	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
	Perennial grass cover and forbs[2]	Greater than or equal to 5 percent arid sites Greater than or equal to 10 percent mesic sites	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
	Riparian areas/mesic meadows[2]	Proper Functioning Condition	Preferred forbs are listed in Stiver et al. In press. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present	Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference XXXX-X. U.S. Bureau of Land Management, Denver, Colorado.
Winter (Seasonal Use Period November 1-February 28)[1]			
Cover and Food	Percent of seasonal habitat meeting desired conditions	Greater than 80 percent of the wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.).	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
	Sagebrush cover above snow[2]	Greater than 5 percent	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985. Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl. In Press. Sage-Grouse Habitat Assessment Framework: Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference XXXX-X. U.S. Bureau of Land Management, Denver, Colorado.
	Sagebrush height above snow	Greater than 10 inches (greater than 25cm)	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Table 2-5. Greater Sage-Grouse Seasonal Habitat Objectives (Continued)

Attribute	Indicators	Desired Condition	Reference

Note: All Desired Conditions will be dependent upon site capability and local variation (e.g., weather patterns, localized drought, ESD state, etc.)

[1]Seasonal dates can be adjusted by local unit according to geographic region.
[2]Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportions of each species, and equals 100%. Note that cover is reported for only those species (e.g., sagebrush, preferred forbs) that are sampled to determine suitability of habitat for sage-grouse. Overall cover at the site will be greater than that sampled for sage-grouse habitat, due to other species present.
[3]Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et al. *In Press*).
[4]Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. *In Press*).
[5]Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *In Press*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. *In Press*). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[6]Preferred forbs are listed in Stiver et al. *In press*. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.

>	greater than
cm	centimeter
km	kilometer
m	meter

2.3.8 Monitoring Framework for Greater Sage-Grouse Habitat Management

The BLM's planning regulations, specifically 43 Code of Federal Regulations (CFR) 1610.4-9, require that land use plans establish intervals and standards for monitoring based on the sensitivity of the resource decisions. Land use plan monitoring is the process of tracking the implementation of land use plan decisions (implementation monitoring) and collecting data/information necessary to evaluate the effectiveness of land use plan decisions (effectiveness monitoring). For greater sage-grouse, these types of monitoring are also described in the criteria found in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (50 CFR Vol. 68, No. 60). One of the Policy for Evaluation of Conservation Efforts When Making Listing Decisions criteria evaluates whether provisions for monitoring and reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the conservation effort are provided.

A guiding principle in the BLM National Sage-grouse Habitat Conservation Strategy (BLM 2004a) is that "the Bureau is committed to sage-grouse and sagebrush conservation and will continue to adjust and adapt our National Sage-grouse Strategy as new information, science, and monitoring results evaluate effectiveness over time." In keeping with the WAFWA Sage-grouse Comprehensive Conservation Strategy (Stiver et al. 2006) and the Greater Sage-grouse Conservation Objectives: Final Report (USFWS 2013a), the BLM and USFS will monitor implementation and effectiveness of conservation measures in greater sage-grouse habitats.

On March 5, 2010, USFWS' 12-Month Findings for Petitions to List the greater sage-grouse (*Centrocercus urophasianus*) as threatened or endangered were posted as a *Federal Register* notice (75 Federal Register 13910-14014, March 23, 2010). This notice stated:

> "…the information collected by BLM could not be used to make broad generalizations about the status of rangelands and management actions. There was a lack of consistency across the range in how questions were interpreted and answered for the data call, which limited our ability to use the results to understand habitat conditions for sage-grouse on BLM lands."

Standardization of monitoring methods and implementation of a defensible monitoring approach (within and across jurisdictions) will resolve this situation. The BLM, USFS, and other conservation partners use the resulting information to guide implementation of conservation activities.

Monitoring strategies for greater sage-grouse habitat and populations must be collaborative, as habitat occurs across jurisdictional boundaries (52 percent on BLM-administered lands, 31 percent on private lands, 8 percent on National Forest System lands, 5 percent on state lands, 4 percent on tribal and other federal lands) (75 *Federal Register* 13910, March 23, 2010). Because state fish and wildlife agencies have primary responsibility for population-level wildlife management, including population monitoring, population efforts will continue to be conducted in partnership with state fish and wildlife agencies. The BLM and USFS have finalized a monitoring framework, which can be found in Appendix Y. This framework describes the process that the BLM and USFS will use to monitor implementation and effectiveness of RMP and/or LUP decisions. The monitoring framework includes methods, data standards, and intervals of monitoring at broad and mid scales; consistent indicators to measure and metric descriptions for each of the scales; analysis and reporting methods; and the incorporation of monitoring results into adaptive management. The need for fine-scale and site-specific habitat monitoring may vary by area depending on existing conditions, habitat variability, threats, and land health. Indicators at the fine and site scales will be consistent with the Habitat Assessment Framework; however, the values for the indicators could be adjusted for regional conditions.

More specifically, the framework discusses how the BLM and USFS will monitor and track implementation and effectiveness of planning decisions (e.g., tracking of waivers, modifications, site-level actions). The two agencies will monitor the effectiveness of RMP and/or LUP decisions in meeting management and conservation objectives. Effectiveness monitoring will include monitoring disturbance in habitats, as well as landscape habitat attributes. To monitor habitats, the BLM and USFS will measure and track attributes of, priority habitat, and general habitat at a broad scale, and attributes of habitat availability, patch size, connectivity, linkage/connectivity habitat, edge effect, and anthropogenic disturbances at a mid-scale. Disturbance monitoring will measure and track changes in the amount of sagebrush in the landscape and changes in the anthropogenic footprint, including changes in energy development density. The framework also includes methodology for analysis and reporting for field offices, states, ranger districts, BLM districts, National Forests, and Forest regions, including geospatial and tabular data for disturbance mapping (e.g., geospatial footprint of new permitted disturbances) and management actions effectiveness.

2.4 Alternatives Considered But Not Carried Forward for Detailed Analysis

The BLM considered several alternatives and management options as possible methods for resolving resource management issues and conflicts, but after further review and consideration, did not carry all of those forward for detailed analysis. The BLM did not carry forward for detailed analysis alternatives described in the following sections because (1) they would not fulfill requirements of the Federal Land Policy and Management Act (FLPMA) or other existing laws or regulations, (2) they would not meet the purpose and need, (3) they were already part of an existing plan, policy, or administrative function, or (4) they did not fall within the limits of the planning criteria. The alternatives considered but not carried forward are grouped by resource topic, although several might apply to more than one resource.

2.4.1 Physical Resources

None of the alternatives considered and subsequently eliminated from detailed analysis addressed this resource.

2.4.2 Mineral Resources

Recommend Mineral Withdrawals across the Planning Area

The BLM considered, but eliminated from detailed analysis alternatives to recommend a withdrawal from appropriations under the mining laws for a large portion of the Planning Area because it found those alternatives to be overly restrictive and not reasonable in those areas. By law, an RMP cannot close an area to the operation of the Mining Laws – this can only be accomplished by withdrawal, which is a separate action BLM can recommend but must ultimately be taken at the Secretarial level. Moreover, withdrawing the entire Planning Area would eliminate development in areas where conflicts can be mitigated or where conflicts do not exist, which would be inconsistent with the policy objectives of the Planning Area. Withdrawals should be justified in accordance with U.S. Department of the Interior's (DOI) 603 Departmental Manual 1 and withdrawal regulations at 43 CFR Part 2300. Withdrawing a large portion of the Planning Area would conflict substantially with the goals and objectives for mineral resources and would require an extensive inventory and evaluation outside the

scope of this RMP and EIS of the current natural uses and values of the site and adjacent land, as well as an analysis of how those uses and values would be affected.

Suspend or Eliminate all Existing Federal Minerals Leasing

The BLM considered, but eliminated from detailed analysis, suspending or eliminating all existing federal minerals leasing and development operations and cancelling existing oil and gas leases. Under the FLPMA, the BLM must recognize all valid existing rights. The BLM can impose reasonable measures to the manner and pace of development; the BLM evaluates measures of this type under alternatives analyzed in detail. Alternatives analyzed in detail also evaluate locations in the Planning Area where the BLM would recommend a withdrawal from mineral entry.

Require Directional Drilling

Directional wells generally are used to complete zones not directly below the drilling rig. Current technologies, along with large reserves, make it possible, based on geological structure, to drill to a bottom hole location several miles from the surface location (for example, the Bakken formation found in parts of Montana and North Dakota).

In the Planning Area, circumstances might result in the need to drill a directional and/or horizontal well. Those circumstances could include, but are not limited to, the following:

- Adverse geologic and topographical features.
- The need to access more of the mineral resource.
- A high density of cultural and historic material requiring in-depth testing and excavation.
- National Historic Trails (NHTs) and Other Historic Trails viewshed considerations.
- Avoid critical habitats of threatened, endangered, or other special status species.
- To develop leases with a NSO restriction.

BLM considered an alternative that would require directional and/or horizontal drilling of all oil and gas wells in the Planning Area. The BLM eliminated that alternative from further consideration and detailed analysis for the following reasons:

- The BLM retains the authority to require directional and/or horizontal drilling or pad drilling from federal surface on a site-specific basis under all alternatives, when consistent with valid existing rights.
- The risk of losing the borehole due to technical drilling difficulties is higher for directional and/or horizontal wells than for vertical wells. In addition, directional and/or horizontal drilling technology requires precise control of target locations in three dimensions. In exploratory areas this information is usually not available. A requirement to drill directional and/or horizontal wells under these conditions would result in additional drilling costs, the loss of some wellbores, and more uneconomical wells drilled.
- Drilling and completion costs for directional and/or horizontal boreholes are higher than for conventional vertical boreholes and can substantially reduce a well's economic viability. Eustes (2003) identified these additional costs. The advantages and disadvantages of requiring directional and/or horizontal boreholes would need to be assessed well by well. In some circumstances, the potential for increased productivity of directional and/or horizontal

boreholes can offset their additional drilling costs and risks, making these types of boreholes the preferable drilling option.

- Some of the oil and gas reservoirs now being developed in the Planning Area are multiple, vertically stacked, and discontinuous sandstones. These reservoirs are not good candidates for horizontal completion practices because their geology is such that a horizontal borehole might contact only one of the productive horizons, while a vertical borehole might be able to contact multiple horizons (depending on factors such as how the well is completed and the areal extent of the pool). A mandate requiring horizontal drilling would make many of these wells uneconomical to drill.

Experience and improved efficiency have caused the additional costs attributed to directional drilling and/or horizontal drilling to decrease. However, exclusive use of directional and/or horizontal drilling is not always necessary and could result in wells not being drilled and reserves not being recovered. This does not meet either the Nation's energy needs or result in the maximum ultimate recovery of the oil and gas resources with minimum waste, as required by regulation (43 CFR 3161.2).

Remove All Stipulations and Restrictions from Oil and Gas Leases

The BLM considered a request to remove all stipulations and restrictions from oil and gas leases. This alternative is unreasonable because it conflicts with the FLPMA Section 102(8) policy to manage the public lands to protect resource values**.** The BLM's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations. This includes encouraging the use of sound resource management practices to restore and maintain land conditions. The BLM assesses and monitors resource conditions and trends and considers the best available information to either maintain or improve the health of the land to fulfill this mandate. Removing all stipulations and restrictions from oil and gas leases would impair the BLM's ability to fulfill its mission by eliminating its primary tool for managing potential effects from oil and gas development on public lands; such an alternative is, therefore, not consistent with the policy objectives of the area or feasible. For these reasons, the BLM eliminated this alternative from detailed analysis.

Phased Oil and Gas Development

The BLM considered an alternative that would regulate the rate of oil and gas development in the Planning Area, but determined that the holders of federal oil and gas leases have the right to develop those leases on the schedules they deem appropriate within regulatory limits. Federal regulations at 43 CFR 3160.1-2 state that "the lessee shall have the right to use so much of the leased lands as is necessary to explore for, drill for, mine, extract, and dispose of all the leased resource in a leasehold …." The 43 CFR 3160 regulations also require lessees to attain maximum economic recovery of the leased resource and to conduct their operations in a manner that prevents undue and unnecessary damage to the environment. It is not possible at the RMP or leasing stages to determine whether a lease would actually be developed, or what well spacing or level of development would be necessary to achieve maximum economic recovery. Well spacing can vary from development area to development area, with some well fields efficiently developed at 1 well per square mile while others require up to 128 wells per square mile. Given the wide range of potential well spacing, the pace of development a lessee must maintain to meet the regulatory requirement of maximum economic recovery also greatly varies. Setting reduced or limited rates of development is more appropriately analyzed in project-/wellfield-specific NEPA documents; therefore, the BLM eliminated this alternative from detailed analysis.

Phased Oil and Gas Leasing

The BLM considered an alternative of phased leasing, especially along areas where conflict with other resources are anticipated to occur, such as bentonite and gypsum mine development or wildlife habitat. The BLM found this alternative unreasonable as 48 percent of the Planning Area is leased or non BLM-administered minerals. The scattered ownership pattern in the Bighorn Basin lends itself to drainage, and the BLM has responsibility to address drainage issues. Leasing is a discretionary action therefore the right to phase leases is retained under all alternatives.

No New Oil and Gas Leasing

The BLM considered closing the entire Planning Area to new leasing of federal minerals, specifically oil and gas, as a method to resolve conflicts with other resource values and uses. The federal mineral estate in much of the Planning Area has already been leased (approximately 960,000 acres), and large portions of the area are developed (BLM 2008a). Although conflicts between oil and gas leasing and other resource values and uses do occur, closing the entire Planning Area to new oil and gas leasing would eliminate development and production activities in areas where conflicts can be effectively mitigated or where there would be no conflicts. The purpose of this RMP revision project is to ensure that public lands are managed according to the principles of multiple use identified in FLPMA while maintaining the valid existing rights and other obligations already established to address the changing needs of the Planning Area and resource conflicts. This alternative would eliminate development and production in areas where conflicts can be mitigated or where conflicts do not exist, which is inconsistent with the multiple-use policy objectives of the Planning Area. Public scoping comments indicate a growing level of concern with the rate and scale of oil and gas leasing and development in the Planning Area. Alternatives analyzed in detail address making portions of the Planning Area closed to oil and gas leasing in response to other identified resource needs. Over 59 percent (2,464,745 acres) of the federal mineral estate in the Planning Area was analyzed as closed to oil and gas leasing under alternatives B and E.

Require Reinjection of all Produced Water

The BLM considered requiring reinjection of all produced water. Under this alternative all produced water from both new and existing sources would be required to be captured and re-injected into an underground stratum. The BLM considered this alternative, but eliminated it from detailed analysis for several reasons, including responding to issues such as potential impacts to aquifers, soils, and the quantity and quality of surface water in and downstream of produced water discharges. The feasibility of an all reinjection alternative is unreasonable as produced water surface discharge from numerous oil and gas fields in the Planning Area has been authorized in the past and such authorizations remain valid. Further, not all stratum are of a type or quality that would permit reinjection. Requiring such reinjection of produced waters wholesale would also be outside of BLM's regulatory authority because all water in the state of Wyoming is owned by the state, and discharge of produced water is therefore under the jurisdiction of the Wyoming Department of Environmental Quality (DEQ), Wyoming State Engineer's Office, and/or the Wyoming Oil and Gas Conservation Commission. BLM Instruction Memorandum (IM) WY-2005-14 addresses water disposal and land application. Under Alternative B, the BLM did analyze a management action prohibiting the authorization of new activities resulting in the surface discharge of produced water on BLM-administered land.

2.4.3 Fire and Fuels Management

None of the alternatives considered and subsequently eliminated from detailed analysis addressed this resource.

2.4.4 Biological Resources

Emphasize the Protection of Resources by Removing Human Uses

The BLM considered, but eliminated from further analysis, an alternative to emphasize the protection of resources by removing most, if not all, human uses because it would not respond to the purpose and need for the RMP revision. FLPMA requires the BLM to manage public lands and resources according to the principles of multiple use and sustained yield. Included in this requirement are human uses, such as mineral development or livestock grazing, that must be managed so as to account for other resource values, such as wilderness or wildlife resources. Alternatives considered in detail address management actions that include closure or prohibition of various resource uses over portions of the Planning Area.

Manage Herd Areas for Wild Horses within the Original Herd Area Boundaries

At present, the BLM manages only two Herd Management Areas (HMAs) for wild horses in the Planning Area: Fifteenmile and McCullough Peaks. In the remaining Herd Areas, the BLM has removed the wild horses and does not manage these areas for wild horses. Analysis for previous decisions determined that managing wild horses in these Herd Areas resulted in management issues or conflicts that were most appropriately resolved by the removal of wild horses. These decisions and findings remain valid because the resource conditions have not changed; information about the issues and conflicts associated with individual Herd Areas are available at the BLM Cody Field Office (CYFO) and Worland Field Office (WFO), and are summarized in Chapter 3 of this document. Management issues and conflicts that resulted in the removal of horses from these areas included horse trespass due to unfenced boundaries, forage and/or water competition with domestic livestock, and private landowner requests.

HMAs are the only administrative units the CYFO and WFO currently use to manage wild horses in the Planning Area. Alternatives considered in detail do include changing the administrative boundary of the existing HMAs without an increase in the number of horses.

Designation of a Wild Horse or Burro Range

The BLM considered, but eliminated from further analysis, the designation of the McCullough Peaks HMA as a Wild Horse or Burro Range in the Bighorn Basin RMP. BLM Handbook H-1601-1 states that an HMA may be considered for designation as a Wild Horse or Burro Range when there is a significant public value present, such as unique characteristics in a herd or an outstanding opportunity for public viewing. The McCullough Peaks HMA does not provide outstanding opportunities for public viewing or have significant public value present. Further, the BLM can achieve needed funding, additional protections, management opportunities, and additional public awareness of this resource under the existing HMA designation. Alternatives considered in detail do address viewing opportunities and additional protections for wild horses within the existing Fifteenmile and McCullough Peaks HMAs.

2.4.5 Heritage and Visual Resources

None of the alternatives considered and subsequently eliminated from detailed analysis addressed this resource.

2.4.6 Land Resources

Prohibit or Exclude Wind-Energy Development, Oil and Gas Leasing, Off-Highway Vehicle Use, and Livestock Grazing

The BLM considered requests to prohibit or exclude part or all of the Planning Area from wind-energy development, oil and gas leasing, off-highway vehicle (OHV) use, and livestock grazing. However, FLPMA requires that BLM manage public lands and resources according to the principles of multiple use and sustained yield, and the BLM eliminated from detailed review alternatives inconsistent with this multiple use mandate. However, alternatives analyzed in detail include limitations and restrictions on wind-energy development, oil and gas leasing, OHV use, and livestock grazing. Specifically, alternatives B and E include wind-energy development right-of-way (ROW) exclusion (1,244,948 acres) and avoidance (1,691,663 acres) areas, areas closed to oil and gas leasing (2,464,745 acres), and areas closed to livestock grazing (1,984,211 acres). The BLM recognizes that there are conflicts between resources and resource uses and considered these conflicts during alternatives development.

No Net Gain in BLM-administered Public Lands

The BLM considered an alternative with no net gain in BLM-administered public lands in the Planning Area. However, the BLM cannot guarantee there would be no net gain of public land, because individual land exchanges are based on equal monetary values of the land, not equal land acreages. Over the past 20 to 30 years in the Bighorn Basin and Wyoming in general, conveyances of various kinds have resulted in a net loss of public land. The BLM coordinates with affected counties and the public on all acquisitions. Current BLM policy establishes exchange as the favored method of land disposal/acquisition (BLM 1995) to minimize spending of taxpayer money and minimize effects to local tax base.

Limit Travel Only to Existing Roads and Trails

The BLM considered an alternative limiting travel to only existing roads and trails within the entire Planning Area, but eliminated it from detailed analysis. The BLM comprehensive travel and transportation management (CTTM) program is guided by resource values and user needs. A broad travel designation for the entire Planning Area would not fulfill the BLM's responsibility per 43 CFR 8341.1 to base travel management designations on the protection of the resources of the public lands, the promotion of the safety of all the users of the public lands, and the minimization of conflicts among the various uses of the public lands. In addition, such an approach is inconsistent with BLM policy, specifically 1626—Travel and Transportation Manual (BLM2011c) and Handbook 8342.1; therefore such an alternative would not meet the purpose and need of the RMP revision. The BLM analyzes a reasonable range of travel management designations in the alternatives considered in detail.

No Livestock Grazing

Livestock grazing is a well-established use within the BLM's multiple-use mandate. The BLM considered an alternative that would make all 3.2 million acres of BLM-administered surface lands in the Planning

Area unavailable for livestock grazing. This alternative was not analyzed in detail because such an alternative is not reasonable, viable, or necessary. Instead, and in accordance with BLM's Land Use Planning Handbook and BLM IM No. 2012-169, the BLM considered a range of alternatives with respect to both areas that are available or unavailable for livestock grazing on an area-wide basis. The range of alternatives considered includes a meaningful reduction in livestock grazing through a reduction in areas available to livestock grazing and forage allocation.

As discussed above, the BLM developed a range of alternatives that sharply defines the issues and provides a clear basis for choice among options by the decision-maker. The BLM analyzed closing 1,984,211 acres to livestock grazing under alternatives B and E to address identified unresolved conflicts concerning various uses of available resources including within elk and bighorn sheep winter range areas and the Greater Sage-Grouse Key Habitat Areas ACEC.

In addition, all alternatives would allow the reduction or elimination of livestock grazing in specific situations where livestock grazing causes or contributes to conflicts with the protection or management of other resource values or uses. Such determinations would be made during site-specific activity planning and associated environmental review. These determinations would be based on several factors, including monitoring studies, review of current range management science, input from livestock operators and interested publics, and the ability to meet the standards in Appendix N.

In summary, current resource conditions on BLM-administered land, including range vegetation, watershed, and wildlife habitat, as reflected in land health assessments, do not warrant prohibition of livestock grazing throughout the entire Planning Area. Such a blanket prohibition, in the absence of resource conflicts, would not meet the purpose and need and would be inconsistent with the policy objectives of the area. However, as described above, the range of alternatives does include a meaningful reduction in grazing throughout the Planning Area.

No Net Loss of Grazing Animal Unit Months

The BLM considered an alternative that would ensure or require no net loss of grazing animal unit months (AUMs), but eliminated it from detailed analysis. The commitment to manage for no net loss of AUMs would conflict with 43 CFR 4110.3, which requires the BLM to periodically review permitted use specified in grazing permits or leases and make changes in the permitted use as needed to manage, maintain, or improve rangeland productivity, to assist in restoring ecosystems to PFC, to conform with land use plans, or to comply with the provisions of 43 CFR 4100, Subpart 4180-Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration. In addition, there could be grazing reductions as a result of land being conveyed out of federal ownership.

Close all Big Game Crucial Winter Range to Livestock Grazing

The BLM considered, but eliminated from detailed analysis, an alternative to remove livestock grazing from all big game crucial winter range. When livestock and big game share the same habitat, there can be competition for forage. However, although big game and livestock might share the same habitat, they do not necessarily compete for the same forage. For species that do not compete for forage with livestock there are no forage-related conflicts between livestock grazing and these species that would be resolved by closing big game crucial winter range to livestock grazing. The BLM did analyze in detail an alternative to eliminate livestock grazing from bighorn sheep and elk crucial winter range because of competing forage needs between these species and livestock.

Open Off-Highway Vehicle "Play" Areas

The BLM evaluated proposals for designating areas as open to OHV use. Motorized vehicle travel is permitted year-round anywhere within an area designated as open to OHV use. Open designations are used for intensive OHV use areas where there are no special restrictions or where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel (see 43 CFR 8340.0-5) (BLM 2011c).

The BLM evaluated the following areas:

- Red Lake/Diamond Basin Area
- North Oregon Basin
- Garland Slopes Area
- McCullough Peaks Area
- Polecat Bench Area
- Bentonite Hills "Darnell's Area"
- Lovell Motocross Track
- Cowley Hill Climb "Monsters Area"

The BLM identified user conflicts, public safety issues, and compelling resource protection needs including threatened and endangered species, greater sage-grouse habitat, cultural and historic features, crucial winter range, valid existing rights such as mining claims or active mining, and ongoing reclamation activities, all of which preclude an open designation for most of these areas at this time. A portion of the Red Lake, Bentonite Hills, and Lovell Motocross Track areas are included within the range of alternatives analyzed in detail. Should the issues listed above be resolved, the BLM may consider R&PP leases or amend the RMP.

2.4.7 Special Designations and Other Management Areas

Remove Existing Areas of Critical Environmental Concern

The BLM considered, but eliminated from detailed analysis, the removal of all existing ACECs in the Planning Area. The WFO and CYFO currently manage nine ACECs in the Planning Area under the existing plans. Additional areas were nominated for consideration as ACECs during the public and internal scoping process for this Proposed RMP and Final EIS. The BLM individually evaluated all existing and newly nominated areas to determine if they met the importance and relevance criteria required for ACEC designations. Based on this evaluation, consideration of planning issues, and input from the public and cooperating agencies, the BLM carried forward two of the existing ACECs in all alternatives (Brown/Howe Dinosaur Area and Spanish Point Karst). Reasons for these ACECs designation and management have not changed since their original designation, and no specific comments addressing issues with their current designation or management were found warranting an alternative considering their removal. In addition, the BLM analyzed alternatives that carried forward all of the existing ACECs (including expansions of five of these areas), nine new ACECs, and several Management or Special Management Areas (SMA) (Appendix F).

Recommend Withdrawals for Wilderness Study Areas

The BLM considered recommending withdrawals from appropriation under the mining laws for WSAs, but eliminated the alternative from detailed study. By law, an RMP cannot close an area to the operation of the Mining Laws – this can only be accomplished by withdrawal, which is a separate action BLM can recommend but must ultimately be taken at the Secretarial level. Withdrawals cannot be applied to WSAs solely for the protection of wilderness characteristics per FLPMA Section 603, although withdrawal of a WSA is permissible for the protection of other resource values. The 10 WSAs within the Planning Area contain important cultural resources and special status species habitat, which may be withdrawn on a case-by-case basis under all of the alternatives, as well as cave and karst resources and portions of the Spanish Point Karst ACEC, which are recommended for withdrawal under all of the alternatives.

2.4.8 Socioeconomic Resources

None of the alternatives considered and subsequently eliminated from detailed analysis specifically addressed socioeconomic resources. However, alternatives considered but eliminated from detailed analysis, such as no livestock grazing, and alternatives analyzed in detail that limit or expand oil and gas, mineral materials, mining, recreation, and livestock grazing affect socioeconomic conditions.

2.5 Management Actions Common to All Alternatives

Management actions common to all alternatives can result because of specific limitations on management of resources and land use programs that guided the development of the management alternatives. These limitations are defined in various laws and regulations that govern BLM management decisions. They are also set forth in the planning criteria to ensure that management actions under all alternatives comply with nondiscretionary laws and regulations. In many cases, these laws and regulations preclude the development of alternatives to a given action; in some cases, they limit management either to implementing or not implementing the action.

This section summarizes some of the typical actions captured by management actions that are common to all alternatives. The section does not list all management actions; rather, the BLM selected and summarized actions to provide an overview. Management actions common to all alternatives include laws, regulations, and policies, and while the following descriptions reflect some of these types of actions, this section primarily includes management actions not established by such laws or policies. Table 2-9 provides a complete list of management actions common to all alternatives for each resource. This section groups management action summaries into eight broad resource topics (physical resources, mineral resources, fire and fuels management, biological resources, heritage and visual resources, land resources, special designations and other management areas, and socioeconomic resources).

2.5.1 Physical Resources

Management actions for physical resources include the use of best management practices (BMP) to preserve air, soil, cave and karst, and water resources. Appendix L includes examples of BLM approved BMPs, Required Design Features and Best Management Practices. Because BLM regularly reviews BMPs, Appendix L does not provide an exhaustive list. Success and effectiveness of BLM approved BMPs are determined by project specific implementation and monitoring. Certain management actions

specify conformance with Wyoming DEQ regulations (e.g., smoke management rules for prescribed burns and meeting water quality standards), or specify enforcement and remediation actions.

The BLM manages water resources to meet the *Wyoming Standards for Healthy Rangelands* and to achieve PFC. Under all alternatives, the BLM manages surface-disturbing activities to prevent degradation of water quality for all waters. Management actions also include control of water runoff from disturbed or developed sites and control of soil erosion to appropriate rates for natural conditions through the Wyoming DEQ Water Quality Division Storm Water Permitting Program.

Under all alternatives, cave and karst resources are closed to mineral materials disposal, closed to mineral leasing, and withdrawn from locatable entry. In addition, motorized vehicle use is limited to designated roads and trails in areas over important caves or cave passages.

2.5.2 Mineral Resources

Mineral resources management defines the scope of mineral development and applies measures such as BMPs to protect other resources and resource uses. Under all alternatives, the BLM manages land not formally withdrawn from mineral entry for exploration and development of locatable minerals. Proposals for new mineral materials disposal sites are subject to site-specific analysis prior to approval, but existing approved sites would remain open.

Management of leasable minerals includes consultation with private landowners about routing access roads, locating well pads, and other specific needs on split-estate; processing oil and gas lease applications on a case-by-case basis; and the application of BMPs in the exploration, development, production, and abandonment of oil and gas resources. Unless otherwise noted, BLM-administered land in the Planning Area that is open to oil and gas leasing is open to geothermal leasing, and, conversely, lands identified as closed to oil and gas leasing and exploration are also closed to geothermal leasing. Geothermal exploration and development is also subject to restrictions on surface-disturbing activities in the same manner as they are applied to oil and gas exploration and development activities.

2.5.3 Fire and Fuels Management

Fire and fuels management actions in the Planning Area would be implemented in coordination with and in support of other natural and cultural resource goals and objectives. Fire and fuels management actions will first prioritize the protection of firefighter and public safety while implementing an efficient and effective response to wildfire; restoring and maintaining resilient landscapes; and promoting fire-adapted communities and infrastructure. Prescribed burns will comply with Wyoming DEQ air quality standards and smoke management rules. Management prescriptions include suppressing fire that threatens greater sage-grouse habitat and crucial winter wildlife habitat in Wyoming big sagebrush communities, ensuring firefighting equipment is cleaned after water sources containing high-risk aquatic invasive species are used.

2.5.4 Biological Resources

Management actions common to all alternatives for biological resources include laws, regulations, and BLM policies that govern management of biological resources, as well as actions that set management to meet thresholds, minimize resource conflict and damage, and require stakeholder coordination. Management actions include a requirement that all types of forest management apply appropriate mitigation guidelines such as those described in the Wyoming Forestry BMPs (Appendix L), that

riparian/wetland areas be managed to meet PFC and the *Wyoming Standards for Healthy Rangelands*, and that the BLM work cooperatively to control outbreaks of grasshoppers and Mormon crickets. Areas harvested for timber are to be regenerated by natural or artificial means consistent with BLM policy, and vegetative communities are managed in accordance with the *Wyoming Standards for Healthy Rangelands*. Management prescriptions for invasive species include developing and maintaining an invasive species and pest management plan, prohibiting aerial application of pesticides within the boundaries of the Spanish Point Karst ACEC, and coordinating with appropriate stakeholders to manage for the reduction of cheatgrass and other invasive species.

Fish and wildlife management includes actions to appropriately mitigate the effects of surface-disturbing activities. Management actions include maintaining or improving important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of applicable guidance. The BLM prohibits surface-disturbing and disruptive activities in the Bighorn River Habitat Management Plan (HMP)/Resource Area Management Plan tracts and the BLM-administered tracts in Yellowtail Wildlife Habitat Management Area and applies a no surface occupancy (NSO) restriction as appropriate. The BLM will continue to use and update existing HMPs (including the West Slope HMP, Bighorn River HMP, and Absaroka Front HMP) as necessary to include management objectives and prescriptions for wildlife.

In consultation with stakeholders, projects that could affect special status species are to be postponed or modified to protect these species. Management actions specific to greater sage-grouse include avoiding aerial pesticide spraying, restoring greater sage-grouse brood-rearing habitats in riparian/wetland areas, managing vegetation diversity to provide suitable habitat during greater sage-grouse nesting periods, and conducting fire management to minimize wildfire size and frequency in sagebrush plant communities.

Wild horse management includes maintaining or enhancing conformance with the *Wyoming Standards for Healthy Rangelands* within the Fifteenmile and McCullough Peaks HMAs. The BLM performs wild horse management activities in compliance with relevant court orders and agreements, including the Consent Decree (August 2003), as applicable to the management situation.

2.5.5 Heritage and Visual Resources

Management of heritage resources, including cultural and paleontological resources, includes consultation and cooperation with Native American tribes to limit exposure of heritage resources to incompatible uses. Management actions provide for consideration of the effects of incompatible uses on historic properties through the processes defined in the National Programmatic Agreement (BLM, ACHP, and National Conference of SHPO 2012) and the Wyoming State Protocol (BLM and Wyoming SHPO 2014). Specific actions include: investigations of Archaeological Resources Protection Act violations; limiting motorized vehicle use in areas that contain significant cultural and paleontological resources; pursuing withdrawals from appropriation under the mining laws for important cultural sites on a case by-case basis; performing inventories of sensitive cultural places identified during tribal consultations; ensuring that areas of importance to Native American Tribes are not transferred from federal ownership, physically modified, or affected by management actions in ways that restrict or deny access and/or use; protecting sites listed on the National Register of Historic Places (NRHP) appropriately; protecting and managing sites that are eligible for or listed on the NRHP; managing sites allocated for conservation, traditional use, or public use to avoid adverse effects; managing sites allocated for scientific or experimental use for their research potential; protecting and managing National Historic Landmarks through management of non-compatible uses and coordinating with affected landowners, local communities, and agencies on any decisions that could affect their use or operations; and devising management actions that complement the objectives of private landowners or local communities consistent with cultural resource protection goals and objectives.

Visual resources are managed in accordance with Visual Resource Management (VRM) class objectives. The BLM considers VRM objectives before authorizing land uses that may affect the visual character of the landscape.

2.5.6 Land Resources

Lands and realty management seeks to improve access to public land and enable better overall management of BLM-administered land. Management of acquired lands or interests in lands is consistent with adjacent or nearby BLM-administered land. The BLM considers land use authorizations, such as permits and leases and protective withdrawals, on a case-by-case basis. ROW management includes avoiding ROW authorizations in areas with 25 percent or more average slope and providing reasonable access across BLM-administered land to private land, subject to other resource concerns. The BLM manages renewable energy development in a manner consistent with other resource values, and initiates consultations with tribal governments if such development might affect tribes.

Routes within the Planning Area would be limited to existing roads, primitive roads, and trails. The OHV designation would change from “limited to existing roads, primitive roads, and trails” to “limited to designated roads, primitive roads, and trails” upon the completion of travel management plans. Route designation will be assessed using the designation criteria from 43 CFR 8342.1(b), “areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.” Specific areas such as the Lovell Shooting Range, and the Cody Archery Range are closed to motorized vehicle use except where permitted. The BLM does not restrict pedestrian and equestrian travel on BLM-administered land, and allows these activities on or off roads or trails, except during some limited seasonal restrictions.

Where off-road vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. This may include closure of routes or areas (43 CFR 8341.2).

The BLM manages recreational use to improve wetland habitat conditions along intensively used streams and reservoirs, consistent with the *Wyoming Standards for Healthy Rangelands*. Surface-disturbing and disruptive activities associated with construction, maintenance, and use of roads, campgrounds, interpretive sites, and other recreational facilities are to be mitigated to protect other resource values.

Livestock grazing management includes the use of rangeland health assessments, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, and seasons of use are necessary.

2.5.7 Special Designations and Other Management Areas

Only the Brown/Howe Dinosaur Area ACEC and Spanish Point Karst ACEC are designated under all alternatives; therefore, only these ACECs have management actions common to all alternatives. Within the Brown/Howe Dinosaur Area ACEC, motorized vehicle use is limited to designated roads and trails, and all surface-disturbing activities are mitigated. The Spanish Point Karst ACEC is closed to motorized vehicle use and closed to oil and gas leasing.

Other special designation management actions include retaining the Red Gulch/Alkali Road National Back Country Byway and closing BLM-administered lands within the waterway corridors of Wild and Scenic River (WSR) eligible and suitable segments to land disposal actions. The BLM manages 10 WSAs in the Planning Area, including McCullough Peaks, Alkali Creek, Cedar Mountain, Honeycombs, Medicine Lodge, Trapper Creek, Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands in accordance with BLM Manual 6330 Management of Wilderness Study Areas. The BLM manages these areas as ROW avoidance and VRM Class I areas; the lands are closed to mineral and geothermal leasing, mineral materials disposal, and renewable energy development.

2.5.8 Socioeconomic Resources

Socioeconomic resource management includes ensuring BLM actions consider local and regional economic development and land use plans, incorporating BLM actions that are sensitive to the economic and social health of the affected area, and referring to available socioeconomic monitoring plans that provide indicators for the economic and social health of an affected area. Management prescriptions for health and safety in the Planning Area generally seek to reduce human and environmental risk and reduce government environmental liabilities. Actions designed to reduce these risks include preparing an Environmental Site Assessment for acquired lands and warning the public about hazardous substances.

2.6 Alternatives Summary

This section summarizes the six alternatives (A through F) considered in detail in this RMP and EIS. Due to the breadth of management prescriptions in the alternatives, this section describes only the key elements of alternatives (those with the greatest potential to affect resources). The summary descriptions provide a general overview of each alternative, the management emphasis associated with each alternative, and key management actions for each alternative. Table 2-9 later in this chapter provides detailed descriptions of the alternatives. The maps in Volume 3 further illustrate differences in acreage allocations and management prescriptions by alternative.

Table 2-6 lists acreage allocations for resources and resource uses by alternative. Table 2-7 lists acreage allocations and the emphasis for management in existing and proposed ACECs. These tables provide a comparative summary of acreage allocations under the four alternatives.

Table 2-6. Comparative Summary of Proposed Land Use Decisions in the Bighorn Basin Planning Area

Topic	Acreage Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Physical, Mineral, Biological, and Heritage and Visual Resources							
Acres Available for Locatable Mineral Entry	BLM-Administered Mineral Estate	4,130,352	3,888,990	4,155,119	4,120,325	2,443,901	4,120,325
Acres Maintained/Recommended for Withdrawal Under the Mining Laws	BLM-Administered Mineral Estate	72,861	314,223	48,095	83,321	1,759,312	83,321
Acres Open to Geothermal Leasing	BLM-Administered Mineral Estate	3,986,094	1,684,832	3,993,194	3,776,248	1,684,832	3,776,248
Acres Closed to Geothermal Leasing	BLM-Administered Mineral Estate	151,931	2,453,193	145,836	361,777	2,453,193	361,777
Acres of Oil and Gas Management Areas where some discretionary seasonal restrictions would be relaxed.	BLM-Administered Mineral Estate	0	0	430,647 (for big game and sage-grouse)	348,617 (for big game)	0	348,617 (for big game)
Acres Closed to Oil and Gas Leasing	BLM-Administered Mineral Estate	260,792	2,464,745	145,836	292,353	2,464,745	324,829
Acres Open to Oil and Gas Leasing with Major Constraints	BLM-Administered Mineral Estate	889,435	932,551	91,956	1,221,142	969,432	1,191,215
Acres Open to Oil and Gas Leasing with Moderate Constraints	BLM-Administered Mineral Estate	1,633,204	335,109	1,334,491	1,714,685	319,671	1,709,652
Acres Open to Oil and Gas Leasing Subject to the Standard Lease Form	BLM-Administered Mineral Estate	1,354,593	405,620	2,565,742	911,814	384,176	912,328
Acres Open to Disposal of Mineral Materials	BLM-Administered Mineral Estate	3,974,564	1,612,993	3,859,251	3,828,320	1,059,062	3,828,320
Acres Closed to Disposal of Mineral Materials	BLM-Administered Mineral Estate	228,649	2,590,220	343,962	374,894	3,144,151	374,894

Table 2-6. Comparative Summary of Proposed Land Use Decisions in the Bighorn Basin Planning Area (Continued)

Topic	Acreage Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Greater Sage-Grouse Winter Concentration Areas	Planning Area	210,229 (TLS)	210,229 (NSO)	210,229 (TLS)[1]	210,229 (TLS)	210,229 (NSO)	210,229 (TLS)
	BLM-Administered Surface	172,809 (TLS)	172,809 (NSO)	172,809 (TLS)[1]	172,809 (TLS)	172,809 (NSO)	172,809 (TLS)
	BLM-Administered Mineral Estate	196,255 (TLS)	196,255 (NSO)	196,255 (TLS)[1]	196,255 (TLS)	196,255 (NSO)	196,255 (TLS)
Greater Sage-Grouse Occupied Lek Protective Buffer (Prohibitions or Restrictions on Surface-disturbing Activities)	Planning Area	26,871 (CSU)	146,324 (NSO)	26,871 (CSU)	116,522 (NSO)	146,324 (NSO)	116,522 (NSO)
	BLM-Administered Surface	21,352 (CSU)	117,398 (NSO)	21,352 (CSU)	97,889 (NSO)	117,398 (NSO)	97,889 (NSO)
	BLM-Administered Mineral Estate	26,835 (CSU)	146,233 (NSO)	26,835 (CSU)	118,309 (NSO)	146,233 (NSO)	118,309 (NSO)
Greater Sage-Grouse Occupied Lek Protective Buffer (Timing Limitation Stipulations on Surface-disturbing Activities)	Planning Area	1,461,107 (TLS)	1,526,277 (TLS)	1,461,107 (TLS)[1]	1,530,550 (TLS)	1,526,277 (TLS)	1,530,550 (TLS)
	BLM-Administered Surface	1,116,698 (TLS)	1,232,583 (TLS)	1,116,698 (TLS)[1]	1,236,037 (TLS)	1,232,583 (TLS)	1,236,037 (TLS)
	BLM-Administered Mineral Estate	1,458,628 (TLS)	1,520,845 (TLS)	1,458,628 (TLS)[1]	1,462,901 (TLS)	1,520,845 (TLS)	1,462,901 (TLS)
Raptor Active Nest Protective Buffer (Restrictions or Timing Limitation Stipulations on Surface-disturbing Activities)	Planning Area	592,529 (TLS)	994,586 (TLS) 82,294 (CSU)	82,294 (TLS)[2]	209,695 (TLS) 82,294 (CSU)	994,586 (TLS) 82,294 (CSU)	209,695 (TLS) 82,294 (CSU)
	BLM-Administered Surface	337,662 (TLS)	569,218 (TLS) 47,651 (CSU)	47,651 (TLS)[2]	126,241 (TLS) 47,651 (CSU)	569,218 (TLS) 47,651 (CSU)	126,241 (TLS) 47,651 (CSU)
	BLM-Administered Mineral Estate	428,089 (TLS)	762,795 (TLS) 58,570 (CSU)	58,570 (TLS)[2]	161,662 (TLS) 58,570 (CSU)	762,795 (TLS) 58,570 (CSU)	161,622 (TLS) 58,570 (CSU)
Acreage of Aspen Restored	BLM-Administered Surface	25-200 per year until 2,000-4,000 are restored	100 per year	N/A[1]	CBC	100 per year	CBC
Riparian/Wetland Areas Managed	BLM-Administered Surface	23,957 Towards PFC	23,957[3] Towards DPC	23,957 Towards PFC	23,957[3] Towards PFC	23,957[3] Towards DPC	23,957[3] Towards PFC
Fisheries Habitat Restored or Improved	BLM-Administered Surface	CBC	10 lotic[4] miles; 80 lentic[5] acres	CBC	on a priority basis	10 lotic[4] miles; 80 lentic[5] acres	on a priority basis

Table 2-6. Comparative Summary of Proposed Land Use Decisions in the Bighorn Basin Planning Area (Continued)

Topic	Acreage Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Restrictions on Surface Development on or near Important Cultural Sites	BLM-Administered Surface	CBC	NSO within 3 miles and CSU in view within 5 miles	NSO within ¼ mile and CSU in view within 1 mile	CSU up to 3 miles where setting is an important aspect of the integrity for the site	NSO within 3 miles and CSU in view within 5 miles	CSU up to 3 miles where setting is an important aspect of the integrity for the site
Visual Resource Management – Class I	BLM-Administered Surface	141,127	154,359	140,976	141,127	154,359	141,127
	BLM-Administered Mineral Estate	139,168	152,243	139,017	139,169	152,243	139,169
Visual Resource Management – Class II	BLM-Administered Surface	340,784	1,784,854	333,027	731,812	1,784,854	731,812
	BLM-Administered Mineral Estate	547,318	2,499,146	507,511	1,170,320	2,499,146	1,170,320
Visual Resource Management – Class III	BLM-Administered Surface	890,482	394,106	510,535	738,531	394,106	738,531
	BLM-Administered Mineral Estate	1,171,831	469,557	790,976	981,591	469,557	981,591
Visual Resource Management – Class IV	BLM-Administered Surface	1,815,043	858,263	2,202,825	1,580,470	858,263	1,580,470
	BLM-Administered Mineral Estate	2,324,800	1,066,985	2,745,681	1,897,333	1,066,985	1,897,333
Visual Resource Management – Unclassified	BLM-Administered Surface	23	24	24	37	24	37
	BLM-Administered Mineral Estate	19,370	19,370	19,370	19,299	19,370	19,299
Resource Uses and Support							
Acres Open to Renewable Energy Development	BLM-Administered Surface	CBC	251,203	1,428,360	1,315,309	254,151	607,429
Renewable Energy Avoidance Areas	BLM-Administered Surface	CBC	1,691,663	1,611,040	1,500,395	988,459	2,507,581
Renewable Energy Exclusion Areas	BLM-Administered Surface	CBC	1,244,948	148,416	372,110	1,945,204	292,949

Table 2-6. Comparative Summary of Proposed Land Use Decisions in the Bighorn Basin Planning Area (Continued)

Topic	Acreage Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Acres Closed to Livestock Grazing	BLM-Administered Surface	5,009	1,984,211	5,009	5,009	1,984,211	5,009
Number of Special Recreation Management Areas	BLM-Administered Surface	7	13	1	13	13	13
Number of Extensive Recreation Management Areas	BLM-Administered Surface	2 (Under previous guidance)	1	2	5	1	5
Acres Closed to Motorized Vehicle Use	BLM-Administered Surface	68,115	170,253	9,274	61,010	170,253	61,010
Acres Open to Motorized Cross-country Travel	BLM-Administered Surface	1,311	3,132	14,830	5,885	3,132	5,885
Acres Limited to Existing Roads and Trails for Motorized Vehicle Use	BLM-Administered Surface	2,315,896	592,563	2,137,574	1,955,943	592,563	1,295,072
Acres Limited to Designated Roads and Trails for Motorized Vehicle Use	BLM-Administered Surface	797,077	2,416,378	1,020,748	1,159,557	2,416,378	1,820,427
Acres Closed to Over-snow Vehicle Use	BLM-Administered Surface	N/A[1]	1,859,038	CBC	CBC	1,859,038	CBC
Land Available for Disposal	BLM-Administered Surface	115,905	24,042	117,845	66,363	24,042	66,363
Surface Ownership Retained	BLM-Administered Surface	3,071,909	3,164,261	3,069,967	3,121,558	3,164,297	3,121,558
Open for Entry Under the Desert Land Act	BLM-Administered Surface	1,409	0	1,409	1,409	0	1,409
Rights-of-Way Avoidance Areas	BLM-Administered Surface	940,943	2,710,695	1,173,162	2,408,662	1,610,729	2,315,730
Rights-of-Way Exclusion Areas	BLM-Administered Surface	61,147	225,447	7,586	40,802	1,322,879	133,734
Lands Managed to Maintain Wilderness Characteristics	BLM-Administered Surface	0	476,349	0	0	476,349	49,396

Table 2-6. Comparative Summary of Proposed Land Use Decisions in the Bighorn Basin Planning Area (Continued)

Topic	Acreage Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Special Designations							
Nez Perce National Historic Trail Management Corridor	BLM-Administered Surface	1,638[3]	24,437 (NSO) 38,319[2] (CSU)	1,638 (NSO) 7,716[2] (CSU)	up to 15,816[2]	24,437 (NSO) 38,319[2] (CSU)	up to 15,816[2]
Wild and Scenic Rivers (acreage managed to preserve eligibility for inclusion in the NWSRS)	BLM-Administered Surface	27,317	27,317	0	0	27,317	0
Wilderness Study Areas	BLM-Administered Surface	141,068[6]	141,068[7]	141,068	141,068[7]	141,068[7]	141,068[7]

Note: The Planning Area is the area of analysis for this document; it encompasses the area addressed in the previous RMPs, regardless of ownership. However, decisions in this RMP apply only to BLM-administered surface lands and mineral estate.

[1]Oil and Gas Management Areas and ROW corridors are exempt from discretionary wildlife seasonal stipulations.
[2]Surface-disturbing activities are avoided.
[3]Management toward DFC and DPC is assumed to exceed the requirements of managing toward PFC.
[4]Running water riparian/wetland areas such as rivers, streams, and springs.
[5]Standing water riparian/wetland areas such as lakes, ponds, seeps, bogs, and meadows.
[6]Includes 1,290 acres of acquired state land in Bobcat Draw.
[7]In-holdings acquired with willing landowners on a case-by-case basis.

BLM	Bureau of Land Management	NWSRS	National Wild and Scenic River System
CBC	case-by-case	PFC	proper functioning condition
CSU	controlled surface use	PHMAs	Priority Habitat Management Areas
DFC	desired future condition	RMP	Resource Management Plan
DPC	desired plant community	ROW	Right-of-way
N/A	not applicable	TLS	timing limitations
NSO	no surface occupancy		

Table 2-7. Comparative Summary of Proposed Areas of Critical Environmental Concern and other Management Areas by Alternative

Name	Value(s) of Concern	Acreage Type	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
			Existing Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage
Big Cedar Ridge	Paleontological	Total Surface	ACEC	264	ACEC	264	None	0	ACEC	264	ACEC	264	ACEC	264
		BLM-Administered Surface		264		264		0		264		264		264
		BLM-Administered Mineral Estate		264		264		0		264		264		264
Red Gulch Dinosaur Tracksite	Paleontological	Total Surface	ACEC	1,798	ACEC	1,798	None	0	ACEC	1,798	ACEC	1,798	ACEC	1,798
		BLM-Administered Surface		1,798		1,798		0		1,798		1,798		1,798
		BLM-Administered Mineral Estate		1,798		1,798		0		1,798		1,798		1,798
Sheep Mountain Anticline	Geologic; Caves; Cultural; Scenic	Total Surface	ACEC	13,261	ACEC	13,261	None	0	ACEC	13,261	ACEC	13,261	ACEC	13,261
		BLM-Administered Surface		11,520		11,520		0		11,520		11,520		11,520
		BLM-Administered Mineral Estate		11,771		11,771		0		11,771		11,771		11,771

Table 2-7. Comparative Summary of Proposed Areas of Critical Environmental Concern and other Management Areas by Alternative (Continued)

Name	Value(s) of Concern	Acreage Type	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
			Existing Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage
Spanish Point Karst	Caves; Recreational; Sinking Stream Segments; Water Quality	Total Surface	ACEC	8,026	ACEC	8,026	ACEC	8,026	ACEC	8,026	ACEC	8,026	ACEC	8,026
		BLM-Administered Surface		6,298		6,298		6,298		6,298		6,298		6,298
		BLM-Administered Mineral Estate		8,022		8,022		8,022		8,022		8,022		8,022
Brown/Howe Dinosaur Area	Paleontological	Total Surface	ACEC	5,521	ACEC	20,778	ACEC	5,521	ACEC	5,521	ACEC	20,778	ACEC	5,521
		BLM-Administered Surface		5,501		20,734		5,501		5,501		20,734		5,501
		BLM-Administered Mineral Estate		5,348		20,581		5,348		5,348		20,581		5,348
Carter Mountain	Vegetation; Wildlife *Expansion*: Cultural; Recreational; Special Status Species; Vegetation; Watershed Vegetation; Wildlife	Total Surface	ACEC	10,947	ACEC	22,203	None	0	ACEC	10,947	ACEC	22,203	ACEC	10,947
		BLM-Administered Surface		10,867		16,574		0		10,867		16,574		10,867
		BLM-Administered Mineral Estate		10,224		17,154		0		10,224		17,154		10,224

Table 2-7. Comparative Summary of Proposed Areas of Critical Environmental Concern and other Management Areas by Alternative (Continued)

Name	Value(s) of Concern	Acreage Type	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
			Existing Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage
Five Springs Falls	Recreational; Scenic; Special Status Species *Expansion*: Geologic; Scenic; Public Safety	Total Surface	ACEC	163	ACEC	1,809	None	0	ACEC	163	ACEC	1,809	ACEC	163
		BLM-Administered Surface		163		1,809		0		163		1,809		163
		BLM-Administered Mineral Estate		163		1,809		0		163		1,809		163
Little Mountain	Caves; Cultural; Paleontological; Scenic	Total Surface	ACEC	21,477	ACEC	89,146	None	0	ACEC	21,477	ACEC	89,146	ACEC	21,477
		BLM-Administered Surface		21,476		72,051		0		21,476		72,051		21,476
		BLM-Administered Mineral Estate		21,477		79,485		0		21,477		79,485		21,477
Upper Owl Creek Area	Cultural; Fish; Recreational; Scenic; Soils; Special Status Species; Vegetation; Wildlife	Total Surface	ACEC	14,266	ACEC	33,241	None	0	ACEC	14,266	ACEC	33,286	ACEC	14,266
		BLM-Administered Surface		13,758		32,733		0		13,758		32,733		13,758
		BLM-Administered Mineral Estate		13,842[1]		32,817		0		13,842		32,817		13,842
Chapman Bench	Special Status Species; Vegetation; Wildlife	Total Surface	None	0	ACEC	23,333	None	0	MA	3,425	ACEC	23,333	MA	3,425
		BLM-Administered Surface		0		23,326		0		3,425		23,326		3,425
		BLM-Administered Mineral Estate		0		23,324		0		3,425		23,324		3,425

Table 2-7. Comparative Summary of Proposed Areas of Critical Environmental Concern and other Management Areas by Alternative (Continued)

Name	Value(s) of Concern	Acreage Type	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
			Existing Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage
Clarks Fork Basin/Polecat Bench West Paleontological Area	Paleontological; Scenic	Total Surface	None	0	ACEC	25,212	None	0	None[2]	0	ACEC	25,212	None[2]	0
		BLM-Administered Surface		0		23,895		0		0		23,895		0
		BLM-Administered Mineral Estate		0		23,384		0		0		23,384		0
Clarks Fork Canyon	Geologic; Open Space; Recreational; Special Status Species; Wildlife	Total Surface	None	0	ACEC	14,056	None	0	ACEC	4,759	ACEC	14,058	ACEC	4,759
		BLM-Administered Surface		0		12,249		0		4,746		12,249		4,746
		BLM-Administered Mineral Estate		0		12,718		0		4,746		12,718		4,746
Foster Gulch Paleontological Area	Paleontological; Scenic	Total Surface	None	0	ACEC	28,585	None	0	None[2]	0	ACEC	28,585	None[2]	0
		BLM-Administered Surface		0		27,302		0		0		27,302		0
		BLM-Administered Mineral Estate		0		27,302		0		0		27,302		0
McCullough Peaks South Paleontological Area	Paleontological; Scenic	Total Surface	None	0	ACEC	6,994	None	0	None[2]	0	ACEC	6,994	None[2]	0
		BLM-Administered Surface		0		6,994		0		0		6,994		0
		BLM-Administered Mineral Estate		0		6,994		0		0		6,994		0

Table 2-7. Comparative Summary of Proposed Areas of Critical Environmental Concern and other Management Areas by Alternative (Continued)

Name	Value(s) of Concern	Acreage Type	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
			Existing Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage
Rainbow Canyon	Paleontological; Geologic; Scenic	Total Surface	None	0	ACEC	1,433	None	0	None	0	ACEC	1,433	None	0
		BLM-Administered Surface		0		1,433		0		0		1,433		0
		BLM-Administered Mineral Estate		0		1,433		0		0		1,433		0
Rattlesnake Mountain	Special Status Species; Vegetation; Wildlife	Total Surface	None	0	ACEC	21,472	None	0	None	0	ACEC	21,472	None	0
		BLM-Administered Surface		0		19,137		0		0		19,137		0
		BLM-Administered Mineral Estate		0		18,639		0		0		18,639		0
Sheep Mountain	Vegetation; Wildlife	Total Surface	None	0	ACEC	73,298	None	0	ACEC	25,960	ACEC	73,298	ACEC	25,960
		BLM-Administered Surface		0		25,151		0		14,200		25,151		14,200
		BLM-Administered Mineral Estate		0		55,289		0		22,563		55,289		22,563
PETM[3]	Paleontological; Scenic	Total Surface	None	0	None	0	None	0	ACEC	14,912	None	0	ACEC	14,912
		BLM-Administered Surface		0		0		0		14,906		0		14,906
		BLM-Administered Mineral Estate		0		0		0		14,908		0		14,908

Table 2-7. Comparative Summary of Proposed Areas of Critical Environmental Concern and other Management Areas by Alternative (Continued)

Name	Value(s) of Concern	Acreage Type	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
			Existing Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage
Absaroka Front	N/A	Total Surface	None	0	MA	402,685	MA	402,685	MA	402,685	MA	402,685	MA	402,685
		BLM-Administered Surface		0		130,872		130,872		130,872		130,872		130,872
		BLM-Administered Mineral Estate		0		253,117		253,117		253,117		253,117		253,117
Craig Thomas Little Mountain	N/A	Total Surface	SMA[1]	89,308	SMA[1]	89,308	SMA[1]	89,308	SMA	89,308	SMA[1]	89,308	SMA	89,308
		BLM-Administered Surface		69,274		69,274		69,274		69,274		69,274		69,274
		BLM-Administered Mineral Estate		79,440		79,440		79,440		79,440		79,440		79,440
Oil and Gas	N/A	Total Surface	None	0	None	0	MA	568,165	MA	528,162	None	0	MA	528,162
		BLM-Administered Surface		0		0		430,674		348,617		0		348,617
		BLM-Administered Mineral Estate		0		0		566,345		441,662		0		441,662

Table 2-7. Comparative Summary of Proposed Areas of Critical Environmental Concern and other Management Areas by Alternative (Continued)

Name	Value(s) of Concern	Acreage Type	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
			Existing Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage	Proposed Designation	Acreage
Greater Sage-Grouse Key Habitat Areas *(Alternative E)* and PHMAs *(Alternative F)* ACECs	Special Status Species, Vegetation	Total Surface	None	0	None	0	None	0	None	0	None	1,857,485	None	1,786,244
		BLM-Administered Surface		0		0		0		0		1,232,583		1,116,698
		BLM-Administered Mineral Estate		0		0		0		0		1,520,845		1,458,628

Note: "Total Surface" refers to all area encompassed by the Planning Area addressed in previous Resource Management Plans (RMPs), regardless of current ownership. BLM-administered surface and BLM-administered mineral estate are federal lands administered by the BLM. This RMP describes and analyzes alternatives for the future management of public lands and resources administered by the BLM.

[1]The Craig Thomas Little Mountain Special Management Area would continue under all alternatives, but only Alternative D contains specific management for this area in this document.
[2]Though not proposed under Alternative D, a portion of this area does fall within the proposed PETM ACEC.
[3]Portions of ACEC proposed under Alternative D are managed as the Clarks Fork Basin/Polecat Bench, McCullough Peaks South Paleontological Area, and Foster Gulch ACECs under Alternative B.

ACEC Area of Critical Environmental Concern
BLM Bureau of Land Management
MA Management Area
N/A not applicable
PETM Paleocene, Eocene Thermal Maximum
PHMA Priority Habitat Management Area
SMA Special Management Area

Goals and objectives (desired outcomes) is a category of land use planning decisions; however, this section does not describe goals and objectives because they do not differ among alternatives. Instead, Section 2.7 *Detailed Description of Alternatives by Resource* describes the goals and objectives for each of the eight resource topics.

Restrictions on resource uses (e.g., closed to mineral leasing) would apply throughout the life of this RMP, unless restrictions change through an RMP amendment. Changes in resource-use restrictions and a resulting RMP amendment can result due to public demand, statewide or national policy and guidance, or other factors. The timing and degree of implementation of management prescriptions in this RMP depend on available budget, staffing, and agency priorities. Actions the BLM takes or authorizes during RMP implementation would comply with standard practices, BLM approved BMPs, guidelines for surface-disturbing activities, and other BLM guidelines and policy. Therefore, the BLM considers these practices and guidelines part of each alternative. Implementation of new BLM policy and guidance during the life of this RMP will be incorporated into the land use planning process and implementation-level decisions.

The lack of detailed, implementation-level decisions in the land use planning process prohibits the development of specific, detailed mitigation measures. As appropriate, the BLM will perform additional environmental analyses during the implementation stage for site-specific actions, and will determine on a case-by-case basis what, if any, mitigation is required. For management actions where adverse impacts to other resources would occur, "on a case-by-case basis" means an action would only be allowed when impacts can be adequately mitigated consistent with other resource goals and objectives.

2.6.1 Alternative A (Current Management)

Overview of the Alternative

Alternative A represents the current management of resources on BLM-administered surface and mineral estate within the Planning Area under the three existing plans. Management under Alternative A continues to balance the use and development of Planning Area resources.

Resource Uses and Support

Under Alternative A, 4,130,352 acres are available for locatable mineral entry and 72,861 acres are withdrawn from locatable mineral entry. Approximately 260,792 acres of federal mineral estate in the Planning Area are closed to oil and gas leasing. The remaining federal mineral estate in the Planning Area is open for oil and gas leasing subject to the following constraints: 1,354,593 acres are subject to standard stipulations, 1,633,204 acres are subject to moderate constraints, and 889,435 acres are subject to major constraints. The BLM identifies constraints on mineral leasing in the Planning Area to protect resource values. Alternative A does not include specific management decisions regarding Oil and Gas Management Areas. Under this alternative, 3,974,564 acres are available for mineral materials disposal and 228,649 acres are closed to mineral materials disposal.

Land resource program actions under Alternative A identify 115,905 acres in the Planning Area as available for disposal. Under Alternative A, the BLM manages 940,943 acres as ROW avoidance areas, and 61,147 acres as ROW exclusion areas. Alternative A requires approval of renewable energy development projects to be considered on a case-by-case basis. Travel management designations under Alternative A include 68,115 acres closed to motorized vehicle use, 2,315,896 acres limited to existing roads and trails, 797,077 acres limited to designated roads and trails, and 1,311 acres open to motorized

vehicle use. Under Alternative A, the BLM considers areas open to over-snow vehicles on a case-by-case basis.

Recreation management under Alternative A balances protection of recreational resources with other resource uses. The BLM applies NSO restrictions to fishing and hunting access areas, Five Springs Falls Campground, the Cody Archery Range, and Recreation and Public Purpose (R&PP) lease area for the Lovell Rod and Gun Club. Under Alternative A, the BLM maintains seven Special Recreation Management Areas (SRMAs) – Absaroka Mountain Foothills (72,130 acres), Badlands (213,981 acres), Bighorn River (15,256 acres), West Slope (375,888 acres), The Rivers (18,247 acres), Historic Trails (12,065 acres), and Worland Caves. Alternative A also includes two Extensive Recreation Management Areas (ERMAs) – the Cody and the Worland general ERMAs.

Under Alternative A, the BLM allows livestock grazing on all but 5,009 acres of the Planning Area. The alternative allows the use of produced water for livestock on a case-by-case basis and prohibits the placement of salt, mineral, or forage supplements within ¼ mile of water, wetlands, riparian areas, or reforested areas.

Special Designations

Alternative A includes nine ACECs – Carter Mountain, Five Springs Falls, Little Mountain, Sheep Mountain Anticline, Brown/Howe Dinosaur Area, Upper Owl Creek Area, Spanish Point Karst, Red Gulch Dinosaur Tracksite, and Big Cedar Ridge. Table 2-7 summarizes acreages and management emphasis in each of these ACECs. Under Alternative A, there is one National Back Country Byway (Red Gulch/Alkali Road National Back Country Byway), one National Historic Landmark (Heart Mountain Relocation Center), and one NHT (the Nez Perce NHT). This alternative also manages 20 WSR eligible waterways, each with interim protective management, and 10 WSAs.

Physical, Biological, Heritage and Visual Resources, and Lands with Wilderness Characteristics

Under Alternative A, the BLM manages physical resources to conserve air, water, and soil resources and to support resources and resource uses. Alternative A includes soil reclamation practices such as seeding of disturbed areas using approved seed mixtures of native species and reestablishing vegetative cover over disturbed soils within 5 years of initial seeding. No reclamation plans are required, and the BLM considers stabilization of heavily eroded roads and topsoil salvage and segregation on a case-by-case basis. The BLM assesses erosion and soil stability during rangeland health evaluations. Alternative A allows for the proper disposal of produced water on BLM-administered lands if it meets the State of Wyoming water quality standards. This alternative does not include management actions to maintain contiguous blocks of vegetation and habitat on BLM-administered lands. Under Alternative A, vegetation resources would be managed to maintain DPC composition for eight broadly defined plant communities. DPC objectives include percent composition by weight for grasses, shrubs, and forbs and, where appropriate, grass-like species and trees with an emphasis on invasion of limber pine and juniper on deep soils on woodland sites. Alternative A prohibits surface-disturbing activities within 500 feet of surface water and riparian/wetland areas and allows aerial application of pesticides in all areas on a case-by-case basis.

Alternative A management actions attempt to provide habitat for fish and wildlife, meet public demand for forest products, protect natural functions in riparian areas, control the spread of invasive species, and comply with the Endangered Species Act (ESA) and BLM policy for special status species. Alternative A applies an NSO restriction and manages surface-disturbing activities using standard restrictions within

500 feet of surface water and riparian areas to protect fish habitat. Seasonal wildlife restrictions under Alternative A include avoiding surface-disturbing activities in big game crucial winter range from November 15 through April 30. This alternative applies CSU stipulations for big game migration corridors, narrow ridges, and overlapping big game crucial winter ranges.

Under this alternative, the BLM prohibits surface-disturbing activities within ¼ mile of occupied greater sage-grouse leks and within 2 miles of occupied leks in greater sage-grouse nesting and early brood-rearing habitats. The BLM prohibits surface-disturbing activities in greater sage-grouse winter concentration areas from November 15 to March 14. Alternative A does not include travel management restrictions in greater sage-grouse Key Habitat Areas. Alternative A prohibits any activity within ¾ mile of active raptor nests from February 1 through July 31. The BLM identifies no specific management actions for black-footed ferret reintroduction but does implement conservation measures, Biological Evaluations, and inter-agency coordination memorandums for all prairie dogs. Impacts to special status plant species from a variety of resource uses are reviewed by the BLM which implements avoidance and mitigation measures on a case-by-case basis.

Alternative A provides for wild horse viewing opportunities in both the Fifteenmile and McCullough Peaks HMAs. Mitigation of surface-disturbing activity to protect wild horse health is applied only in the Fifteenmile HMA. As required by national policy, the BLM prohibits wild horse gathers between March 1 and June 30.

Alternative A requires the BLM to balance the protection of cultural and paleontological resources with resource development. Under this alternative, the BLM pursues restrictions and places stipulations on mineral leasing and mineral materials disposal on a case-by-case basis near cultural resources. Alternative A also allows renewable energy development near cultural resource sites on a case-by-case basis, consistent with applicable policy and guidance and other resource management objectives. Under Alternative A, the BLM attaches Standard Paleontological Resources Protection Stipulations to authorizations for surface-disturbing activities on Potential Fossil Yield Classification (PFYC) 3, 4, and 5 formations. This alternative also requires an on-the-ground survey prior to approval of surface-disturbing activities or land-disposal actions, and monitoring of surface-disturbing activities in all PFYC 4 and 5 formations and, surveys may or may not be required in PFYC 3 areas. Under this alternative, the BLM prohibits surface-disturbing activities within 50 feet of the outer edge of a paleontological locality and also prohibits the resumption of activity within 50 feet of a paleontological discovery until the authorized officer issues a written authorization to proceed.

Under Alternative A, the BLM manages visual resources in accordance with four VRM classes. The class allocations for BLM-administered surface lands include 141,127 acres of VRM Class I, 340,784 acres of VRM Class II, 890,482 acres of VRM Class III, and 1,815,043 acres of VRM Class IV. Under Alternative A, 23 acres are unclassified. Alternative A does not specifically manage lands with wilderness characteristics to preserve their wilderness characteristics.

2.6.2 Alternative B

Overview of the Alternative

Alternative B emphasizes conservation of physical, biological, heritage and visual resources, and lands with wilderness characteristics with constraints on resource uses. Alternative B conserves large areas of land for physical, biological, and heritage resources; designates 17 ACECs; and places a number of restrictions on motorized vehicle use and mineral development.

Resource Uses and Support

Mineral resource uses are subject to additional constraints under Alternative B compared to other alternatives except Alternative E (see Table 2-6 for comparative land use acreages by alternative). Under Alternative B, 3,888,990 acres are available and 314,223 acres are withdrawn or would be recommended for withdrawal or extension of an existing withdrawal from locatable mineral entry. In addition, approximately 2,464,745 acres of federal mineral estate are closed to oil and gas leasing; the remaining federal mineral estate is open to oil and gas leasing subject to the following constraints: 405,620 acres are subject to the standard lease form, 335,109 acres are subject to moderate constraints, and 932,551 acres are subject to major constraints. Alternative B does not delineate Oil and Gas Management Areas. This alternative makes 1,612,993 acres available for mineral materials disposal, while 2,590,220 acres are closed to mineral materials disposal.

Land resource program actions under Alternative B identify 24,042 acres of BLM-administered land in the Planning Area as available for disposal. Under Alternative B, the BLM manages 2,710,695 acres as ROW avoidance areas, and 225,487 acres as ROW exclusion areas. Under Alternative B, 251,203 acres are open to renewable energy development.

Under Alternative B, travel and recreation management emphasizes protection of resources and recreational experiences, and includes more restrictions on resource uses than the other alternatives except Alternative E. Under Alternative B, 170,253 acres of BLM-administered land are closed to motorized vehicle use, 592,563 acres are limited to existing roads and trails, 2,416,378 acres are limited to designated roads and trails, and 3,132 acres are open to motorized vehicle use. Areas opened through activity planning to over-snow travel are required to have a minimum average of 12 inches of snow, and all ACECs, lands with wilderness characteristics specifically managed to preserve their wilderness characteristics, WSAs, WSRs, greater sage-grouse winter concentration areas, and big game crucial winter ranges are closed to over-snow travel. Alternative B expands the resource constraints on recreational areas present under Alternative A, applying an NSO restriction on areas within ¼ mile of campgrounds, trailheads, day use areas, and similar recreation sites and applying a CSU stipulation on developed recreation sites and national, regional, and local trails. Under Alternative B, the BLM designates the following 13 SRMAs: Absaroka Mountain Foothills (72,130 acres), Badlands (220,687 acres), Bighorn River (15,113 acres), West Slope (406,309 acres), The Rivers (18,247 acres), Canyon Creek (3,677 acres), Red Canyon Creek (8,435 acres), Horse Pasture (144 acre), McCullough Peaks (160,838 acres), Basin Garden (19,771 acres), Beck Lake (6,483 acres), and Newton Lake Ridge (1,997 acres). Cave and karst resources are managed under the Worland Caves ERMA while all other non-designated land is managed under other multiple-use objectives.

Under this alternative, a large portion of the Planning Area is closed to livestock grazing (1,984,211 acres) as a result of factors such as crucial winter range for elk and bighorn sheep and greater sage-grouse Key Habitat Areas. The remainder of the Planning Area is open to grazing where it does not conflict with other resource uses.

Special Designations

Alternative B includes 17 ACECs – the nine existing areas (five of which the BLM proposes for expansion) and eight new ACECs. The five existing ACECs the BLM proposes to expand are Brown/Howe Dinosaur Area, Carter Mountain, Five Springs Falls, Little Mountain, and Upper Owl Creek. The eight proposed ACECs are Chapman Bench, Clarks Fork Basin/Polecat Bench West Paleontological Area, Clarks Fork Canyon, Foster Gulch Paleontological Area, McCullough Peaks South Paleontological Area, Rainbow Canyon, Rattlesnake Mountain, and Sheep Mountain. Table 2-7 summarizes acreages and management emphasis in each of these ACECs.

Alternative B retains the Red Gulch/Alkali Road National Back Country Byway and designates the Hyattville Logging Road and Hazelton Road as primitive Back Country Byways. Under this alternative, the BLM also applies protective management prescriptions to the Heart Mountain Relocation Center National Historic Landmark, Nez Perce NHT, and other important historic and regional trails. Under Alternative B, the BLM manages all 20 WSR-eligible waterways as suitable for inclusion in the National Wild and Scenic River System (NWSRS), and applies more restrictive interim management prescriptions to the waterways. Under Alternative B, the BLM applies additional constraints on travel within the 10 WSAs.

Physical, Biological, Heritage and Visual Resources, and Lands with Wilderness Characteristics

Under Alternative B, the BLM manages physical resources (air, water, and soil) with an emphasis on conservation. This alternative is less focused on supporting resource uses than Alternative A. Alternative B requires an inventory of BLM-administered land to determine the rate of erosion and degree of soil slope stability and photo point monitoring of all channel crossings and all surface disturbance of more than ½ acre. In addition, Alternative B requires reclamation plans and topsoil salvage for any BLM-authorized surface-disturbing activity. As under Alternative A, the BLM continues the use of seed mixtures of native species to reclaim disturbed areas. Under Alternative B, the BLM does not authorize new activities resulting in the surface discharge of produced water on BLM-administered land and allows the fencing of springs, wetlands, reservoirs, and riparian areas as necessary to meet resource objectives.

Alternative B emphasizes the conservation of habitat for fish and wildlife, maintenance of contiguous blocks of native plant communities, ecosystem management, protection of natural functions in riparian areas, and control of invasive species. Under Alternative B, ESDs are emphasized in the management of vegetation resources, with a management focus on making progress towards the reference state plant community as described in the appropriate ESD. This alternative places the second-most constraints on resource uses that affect biological resources after Alternative E. For example, the BLM prohibits surface-disturbing activities within ¼ mile of riparian/wetland areas, applies an NSO restriction on wetland areas of more than 40 acres, and prohibits aerial application of pesticides within ½ mile of riparian/wetland areas and aquatic habitats. For the protection of fish species, the BLM also applies an NSO restriction and prohibits surface disturbance within ¼ mile of any waters rated by the Wyoming Game and Fish Department (WGFD) as Blue Ribbon (national importance) or Red Ribbon (regional importance) trout streams, and applies a 500 foot buffer around all other fisheries. Seasonal wildlife

restrictions under this alternative include a motorized vehicle closure in big game crucial winter range. The BLM prohibits surface-disturbing activities year-round in big game crucial winter range and within ½ mile of big game migration corridors. Under this alternative, the BLM designates the Absaroka Front Management Area (130,872 acres), closing it to most mineral entry and limiting other resource uses.

Compared to Alternative A, special status species receive increased protection under Alternative B. Alternative B extends the protective buffers around greater sage-grouse habitat, prohibiting surface-disturbing activities within 0.6 mile of occupied greater sage-grouse leks and seasonally mitigating surface-disturbing activities in greater sage-grouse nesting and early brood-rearing habitat. Greater sage-grouse Key Habitat Areas are closed to mineral leasing and are closed to motorized vehicle use from March 15 to June 30. Under Alternative B, the BLM prohibits surface-disturbing activities within 1 mile of active raptor nests during nesting periods and applies a year-round ¼-mile CSU stipulation on all raptor nests. The BLM applies an NSO restriction on suitable habitat for black-footed ferret reintroduction and on the Sage Creek Prairie Dog Town. For the protection of BLM special status plant species, the BLM applies protective buffers that prohibit various resource uses and surface-disturbing activity around special status plant species populations.

Alternative B emphasizes wild horse health and does not allow special recreation permits (SRP) using domestic horses in the McCullough Peaks and Fifteenmile HMAs. Under this alternative, the BLM applies seasonal restrictions on surface-disturbing activities to prevent foal abandonment or jeopardy of wild horse health and welfare. Under Alternative B, wild horse gathers would occur, to the extent possible, in the fall after peak foaling.

Alternative B emphasizes the protection of cultural and paleontological resources and restricts resource uses that might adversely affect such resources. Around important cultural sites, the BLM applies an NSO restriction within 3 miles and a CSU stipulation in view within 5 miles for leasable minerals. The BLM also prohibits mineral materials disposal within 3 miles or in view within 5 miles of important cultural sites. Under Alternative B, areas within 5 miles of trails and sites eligible for listing on the NRHP and Traditional Cultural Properties (TCP) are exclusion areas for renewable energy development (specifically wind turbines), unless structures are screened from the sites by intervening topography. The BLM attaches Standard Paleontological Resources Protection Stipulations to authorizations for surface-disturbing activities in all areas, regardless of PFYC. This alternative also requires an on-the-ground survey before approval of surface-disturbing activities or land-disposal actions, and monitoring of surface-disturbing activities for PFYC 3, 4, and 5 formations. The BLM prohibits surface-disturbing activities within 100 feet of the outer edge of a paleontological locality and prohibits the resumption of activity within 100 feet of a paleontological discovery until the authorized officer issues a written authorization to proceed.

Compared to Alternative A, Alternative B manages more acreage as VRM Class I and II areas which allow only a low level of change to the characteristic landscape. The class allocations for BLM-administered surface lands include 154,359 acres of VRM Class I, 1,784,854 acres of VRM Class II, 394,106 acres of VRM Class III, and 858,263 acres of VRM Class IV. Under Alternative B, 37 acres are unclassified.

Under this alternative, the BLM specifically manages all lands with wilderness characteristics to preserve their wilderness characteristics (naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation); and applies additional stipulations on travel, mineral resource use, and ROW authorizations in these areas.

2.6.3 Alternative C

Overview of the Alternative

Alternative C emphasizes resource uses and reduces constraints on resource uses to protect physical, biological, and heritage and visual resources. Compared to other alternatives, Alternative C conserves the least land area for physical, biological, and heritage resources; designates the fewest ACECs and SRMAs; and is the least restrictive to motorized vehicle use and energy and mineral development.

Resource Uses and Support

Under Alternative C, 4,155,119 acres are available and 48,095 acres are withdrawn or would be recommended for withdrawal or extension of an existing withdrawal from locatable mineral entry; existing withdrawals and segregations not carried forward are allowed to expire. In addition, approximately 145,836 acres of federal mineral estate are closed to oil and gas leasing in the Planning Area. The remaining federal mineral estate in the Planning Area is open to oil and gas leasing subject to the following constraints: 2,565,742 acres are subject to the standard lease form, 1,334,491 acres are subject to moderate constraints, and 91,956 acres are subject to major constraints. Alternative C delineates Oil and Gas Management Areas around intensively-developed existing fields, and the BLM manages these areas primarily for oil and gas exploration and development, with all other surface uses considered secondary. This alternative makes 3,859,251 acres available for mineral materials disposal, while 343,962 acres are closed to mineral materials disposal.

Land resource management actions under Alternative C identify 117,845 acres in the Planning Area as available for disposal. The BLM manages approximately 1,173,162 acres as ROW avoidance areas and 7,586 acres as ROW exclusion areas. Under Alternative C, 1,428,360 acres are open to renewable energy development. Travel management under Alternative C includes fewer travel restrictions than other alternatives. Under Alternative C, the BLM closes 9,274 acres of BLM-administered land to motorized vehicle use, limits 2,137,574 acres to existing roads and trails, limits 1,020,748 acres to designated roads and trails, and opens 14,830 acres to motorized vehicle use. The BLM closes areas to over-snow vehicle travel on a case-by-case basis.

Areas open to surface-disturbing activity on a case-by-case basis include hunting and fishing access areas, Five Springs Falls Campground, the Cody Archery Range, and the R&PP lease area for the Lovell Rod and Gun Club. Alternative C includes the most development of recreation sites, including the addition of interpretive sites, facilities, and additional amenities, and the addition or upgrade of existing recreation sites. Under Alternative C, Rattlesnake Ridge is the only SRMA (7,996 acres) in the Planning Area. ERMAs under Alternative C include Basin Gardens (15,349 acres), and Basin Gardens Play Area (4,421 acres). All other non-designated land is managed under other multiple-use objectives.

Under Alternative C, the Planning Area is closed to livestock grazing in the same areas as Alternative A. Livestock grazing is not managed specifically to enhance other resource values by restricting livestock grazing. Alternative C allows the use of salt, mineral, or forage supplements to maximize livestock utilization, and the use of produced water on a case-by-case basis.

Special Designations

Alternative C carries forward current management of the existing Brown/Howe Dinosaur Area and Spanish Point Karst ACECs, the Heart Mountain Relocation Center National Historic Landmark, the Nez Perce NHT, and the Red Gulch/Alkali Road National Back Country Byway, with additional protective management applied in some areas. The alternative does not retain other ACECs or designated trails and does not propose expansions or additional areas. Under this alternative, the BLM manages none of the 20 WSR eligible waterways as suitable for inclusion in the NWSRS and releases these areas to other uses. Alternative C limits motorized vehicle use to designated roads and trails within the 10 WSAs.

Physical, Biological, Heritage and Visual Resources, and Lands with Wilderness Characteristics

Under Alternative C, the BLM generally manages physical resources similar to Alternative A, but with fewer management requirements and more allowance for the case-by-case application of management actions. Under Alternative C, the BLM seeds areas that do not meet resource objectives using approved nonnative and native species and requires 30 percent desired vegetative cover within three growing seasons. The BLM considers reclamation plans and topsoil salvage and segregation on a case-by-case basis. Under this alternative, the BLM would assess erosion and soil stability during rangeland health evaluations but would not require photo point monitoring of surface disturbance. Alternative C authorizes new activities resulting in the surface discharge of produced water, and allows the beneficial use of produced water in accordance with applicable laws and regulations and at the discretion of the BLM and its stakeholders.

The BLM would not manage to maintain contiguous blocks of native plant communities or minimize fragmentation. Under Alternative C, the *Wyoming Standards for Healthy Rangelands* would guide the management of vegetation resources with an emphasis on appropriate function structural groups as defined in BLM Technical Reference 1734-6, *Interpreting Indicators of Rangeland Health* (BLM 2005c). Under this alternative, the BLM allows surface-disturbing activities in flood plains or riparian/wetland areas on a case-by-case basis and prohibits the aerial application of pesticides within 100 feet of riparian/wetland areas and aquatic habitats.

Under Alternative C, the BLM applies similar restrictions to protect fisheries as Alternative A, including applying an NSO restriction and managing surface-disturbing activities using standard restrictions within 500 feet of surface water and riparian areas. Alternative C requires identification and management of migration and travel corridors for big game species and migratory birds, but does not specify protective measures. This alternative exempts Oil and Gas Management Areas and ROW corridors from discretionary wildlife seasonal stipulations and allows the BLM to manage motorized vehicle use in big game crucial winter range consistent with other resource objectives. Under this alternative, the Absaroka Front Management Area (130,872 acres) is open to mineral entry and ROW authorizations, with some seasonal restrictions.

Special status species generally receive similar protection under Alternative C as under Alternative A. Under Alternative C, the BLM applies the same prohibitions (outside of Oil and Gas Management Areas and ROW corridors) on surface-disturbing and disruptive activities for occupied greater sage-grouse leks and the same timing restrictions for greater sage-grouse winter concentration areas as under Alternative A. The BLM manages motorized vehicle use in greater sage-grouse Key Habitat Areas consistent with other resource objectives, and applies timing limitations (TLS) to avoid surface-disturbing activities within ¼ mile of active raptor nests (during nesting and fledging periods). The BLM only implements protective measures for white- and black-tailed prairie dog colonies in the Sage Creek Town area. For special status plant species, the BLM prohibits range improvement projects and other

surface-disturbing activities within 300 feet and prohibits aerial application of pesticides within ½ mile (vehicle and hand application is allowed on a case-by-case basis) of known populations of special status plant species.

Wild horse management under Alternative C places a greater emphasis on public viewing and other resource uses than under other alternatives. Under this alternative, the BLM actively promotes opportunities for public viewing within the McCullough Peaks HMA and allows SRP activities in both HMAs. As required by national policy, the BLM does not allow wild horse gathers between March 1 and June 30.

Alternative C establishes set buffers around cultural sites, but, similar to Alternative A, requires the BLM to balance the protection of cultural and paleontological resources with resource development. Around important cultural sites, the BLM applies an NSO restriction within ¼ mile and a CSU stipulation within 1 mile for leasable minerals. Similarly, Alternative C prohibits mineral materials disposals within ¼ mile or in view within 1 mile of important cultural sites. Alternative C manages areas within 5 miles of trails and sites eligible for listing on the NRHP and TCPs as avoidance areas for renewable energy development (specifically wind turbines), unless structures are screened from the site by intervening topography. Under Alternative C, the BLM attaches Standard Paleontological Resources Protection Stipulations to authorizations for surface-disturbing activities in PFYC 4 or 5 areas. This alternative also requires an on-the-ground survey before approval of surface-disturbing activities or land-disposal actions, and monitoring of surface-disturbing activities for PFYC 5 formations. Similar to Alternative A, the BLM prohibits surface-disturbing activities within 50 feet of the outer edge of a paleontological locality and prohibits the resumption of activity within 50 feet of a paleontological discovery until the authorized officer issues written authorization.

Under Alternative C, the BLM manages the least amount of acreage as VRM Class I and II. The class allocations for BLM-administered surface lands include 140,976 acres of VRM Class I, 333,027 acres of VRM Class II, 510,535 acres of VRM Class III, and 2,202,825 acres of VRM Class IV. Under Alternative C, 37 acres are unclassified (i.e., water or under other federal agency jurisdiction). Alternative C focuses on resource development and enhanced opportunity for responsible use of public land resources and does not manage any lands with wilderness characteristics specifically to maintain their wilderness characteristics.

2.6.4 Alternative D (Proposed RMP)

Overview of the Alternative

Alternative D generally increases conservation of physical, biological, and heritage and visual resources compared to current management, including the designation of one SMA, two Management Areas, and 12 ACECs. Alternative D also emphasizes moderate constraints on resource uses and reclamation and mitigation requirements to reduce impacts to resource values.

Resource Uses and Support

Under Alternative D, 4,120,325 acres are available for locatable mineral entry, while 83,321 acres are withdrawn or would be recommended for withdrawal or extension of existing withdrawals; existing withdrawals and segregations not carried forward would be allowed to expire. In addition, approximately 292,353 acres of federal mineral estate are closed to oil and gas leasing in the Planning Area. The remaining federal mineral estate in the Planning Area is open to oil and gas leasing subject to

the following constraints: 911,814 acres are subject to the standard lease form, 1,714,685 acres are subject to moderate constraints, and 1,221,142 acres are subject to major constraints. Alternative D delineates Oil and Gas Management Areas to be managed primarily for oil and gas exploration and development. Alternative D refines stipulations for protections of big game, geologic features, recreation, and LRP soils for oil and gas-related surface disturbances within the Absaroka Front (130,872 acres), Fifteenmile (180,186 acres), and Big Horn Front (379,308 acres) Master Leasing Plan (MLP) Analysis Areas. This alternative makes 3,828,320 acres available for mineral materials disposal, while 374,894 acres are closed to mineral materials disposal.

Land resource program actions under Alternative D identify 66,363 acres of BLM-administered land in the Planning Area as available for disposal. Under Alternative D, the BLM manages 2,408,662 acres as ROW avoidance areas and 40,802 acres as ROW exclusion areas. Under Alternative D, 1,315,309 acres are open to renewable energy development. Travel management designations under Alternative D include 61,010 acres closed to motorized vehicle use, 1,955,943 acres limited to existing roads and trails, 1,159,557 acres limited to designated roads and trails, and 5,885 acres open to motorized vehicle use. Similar to Alternative A, the BLM considers areas open to over-snow vehicles on a case-by-case basis.

Alternative D designates more recreation management areas than Alternative A, including SRMAs, Recreation Management Zones (RMZ), and ERMAs. Other resource uses such as minerals development are typically allowed to occur within these areas if the adverse impacts can be mitigated. An NSO restriction is applied to all developed recreation sites, national and regional trails, local trail systems, and interpretive sites with exceptional recreation value. Under Alternative D the BLM maintains 13 SRMAs: Absaroka Mountain Foothills (42,615 acres), Badlands (211,516 acres), Bighorn River (2,496 acres), West Slope (320,704 acres in CYFO), Rivers (6,047 acres), McCullough Peaks (160,838 acres), Basin Gardens Play Area (4,421 acres), Canyon Creek (3,675 acres), Horse Pasture (144 acres), Middle Fork of the Powder River (14,644 acres), West Slope (190,928 acres in WFO), Beck Lake (6,473 acres), and Newton Lake Ridge (1,949 acres). All land not included in a SRMA or within the Absaroka, Bighorn River, Rattlesnake Ridge, Red Canyon Creek, or Southern Bighorns ERMAs, is managed under other multiple-use objectives.

Under Alternative D, the BLM closes the same acreage in the Planning Area to livestock grazing as Alternative A (5,009 acres). However, unlike Alternative A, grazing is allowed in closed areas as a tool to maintain or improve resource conditions. To reduce user conflict, new resource uses are mitigated to minimize or avoid conflict with livestock grazing.

Special Designations

Alternative D includes 12 ACECs – the nine existing areas and three new ACECs. The three proposed ACECs are Clarks Fork Canyon; Paleocene, Eocene Thermal Maximum (PETM); and Sheep Mountain. Alternative D would also designate the Chapman Bench Management Area for the retention and success of sensitive species habitat and would manage a portion of the Little Mountain area as the Craig Thomas Little Mountain SMA. Table 2-7 summarizes acreages and management emphasis in each of these ACECs and other management areas. Similar to Alternative C, Red Gulch/Alkali Road will continue to be managed as a National Back Country Byway, whereas other proposed roads will not be managed as byways. Alternative D does not designate additional back country byways, but would consider the designation of new back country byways in the future. Alternative D would also provide similar but less protective measures than Alternative B for the Heart Mountain Relocation Center National Historic Landmark, Nez Perce NHT, and Other Trails. Under Alternative D, the BLM finds no WSR eligible waterways suitable for inclusion in the NWSRS, and does not continue interim management to protect

their outstanding remarkable values and free-flowing characteristics. Alternative D limits motorized vehicle use to designated roads and trails within six WSAs and closes four WSAs to motorized vehicle use.

Physical, Biological, Heritage and Visual Resources, and Lands with Wilderness Characteristics

Under Alternative D, management of physical resources emphasizes moderate constraints on resource uses and mitigation of impacts. Reclamation practices include beginning interim and final reclamation at the earliest feasible times and, in disturbed areas, reestablishing healthy native or desired plant communities based on predisturbance/desired plant species composition. The BLM requires reclamation plans, stipulations, or measures prior to approval of authorized surface-disturbing activities. Similar to Alternative A, the BLM assesses erosion and soil stability during rangeland health evaluations and allows the surface discharge of produced water from new activities, where compatible with other resource objectives.

Management of biological resources under Alternative D emphasizes protection through avoidance and mitigation of surface-disturbing activity and moderate resource constraints. For example, Alternative D avoids surface-disturbing activities within big game crucial winter range, but exempts Oil and Gas Management Areas from discretionary big game seasonal stipulations. Similar to Alternative A, surface-disturbing activities are prohibited within the 500 feet of surface water and wetland/riparian areas, although exceptions may be made on a case-by-case basis. The BLM also applies an NSO restriction on wetland areas greater than 20 acres and designated 100-year flood plains. Aerial applications of pesticides are allowed within wetland/riparian areas on a case-by-case basis. Vegetation resources are managed to maintain contiguous blocks of native plant communities. Under Alternative D, ESDs are emphasized in the management of vegetation resources in plant communities determined to be meeting Wyoming Standards for Healthy Rangelands manage to maintain or improve those communities, as described in the appropriate ESD. For fish species, the BLM avoids surface-disturbing activities within ¼ mile of any waters rated by the WGFD as Blue Ribbon or Red Ribbon fisheries and applies a 500-foot buffer to all other fisheries. Alternative D would manage the Absaroka Front Management Area with a mix of CSU, TLS, and NSO stipulations as well as areas that are closed mineral leasing.

Special status species generally receive greater protection under Alternative D than under Alternative A. For greater sage-grouse, constraints on resource uses are greater within PHMAs than outside PHMAs. For example, the BLM would apply a NSO stipulation to prohibit surface-disturbing activities within a 0.6-mile radius of the perimeter of occupied greater sage-grouse leks within PHMAs and within ¼-mile radius of the perimeter of greater sage-grouse leks outside PHMAs. The BLM would also apply a goal of consolidating development to maintain greater sage-grouse habitat. To protect raptor habitat, the BLM would apply species specific protective buffers of up to 1 mile of active raptor nests during nesting periods and a year-round ¼-mile CSU stipulation on all raptor nests. Under Alternative D, the BLM applies an NSO restriction on suitable habitat for black-footed ferret reintroduction and on the Sage Creek Prairie Dog Town. The BLM requires avoidance of range improvement projects and aerial application of herbicides within ¼ mile and ½ mile, respectively, of BLM special status plant species populations.

Wild horse management under Alternative D balances providing opportunities for public viewing of wild horses with protection of horse health. Opportunities for public viewing, education, and interpretation of wild horses are promoted within the McCullough Peaks HMA, but SRPs using domestic horses would be prohibited within the McCullough Peaks HMA and avoided within the Fifteenmile HMA. Under this

alternative, the BLM applies seasonal restrictions on surface-disturbing activities to prevent foal abandonment and jeopardy of wild horse health and welfare.

Cultural and paleontological resources generally receive more protection under Alternative D than Alternative A. The BLM protects the foreground of important cultural sites up to 3 miles, using BLM approved BMPs to avoid or mitigate adverse impacts from mineral development or other surface-disturbing activity. The BLM attaches Standard Paleontological Resources Protection Stipulations to authorizations for surface-disturbing activities regardless of PFYC formation and requires an on-the-ground survey prior to approval of surface-disturbing activities or land-disposal actions for all PFYC 4 and 5 formations. Monitoring of surface-disturbing activities for PFYC 4 and 5 formations would be conducted. The BLM allows surface-disturbing activities within 100 feet of a paleontological locality if the impacts can be adequately mitigated but prohibits the resumption of activity within 100 feet of a paleontological discovery until the authorized officer issues a written authorization to proceed.

Under Alternative D, the BLM manages more acres as VRM Class I and II than Alternative A. The class allocations for BLM-administered surface lands include 141,127 acres of VRM Class I, 731,812 acres of VRM Class II, 738,531 acres of VRM Class III, and 1,580,470 acres of VRM Class IV. Under Alternative D, 37 acres are unclassified.

Like Alternative C, Alternative D does not manage any lands with wilderness characteristics to maintain their wilderness characteristics.

2.6.5 Alternative E

Overview of the Alternative

Alternative E is the same as Alternative B outside of greater sage-grouse Key Habitat Areas. Within greater sage-grouse Key Habitat Areas, Alternative E includes additional management actions and designates the area as an ACEC. Alternative E emphasizes conservation of physical, biological, heritage and visual resources, and lands with wilderness characteristics with constraints on resource uses.

Resource Uses and Support

Management of activities associated with mineral resource exploration, development, and extraction are the same as described under Alternative B, except within greater sage-grouse Key Habitat Areas (1,232,583 acres) where locatable withdrawals and closure to mineral materials disposal would reduce the area available for mineral exploitation more than under any other alternative (see Table 2-6 for comparative land use acreages by alternative). Under Alternative E, 2,433,901 acres are available and 1,759,312 acres are recommended for withdrawal or extension of an existing withdrawal from locatable mineral entry. Alternative E does not delineate Oil and Gas Management Areas and manages leasable minerals the same as Alternative B. Alternative E makes 1,059,062 acres available for mineral materials disposal, while 3,144,151 acres are closed to mineral materials disposal.

Land resource program actions under Alternative E identify 24,042 acres of BLM-administered land in the Planning Area as available for disposal through land tenure adjustments. The BLM manages 1,610,792 acres as rights-of-way (ROW) avoidance areas and 1,322,879 acres as ROW exclusion areas. Under Alternative E, 254,151 acres are open and 1,945,204 acres are closed to renewable energy development.

Under Alternative E, travel management designations, including areas open to motorized vehicle use and over-snow travel, are the same as Alternative B; however, Alternative E prohibits new road construction within 4 miles of active greater sage-grouse leks and requires the development of travel management plans that minimize impacts to greater sage-grouse habitat. In addition, routes within greater sage-grouse Key Habitat Areas would be managed under a seasonal closure restricting motorized use from March 15 through June 30.

Recreation management is the same as under Alternative B, except within greater sage-grouse Key Habitat Areas where the BLM requires that Special Recreation Permits have neutral or beneficial effects to sage-grouse habitat. Alternative E manages livestock grazing the same as Alternative B, including the closure of greater sage-grouse Key Habitat Areas.

Special Designations

Special designations under Alternative E include those identified under Alternative B with the addition of the Greater Sage-Grouse Key Habitat Areas ACEC, which consists of BLM-administered land within the greater sage-grouse Key Habitat Areas. Under Alternative E, the BLM applies various constraints to resource uses within the Greater Sage-Grouse Key Habitat Areas ACEC to conserve greater sage-grouse and its habitat, including limiting anthropogenic disturbance to one disturbance per 640 acres and 3 percent or less of total sage-grouse habitat; recommending withdrawal from mineral entry and closure to livestock grazing; prohibiting mineral material disposals; and managing the ACEC as ROW and renewable energy exclusion areas.

Alternative E includes 18 ACECs – the nine existing areas (five of which the BLM proposes for expansion) and nine new ACECs. The five existing ACECs the BLM proposes to expand are Brown/Howe Dinosaur Area, Carter Mountain, Five Springs Falls, Little Mountain, and Upper Owl Creek. The nine proposed ACECs are Chapman Bench, Clarks Fork Basin/Polecat Bench West Paleontological Area, Clarks Fork Canyon, Foster Gulch Paleontological Area, McCullough Peaks South Paleontological Area, Rainbow Canyon, Rattlesnake Mountain, Sheep Mountain, and Greater Sage-Grouse Key Habitat Areas. Table 2-7 summarizes acreages and management emphasis in each of these ACECs.

Physical, Biological, Heritage and Visual Resources, and Lands with Wilderness Characteristics

Alternative E implements the same resource protection measures as Alternative B, but with additional management to emphasize the conservation of greater sage-grouse priority habitat areas through the Greater Sage-Grouse Key Habitat Areas ACEC. The scale of the this additional ACEC and the limitations on surface disturbances and road development, as well as withdrawal of locatable minerals, closure to mineral materials disposal, ROW development, and renewable energy development it includes, result in greater overall resource protection under Alternative E than under the other alternatives.

Fire and fuels management, habitat restoration/vegetation management, and invasive species management actions under Alternative E are the same as Alternative B, but with additional emphasis on greater sage-grouse habitat objectives within the Greater Sage-Grouse Key Habitat Areas ACEC. For example, fuels management activities under this alternative must maintain at least 15 percent of sagebrush cover and evaluate the benefits of fuel breaks against the additional loss of sagebrush cover.

The management of physical resources, heritage and visual resources, and lands with wilderness characteristics is consistent with Alternative B.

2.6.6 Alternative F

Overview of the Alternative

Alternative F is the same as Alternative D outside of greater sage-grouse PHMAs. Within greater sage-grouse PHMAs, Alternative F includes additional management actions and designates these areas as an ACEC. Alternative F generally emphasizes conservation of physical, biological, and heritage and visual resources compared to current management, while placing moderate constraints on resource uses and reclamation and mitigation requirements to reduce impacts to resource values.

Resource Uses and Support

Management of activities associated with mineral resource exploration, development, and extraction are the same as described under Alternative D. Under Alternative F, 324,829 acres of federal mineral estate are closed to oil and gas leasing in the Planning Area. The remaining federal mineral estate in the Planning Area is open to oil and gas leasing subject to the following constraints: 912,328 acres are subject to the standard lease form, 1,709,652 acres are subject to moderate constraints, and 1,191,215 acres are subject to major constraints. Alternative F designates 438,863 acres as Oil and Gas Management areas. These areas are managed primarily for oil and gas exploration and development except where these areas are overlapped by the Greater Sage-Grouse PHMAs ACEC, in which case the BLM would apply protective management actions consistent with the ACEC designation. Alternative F applies MLPs to the same areas and acreages as Alternative D for the protection of big game, geologic features, and LRP soils; the Absaroka Front, Fifteenmile, and Big Horn Front areas. The management of locatable and salable mineral resources is the same as Alternative D.

Land resource program actions under Alternative F identify 66,363 acres of BLM-administered land in the Planning Area as available for disposal through land tenure adjustments. The BLM manages 2,315,730 acres as ROW avoidance areas and 133,734 acres as ROW exclusion areas. Under Alternative F, 607,429 acres are open to renewable energy development and 292,949 acres are renewable energy development exclusion areas.

Travel management designations under Alternative F include 61,010 acres closed to motorized vehicle use, 1,295,072 acres limited to existing roads and trails, 1,820,427 acres limited to designated roads and trails, and 5,885 acres open to motorized vehicle use. Motorized vehicle use in the Greater Sage-Grouse PHMAs ACEC is limited to designated roads and trails and the construction of new primary roads would be prohibited within 1.9 miles of greater sage-grouse leks. Similar to alternatives A and D, the BLM considers areas open to over-snow vehicles on a case-by-case basis.

Recreation management is the same as under Alternative D, except within greater sage-grouse PHMAs where the BLM requires that Special Recreation Permits have neutral or beneficial effects to greater sage-grouse habitat. The BLM closes the same acreage in the Planning Area to livestock grazing as alternatives A and D (5,009 acres). Alternative F manages grazing lands consistent with Alternative D, except in the Greater Sage-Grouse PHMAs ACEC where the BLM prioritizes the consideration of sage-grouse habitat objectives and management considerations over livestock grazing objectives through the imposition of restrictions on livestock grazing location and timing, and range improvement projects.

Special Designations

Special designations under Alternative F include those identified under Alternative D with the addition of a Greater Sage-Grouse PHMAs ACEC, which consists of public lands within greater sage-grouse PHMAs. Alternative F implements various resource protection measures within greater sage-grouse PHMAs; however, constraints on resource uses in priority sage-grouse habitats under Alternative F are generally more moderate than those under alternatives E and B. For example, PHMAs are available for fluid mineral leasing under Alternative F subject to NSO and TLS restrictions, whereas alternatives E and B close Key Habitat Areas to fluid mineral leasing. Similarly, whereas Alternative E prohibits the construction of above-ground transmission lines in greater sage-grouse priority habitat areas, Alternative F allows the construction of above-ground transmission lines subject to seasonal restrictions.

Alternative F includes 13 ACECs – the nine existing areas and four new ACECs. The four proposed ACECs are Clarks Fork Canyon, PETM, Sheep Mountain, and Greater Sage-Grouse PHMAs. Table 2-7 summarizes acreages and management emphasis in each of these ACECs and other management areas.

Physical, Biological, Heritage and Visual Resources, and Lands with Wilderness Characteristics

Alternative F places similar constraints on resource uses that affect biological resources as Alternative D, but proposes additional management to emphasize the conservation of greater sage-grouse habitat through the designation of the Greater Sage-Grouse PHMAs ACEC. As discussed above, Alternative F applies additional limitations on surface disturbance and disruptive activities within the Greater Sage-Grouse PHMAs ACEC. Fire and fuels management, habitat restoration and/or vegetation management, and invasive species management actions under Alternative F are the same as Alternative D, but with additional emphasis on sage-grouse habitat objectives within the Greater Sage-Grouse PHMAs ACEC.

The management of physical resources, heritage and visual resources, and lands with wilderness characteristics are the same as Alternative D.

2.7 Detailed Descriptions of Alternatives by Resource

This section is comprised of two tables. To assist the reader in maneuvering through the alternatives, Table 2-8 lists key terms and concepts by resource topic (such as CSU, easements, and erosion/sediment control) and directs readers to the locations in Table 2-9 that address the term. Table 2-9 identifies goals and objectives, management actions common to all alternatives, and management actions by alternative. Table 2-9 is arranged according to the following resource topics:

Number	Resource Topic
0000	Common to All
1000	Physical Resources (PR)
2000	Mineral Resources (MR)
3000	Fire and Fuels Management (FM)
4000	Biological Resources (BR)
5000	Heritage and Visual Resources (HR)
6000	Land Resources (LR)
7000	Special Designations (SD)
8000	Socioeconomic Resources (SR)

This numbering system and the abbreviations for each of the eight resource topics appear as headings and serve to organize Table 2-9. The goals and objectives listed in the table apply to all four alternatives under consideration for the entire Planning Area and would apply for the life of this RMP.

Management actions are anticipated to achieve the goals and objectives identified for each resource topic. Some management actions are constant across all alternatives (common to all), whereas others vary by alternative. Management actions that apply to all alternatives are listed for each resource topic under the heading Management Actions Common to All Alternatives immediately following the goals and objectives for each resource topic. Management actions that vary by alternative are listed under the heading Management Actions by Alternative.

Because the Bighorn Basin RMP Revision Project is a combined effort to revise RMPs for both the CYFO and WFO, management actions might apply to one or both field offices. Table 2-9 designates management actions that apply to the CYFO with an X in the column labeled C, and designates management actions that apply to the WFO with an X in the column labeled W.

Actions apply for the life of this RMP, but can be changed via RMP amendments. For example, areas identified as closed to mineral leasing refer to federal mineral estate closed from leasing for the life of this RMP unless changed through an RMP amendment. Furthermore, where the RMP places seasonal or other restrictions or limitations on development, the authorized officer may issue written exceptions, waivers, or modifications to these limitations, including documented supporting analysis (Appendix G).

Table 2-8. Key Terms and Concepts by Resource Topic

Term or Concept	Resource Topic
Abandoned Mine Lands	Public Health and Safety
Aspen	Forest, Woodlands, and Forest Products; Fish and Wildlife
Black-footed ferret	Special Status Species
Best Management Practice (BMP)	Air Quality; Soil Resources; Water Resources; Mineral Resources; Forest, Woodlands, and Forest Products; Riparian/Wetland Resources; Special Status Species; Visual Resource Management; Renewable Energy; ROW and Corridors; Livestock Grazing Management
Classification	Mineral Resources; Lands and Realty
Conveyance	Lands and Realty; Public Health and Safety
Cooperation with agencies/governments/landowners/stakeholders	Water Resources; Fire and Fuels Management; Invasive Species; Fish and Wildlife; Special Status Species; Cultural Resources; Renewable Energy; ROW and Corridors; Livestock Grazing Management; National Back Country Byways; National Historic Trails; WSAs; Social and Economic
Crucial winter range	Fish and Wildlife; Livestock Grazing Management; ACECs
Controlled surface use (CSU)	Mineral Resources; Fish and Wildlife; Special Status Species; Cultural Resources; Recreation; National Historic Landmark; National Historic Trails
Desert Land Act	Lands and Realty
Disposal (Land)	Paleontological Resources; Lands and Realty; ACECs; Wild and Scenic Rivers

Table 2-8. Key Terms and Concepts by Resource Topic (Continued)

Term or Concept	Resource Topic
Disposal (Mineral Materials)	Mineral Resources; Cultural Resources; Recreation; Lands with Wilderness Characteristics; ACECs; National Historic Landmark; National Historic Trails and Scenic Trails; Wild and Scenic Rivers
Easement	Visual Resource Management; Lands and Realty; ROW and Corridors; Recreation; Livestock Grazing Management
Extensive Recreation Management Area (ERMA)	Cave and Karst Resources; Recreation
Erosion/sediment control	Soil Resources; Water Resources; Riparian/Wetland Resources; Fish and Wildlife
Fire suppression	Fire and Fuels Management; Special Status Species; Cultural Resources; ACECs
Geologic hazards	Public Health and Safety
Geophysical exploration	Common to All; Mineral Resources; Fish and Wildlife; Special Status Species; Recreation; ACECs; Wild and Scenic Rivers
Geothermal	Mineral Resources; ACECs
Greater sage-grouse	Fire and Fuels Management; Fish and Wildlife; Special Status Species; Comprehensive Travel and Transportation Management; Livestock Grazing Management; ACECs
Invasive nonnative pest species/weeds	Fire and Fuels Management; Invasive Species; Fish and Wildlife; Special Status Species; ACECs; Lands with Wilderness Characteristics; Livestock Grazing Management
Juniper	Forest, Woodlands, and Forest Products; Grasslands and Shrublands
Priority and Key Habitat Areas (greater sage-grouse)	Special Status Species; ACECs
Livestock grazing	Forest, Woodlands, and Forest Products; Riparian/Wetland Resources; Grasslands and Shrublands; Fish and Wildlife; Lands with Wilderness Characteristics; Livestock Grazing Management; ACECs; Social and Economic
Migration corridors	Fish and Wildlife; Lands and Realty
Mineral leasing/lease (leasable minerals)	Mineral Resources; Fish and Wildlife; Special Status Species; Recreation; Lands with Wilderness Characteristics; ACECs; National Historic Landmark; Wild and Scenic Rivers; WSAs; Social and Economic
Mitigation	Common to All; Air Quality; Soil Resources; Water Resources; Mineral Resources; Riparian/Wetland Resources; Forest, Woodlands, and Forest Products; Fish and Wildlife; Special Status Species; Wild Horses; Cultural Resources; Visual Resource Management; Lands and Realty; National Historic Trails; Recreation; ACECs; Social and Economic; Public Health and Safety
Motorized vehicle use closed	Cave and Karst Resources; Visual Resource Management; Comprehensive Travel and Transportation Management; Recreation; ACECs; Wild and Scenic Rivers; WSAs
Motorized vehicle use limited to designated roads and trails	Cave and Karst Resources; Fish and Wildlife; Special Status Species; Cultural Resources; Visual Resource Management; Comprehensive Travel and Transportation Management; Recreation; Lands with Wilderness Characteristics; ACECs; National Historic Trails and Scenic Trails; Wild and Scenic Rivers; WSAs
Motorized vehicle use limited to existing roads and trails	Comprehensive Travel and Transportation Management; Recreation; ACECs; Wild and Scenic Rivers; WSAs
Motorized vehicle use open	Comprehensive Travel and Transportation Management; Recreation

Table 2-8. Key Terms and Concepts by Resource Topic (Continued)

Term or Concept	Resource Topic
Motorized vehicle use seasonal closure	Fish and Wildlife; Comprehensive Travel and Transportation Management; ACECs; Social and Economic
No surface occupancy (NSO)	Mineral Resources; Riparian/Wetland Resources; Fish and Wildlife; Special Status Species; Cultural Resources; Recreation; ACECs; National Historic Trails and Scenic Trails; Wild and Scenic Rivers
Oil and Gas Management Areas	Mineral Resources; Fish and Wildlife; Special Status Species
Pesticide application	Water Resources; Invasive Species; Fish and Wildlife; Special Status Species
Plant community/communities	Soil Resources; Grasslands and Shrublands; Invasive Species; Special Status Species
Prairie dog	Fish and Wildlife; Special Status Species
Prescribed burn/fire	Air Quality; Fire and Fuels Management; Lands with Wilderness Characteristics; ACECs
Produced water	Water Resources; Fish and Wildlife; Livestock Grazing Management; Public Health and Safety
Public access	Fish and Wildlife; ROW and Corridors; Comprehensive Travel and Transportation; Recreation; Lands with Wilderness Characteristics; ACECs; National Historic Trails and Scenic Trails; Social and Economic
Range improvements (fencing, reservoirs, vegetation treatments)	Water Resources; Fish and Wildlife; Special Status Species; Wild Horses; Livestock Grazing Management; ACECs; Wild and Scenic Rivers; WSAs
Rangeland	Soil Resources; Grasslands and Shrublands; Lands with Wilderness Characteristics; Livestock Grazing Management
Renewable energy (wind, biomass, solar)	Leasable Minerals – Geothermal; Fish and Wildlife; Cultural Resources; Renewable Energy; Recreation; ACECs; WSAs
Rock art	Cultural Resources; Fire and Fuels Management
Rights-of-way (ROW) avoidance	Cave and Karst Resources; Fish and Wildlife; Special Status Species; Cultural Resources; Lands and Realty; National Historic Trails; ROW and Corridors; Recreation; Lands with Wilderness Characteristics; ACECs; Wild and Scenic Rivers; WSAs
Rights-of-way (ROW) exclusion	Fish and Wildlife; National Historic Trails; Renewable Energy; ROW and Corridors; Recreation; ACECs; Wild and Scenic Rivers
Rights-of-way (ROW) open	Recreation; National Historic Trails; Wild and Scenic Rivers
Sagebrush	Fire and Fuels Management; Vegetation; Grassland and Shrubland; Fish and Wildlife; Special Status Species
Seeding/reclamation	Soil Resources; Invasive Species; Special Status Species; Wild and Scenic Rivers; Mineral Resources; Fish and Wildlife; Public Health and Safety
Segregation	Lands and Realty
Special Recreation Management Area (SRMA)	Cave and Karst Resources; Recreation
Surface-disturbing/surface disturbance	Common to All; Soil Resources; Water Resources; Mineral Resources; Forest, Woodlands, and Forest Products; Riparian/Wetland Resources; Fish and Wildlife; Special Status Species; Wild Horses; Cultural Resources; Paleontological Resources; Visual Resource Management; Recreation; Lands with Wilderness Characteristics; Livestock Grazing Management; ACECs; National Historic Landmark; National Historic Trails and Scenic Trails; Wild and Scenic Rivers

Table 2-8. Key Terms and Concepts by Resource Topic (Continued)

Term or Concept	Resource Topic
Timber harvest/firewood (personal use)/poles	Forest, Woodlands, and Forest Products; Wild and Scenic Rivers; Lands with Wilderness Characteristics
Timing limitations (TLS)	Fish and Wildlife; Special Status Species
Vegetation treatment	Fire and Fuels Management; Forest, Woodlands, and Forest Products; Invasive Species; Fish and Wildlife; Lands with Wilderness Characteristics; Livestock Grazing Management; Wild and Scenic Rivers
Visual resource management (VRM)	Visual Resource Management; Recreation; Lands with Wilderness Characteristics; National Historic Trails; ACECs; Wild and Scenic Rivers; WSAs
Water quality	Water Resources; Fire and Fuels Management; Riparian/Wetland Resources; Wild and Scenic Rivers
Well (oil and gas)	Water Resources; Mineral Resources; Special Status Species; Social and Economic; Public Health and Safety
Well (water)	Water Resources
Withdrawal	Mineral Resources; Cultural Resources; Lands and Realty; Recreation; Livestock Grazing Management; ACECs; National Back Country Byways; National Historic Landmark; Wild and Scenic Rivers
Wyoming Standards for Healthy Rangelands	Soil Resources; Water Resources; Grasslands and Shrublands; Riparian/Wetland Resources; Fish and Wildlife; Wild Horses; Recreation; Lands with Wilderness Characteristics; Livestock Grazing Management

ACEC Area of Critical Environmental Concern
WSA Wilderness Study Area

Table 2-9. Detailed Alternatives

0000 COMMON TO ALL									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
0001	X	X	PR:3.1 MR:1.1 MR:1.3 MR:3.1	Surface-disturbing activities are subject to the *Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities, the Wyoming BLM Reclamation Policy, and the Wyoming DEQ-WQD's Storm Water Permitting Program*.					
0002	X	X	SD:1 SD:5.1 BR:7.1 BR:7.6 BR:8.2 BR:9.1 BR:9.2	The BLM may pursue a withdrawal from appropriation under the mining laws for locatable minerals within ACECs, recommended WSR suitable waterway segments, and special status species habitat on a case-by-case basis.					
0003	X	X	MR:1 MR:1.2 MR:2 BR:6 BR:6.1 BR:7 LR:2.1 LR:3.1	Utilize recommendations found in WGFD documents *Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats* (WGFD 2010b), *Wildlife Protection Recommendations for Wind Energy Development in Wyoming* (WGFD 2010c), and similar documents updated over time where determined applicable and consistent with valid existing rights.					

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
1000 PHYSICAL RESOURCES (PR) – Air Quality									
				GOAL PR:1 Minimize the impact of management actions in the Planning Area on air quality by complying with all applicable air quality laws, rules, and regulations. **Objectives:** **PR:1.1** Maintain concentrations of criteria pollutants in compliance with applicable state and federal Ambient Air Quality Standards within the scope of BLM's authority. **PR:1.2** Maintain concentrations of PSD pollutants associated with management actions in compliance with the applicable increment. **GOAL PR:2** Improve air quality in the Planning Area as practicable. **Objectives:** **PR:2.1** Reduce visibility-impairing pollutants in accordance with the reasonable progress goals and time-frames established within the State of Wyoming's Regional Haze State Implementation Plan. **PR:2.2** Reduce atmospheric deposition pollutants to levels below generally accepted levels of concern and levels of acceptable change.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
1001	X	X	PR:1	Manage prescribed burns to comply with all applicable air quality laws, rules, and regulations, including Wyoming DEQ Air Quality District smoke-management rules and regulations.					
1002	X	X	PR:1	Define a criteria pollutant and air quality related values monitoring strategy and cooperatively establish a monitoring network by creating a method for siting air quality monitors in order to provide additional data for describing background concentrations.					
1003	X	X	PR:1 PR:2	Provide for compliance with applicable air quality standards in the Planning Area and work cooperatively to encourage industry and other permittees to adopt measures to reduce emissions.					
1004	X	X	PR:1.1	Enhance the existing cooperative process that shares air quality information with agencies, stakeholders, and the public.					
1005	X	X	PR:1.1	The State of Wyoming has primary responsibility (primacy) for administering and enforcing air quality standards and regulations within the state. BLM actions will conform with Wyoming DEQ Air Quality Standards and Regulations through application of BMPs and other measures consistent with resource goals and objectives.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
1006	X	X	PR:1 PR:2	Perform analyses of activities with expected effects to air resources. Modeling may be performed on a case-by-case basis.	Require quantitative air quality modeling of industrial activities (e.g., oil and gas field development or mining activities) in order to determine the potential effects from proposed emission sources and the effects of potential mitigation strategies for projects expected to approach or exceed emission standards at the	Same as Alternative A.	Characterize the condition of Class I areas within and adjacent to the Planning Area (Table 3-4), with stakeholders. Appendix J describes the details of this characterization. The proponent of a project will demonstrate regard for air resources and will demonstrate consideration of measures to reduce emissions to meet air	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Air Quality									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					project/RMP level.		quality goals and objectives and Management Action 1003. The BLM will require additional air emission control measures and strategies within its regulatory authority and in consultation with stakeholders if proposed or committed measures are insufficient to achieve air quality goals and objectives. Perform quantitative air quality analyses (i.e., modeling) for project specific developments as determined on a case-by-case basis in consultation with state, federal, and tribal entities to determine the potential impacts of proposed air emissions. Modeling may be performed to determine the effectiveness of mitigation strategies. Perform a quantitative air quality analysis to ensure protection of air quality when the sum of project specific developments in the Planning Area approaches a level of concern as determined in consultation with state, federal, and tribal entities. The BLM may facilitate discussions with stakeholders to implement		

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Air Quality									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							mitigation measures beyond BLM's authority, to reduce emissions from current levels in the Planning Area.		

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Soil									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL PR:3 Maintain or improve soil health (e.g., chemical, physical, and biotic properties) while focusing on making significant progress toward meeting the *Wyoming Standards for Healthy Rangelands* (Appendix N). **Objective:** **PR:3.1** Apply guidelines and appropriate measures to all management actions (including reclamation) affecting soil health to decrease erosion and sedimentation, to achieve and maintain stability, and to support the hydrologic cycle by providing for water capture, storage, and release.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
1007	X	X	PR:3.1	Use BMPs to reduce runoff, soil erosion, and sediment yield, and to retain water on the landscape.					
1008	X	X	PR:3.1	Develop appropriate mitigation for surface-disturbing and disruptive activities associated with wildlife and fish management through use of the mitigation guidelines described in Appendix H.					
1009	X	X	PR:3.1	Maintain existing watershed improvement projects.					
1010	X	X	PR:3.1	Allow surface-disturbing activities on fragile soils, biological crusts, soils with low reclamation potential, and soils with highly erosive characteristics on a case-by-case basis.					
1011	X	X	PR:3.1	Construct water flow, sediment control, and watershed stabilization projects in partnership with local, state, and federal programs.					
1012	X	X	PR:3.1	Prioritize and reseed portions of watersheds as opportunities arise.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
1013	X	X	PR:3.1	Stabilize existing watershed improvement projects where they have failed to promote/enhance/ improve watershed stability.	Stabilize watershed projects to prevent the release of stored sediment if projects are no longer meeting resource objectives.	Same as Alternative B, except on a case-by-case basis.	Stabilize existing watershed improvement projects to prevent the release of stored sediment if projects are no longer needed to meet resource objectives.	Same as Alternative B.	Same as Alternative D.
1014	X	X	PR:3.1	No similar management action; however, under current management all surface-disturbing activities are analyzed for suitability and impacts.	Prior to approval of surface disturbance, analyze surface-disturbing activities by mapping soils to a series level, collecting soil samples for physical and chemical analysis, and evaluating current erosion conditions.	Same as Alternative B, except conduct mapping, collecting, and evaluating on a case-by-case basis.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Soil									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
1015	X	X	PR:3.1	Assess erosion and soil stability during land health evaluations.	Inventory BLM-administered land to determine the rate of erosion and degree of soil stability.	Same as Alternative A.	Same as Alternative A, plus incorporate erosion rates and soil stability into soil survey efforts as soil survey funds become available.	Same as Alternative B.	Same as Alternative D.
1016	X	X	PR:3.1	Allow seeding of areas disturbed by surface-disturbing activities (as part of interim and final reclamation) or areas not meeting resource objectives using approved BLM seed mixtures of native species.	Same as Alternative A.	Allow seeding of areas not meeting resource objectives using approved nonnative and native species.	Allow seeding of areas disturbed by surface-disturbing activities (as part of interim and final reclamation) and areas not meeting resource objectives using approved BLM seed mixtures.	Same as Alternative A.	Same as Alternative D.
1017	X	X	PR:3.1	Routinely seed disturbed areas with native plant species.	In disturbed areas, reestablish healthy native plant communities based on preexisting composition or other species, as identified in an approved management plan.	In disturbed areas, reestablish plant communities to increase commodity production to meet other resource objectives.	In disturbed areas, reestablish healthy native or desired plant communities based on pre-disturbance/desired plant species composition.	Same as Alternative B.	Same as Alternative D.
1018	X	X	PR:3.1	No similar action.	Require a temporary protective surface treatment for the reclamation of all mechanically disturbed areas such as mulch, matting, netting, or tackifiers (excluding fires and including BLM-permitted or trespass activities).	Same as Alternative A.	When appropriate for the site and situation, require temporary protective surface treatments such as weed-free mulch, matting, netting, or tackifiers to facilitate the reclamation of areas affected by authorized or unauthorized surface-disturbing activities. If needed, allow, the use of sterile, weed-free temporary protective surface treatments to facilitate stabilization following wildfires.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Soil									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
1019	X	X	PR:3.1	Reestablish vegetation cover over disturbed soils within 5 years of initial seeding. Require reclamation in compliance with BLM policy, including Wyoming BLM Reclamation Policy and similar guidance updated over time.	Require 50 percent pre-disturbance of desired vegetative cover within three growing seasons. Require 80 percent pre-disturbance vegetative cover within 5 years of initial seeding. Interim and final reclamation will begin at the earliest feasible time.	Require 30 percent desired vegetative cover within three growing seasons. Require reclamation in compliance with BLM policy, including Wyoming BLM Reclamation Policy and similar guidance updated over time.	Interim and final reclamation will begin at the earliest feasible time. Successful final reclamation of the desired vegetative cover will be considered achieved if conditions are equal to or better than pre-disturbance site condition. Require reclamation in compliance with BLM policy, including Wyoming BLM Reclamation Policy and similar guidance updated over time.	Same as Alternative B.	Same as Alternative D.
1020	X	X	PR:3.1	Reclamation plans are not required.	Reclamation plans will be developed and approved prior to any authorized surface-disturbing activities.	Reclamation plans are required on a case-by-case basis.	Reclamation plans, stipulations, and/or mitigation and monitoring measures are required prior to approval of all authorized surface-disturbing activities. Develop specific objectives and timeframes for reclamation plans in coordination with stakeholders.	Same as Alternative B.	Same as Alternative D.
1021	X	X	PR:3.1	Consider stabilization of heavily eroded or washed out roads on a case-by-case basis.	Close and reclaim heavily eroded or washed out roads and trails if alternative roads and trails are available. Stabilize or relocate heavily eroded or washed out roads and trails if alternative roads and trails are unavailable.	Stabilize heavily eroded or washed out roads and trails.	In consultation with stakeholders and subject to site-specific NEPA actions, close and reclaim unnecessary and/or heavily eroded roads and trails if other stable roads and trails are available on a priority basis. Stabilize or relocate heavily eroded or washed out roads and trails if other	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Soil									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							stable roads and trails are unavailable on a priority basis.		
1022	X	X	PR:3.1	Consider topsoil salvage and segregation on a case-by-case basis.	Require topsoil salvage and segregation for all surface-disturbing activities.	Same as Alternative A.	Salvage and segregate topsoil for all applicable surface-disturbing activities. Use salvaged topsoil in the reclamation of the associated surface disturbance.	Same as Alternative B.	Same as Alternative D.
1023	X	X	PR:3 PR:3.1	No similar action.	Require photo point monitoring of all channel crossings and all surface disturbance greater than 0.5 acres.	Same as Alternative A.	Channel crossings and surface disturbance are subject to the monitoring and reporting requirements of Reclamation Requirement 10 of the Wyoming Reclamation Policy, where applicable, and similar guidance updated over time.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
1000 PHYSICAL RESOURCES (PR) – Water									
				GOAL PR:4 Maintain the quality of surface water and groundwater resources, maintain compliance with applicable federal and state water quality standards, and improve water quality where practical within the scope of the BLM's authority. **Objectives:** **PR:4.1** Manage water resources to meet or achieve the *Wyoming Standards for Healthy Rangelands*. **PR:4.2** Attain, maintain, or enhance the physical, chemical, and biological integrity of surface water (Map 3). **PR:4.3** Manage watersheds to prevent accelerated channel erosion and undesirable adjustments in channel geometry (e.g., width-depth ratio, sinuosity, bank stability, gradient) of stream channels within the authority of the BLM. **PR:4.4** Manage watersheds to restore stream channels that have been degraded within the authority of the BLM. **PR:4.5** Manage watersheds to achieve and maintain erosional stability and to support the hydrologic cycle and aquifer recharge. **PR:4.6** Manage pollutants on federal lands to minimize threats to drinking water sources. **PR:4.7** Manage produced water to meet other resource goals and objectives. **GOAL PR:5** Within the scope of BLM's authority, provide for the availability of water to support uses on public lands. **Objective:** **PR:5.1** Rehabilitate, maintain, acquire, develop, or reclaim water supply sources to meet other resource goals and objectives within the scope of BLM's authority.				
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
1024	X	X	PR:4	Water quality standards, enforcement, and remediation are the primacy of and administered by the State of Wyoming. BLM actions will conform with Wyoming DEQ-WQD regulations and requirements through application of BMPs and other measures consistent with resource goals and objectives. Reporting of leaks and spills to the Wyoming DEQ and/or Wyoming Oil and Gas Conservation Commission will be required, as appropriate.					
1025	X	X	PR:5.1	File for water rights to water projects on BLM-administered land as determined appropriate by the BLM.					
1026	X	X	PR:4.2 PR:4.6	Avoid aerial application of fire suppressant chemicals within 300 feet of perennial waters. Consider ground-based application on a case-by-case basis.					
1027	X	X	PR:4.5	Protect watershed resources through the application of watershed conservation practices and BMPs.					
1028	X	X	PR:4.6	In cooperation with stakeholders and within BLM's authority, protect groundwater during BLM activities and permitted actions through appropriate measures. These measures may be determined through methods such as predictive modeling, the results of monitoring, or project-specific analysis.					
1029	X	X	PR:4.2 PR:4.5-4.7	Apply BMPs for oil and gas and water well drilling operations, mining, and other activities, which could affect groundwater resources. For all oil and gas wells, a groundwater monitoring program will be established in accordance with state requirements.					
1030	X	X	PR:4.2 PR:4.5-4.7	Conduct water quality monitoring following the application of pesticides when treatments are conducted adjacent to streams within municipal watersheds, fish hatchery supply watersheds, or adjacent to major fish-bearing streams on a case-by-case basis.					
1031	X	X	PR:4.2 PR:4.3 PR:4.5	Control water runoff from disturbed or developed sites and control soil erosion to appropriate rates for natural conditions through the Wyoming Storm Water Discharge Program using appropriate BMPs and technologies.					

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
1000 PHYSICAL RESOURCES (PR) – Water									
1032	X	X	PR:4.3-4.5	Participate in the development and implementation of local watershed management plans and/or TMDLs with interested stakeholders and Wyoming DEQ. Apply BMPs as appropriate from the *E. coli Total Maximum Daily Loads for the Big Horn River Watershed* (Wyoming DEQ 2013a), for the development and implementation of authorized activities on BLM lands in the Big Horn watershed.					
1033	X	X	PR:4.5	Implement BMPs to protect water quantity and water quality within cave and karst areas exhibiting unique underground drainage characteristics.					
1034	X	X	PR:4.1 PR:4.2 PR:4.7 PR:5.1	Acquire abandoned mineral wells that produce water as determined appropriate by BLM to meet other resource objectives.					
1035	X	X	PR:4.5	Cooperate with stakeholders to plug unneeded abandoned water wells to prevent groundwater contamination and with the State Engineers Office regulations (Part III) for proper water well abandonment.					
1036	X	X	PR:4.6	Cooperate with EPA, the State of Wyoming, and local governments in the development and implementation of source water and wellhead protection plans to protect drinking water sources.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
1037	X	X	PR:4.1-4.4 PR:4.6	Implement watershed improvement practices in Wyoming's Bighorn Basin water quality plans to reduce sediment loadings in streams and river segments as well as lakes and reservoirs. When approved, these practices will be included in various BLM activity plans and in BLM use authorizations, as appropriate.	Develop watershed improvement practices in cooperation with local governments to reduce sediment loading in stream and river systems as well as lakes and reservoirs. Once developed, include in all activity plans and permitted activities.	Apply BMPs to all activity plans and permitted activities.	Same as Alternative B, plus apply BMPs and work in cooperation with stakeholders on activity plans and other authorized activities.	Same as Alternative B.	Same as Alternative D.
1038	X	X	PR:4.2 PR:4.3	In cooperation with other stakeholders, encourage the maintenance of natural flow regimes in streams supporting fisheries in compliance with Wyoming water laws.	In cooperation with other stakeholders, maintain the natural flow regimes in priority streams supporting fisheries in compliance with Wyoming water laws.	In cooperation with other stakeholders, encourage water development projects to allow for adequate in-stream flow to support riparian and fisheries values in compliance with Wyoming water laws.	In cooperation with other stakeholders, encourage the maintenance of natural flow regimes in priority streams supporting fisheries in compliance with Wyoming water laws.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Water									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
1039	X	X	PR:4.1-4.3	Fence springs and reservoirs on BLM-administered land, as necessary, to meet resource objectives. Provide offsite water as necessary.	Consider fencing of springs, wetlands, reservoirs, and riparian areas, and provide offsite water when necessary to meet resources objectives.	Same as Alternative B, except only fence springs and their associated wetlands. Provide offsite water as necessary.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
1040	X	X	PR:4.3 PR:4.4	No similar action.	Cooperate with adjacent landowners and managers to address Impaired waterbodies listed on the State of Wyoming's 303d list. Prioritize all streams not meeting state water quality standards where the evidence indicates that failure to meet such standards is the result of BLM management actions or permitted activities.	Same as Alternative B.	Cooperate with adjacent landowners, managers, and the Wyoming DEQ to address waterbodies not meeting state water quality standards. Prioritize and implement BMPs to address causal factors related to the impairment of water quality of waters where the evidence indicates that failure to meet such standards is the result of BLM management actions or permitted activities.	Same as Alternative B.	Same as Alternative D.
1041	X	X	PR:4.1 PR:4.2 PR:4.6 PR:4.7	Authorize new activities resulting in the surface discharge of produced water if it meets State of Wyoming water quality standards. As the surface administrator of public lands, the BLM considers multiple-use objectives and provides recommendations to the Wyoming DEQ before that agency issues water discharge permits.	Do not authorize new activities resulting in the surface discharge of produced water on BLM-administered land.	Authorize new activities resulting in the surface discharge of produced water and require the proper disposal of this water. At the discretion of BLM and its stakeholders, such waters may be put to beneficial use, in accordance with federal, state, and local laws and regulations. When it occurs in waterways on BLM-administered land, require the discharge of produced water be done in such a	Authorize new activities resulting in the surface discharge of produced water where compatible with other resource objectives and in consultation with stakeholders. Require water monitoring plans for new activities resulting in surface discharges of water to track changes in receiving channels and to minimize adverse impacts to watershed health. If adverse impacts to	Same as Alternative B and restrict or prohibit BLM-authorized activities and infrastructure such as unlined impoundment ponds/pits, reserve pits, and evaporation ponds that could result in the contamination of sensitive water resources, including Groundwater Zones 1-3, Surface Water Zones 1-3, and sensitive aquifer systems identified through the use of the Wyoming Groundwater Vulnerability Assessment Handbook or	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Water									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
						manner as to cause minimal environmental harm, while still contributing to beneficial uses.	receiving channels or watershed health occur, require development and implementation of water management plans which include reclamation strategies and mitigation to address impacts. Avoid or mitigate BLM-authorized activities and infrastructure such as unlined impoundment ponds/pits, reserve pits, and evaporation ponds that could result in the contamination of sensitive water resources, including Source Water Protection Areas identified in Wellhead or Source Water Protection Plans approved local governing bodies and "High" and "Moderately High" sensitivity aquifer systems identified through the use of the Wyoming Groundwater Vulnerability Assessment Handbook or similar document as updated over time, on a case-by-case basis. BMPs appropriate for consideration to mitigate potential water quality impacts are listed in Appendix L.	similar document as updated over time, unless anticipated impacts are mitigated. BMPs appropriate for consideration to mitigate potential water quality impacts are listed in Appendix L.	

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Water									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
1042	X	X	PR:4.6	No similar action.	Prohibit activities that could affect water resources within a ¼ mile area around public water supply wells, and an area including ¼ mile on both sides of a river or stream, for 10 miles upstream of the public water supply intake, within the watershed. For lakes and reservoirs, this would include a ¼ mile area around the waterbody.	Allow activities around public water supply wells on a case-by-case basis.	Avoid activities that could negatively affect water resources within a ¼ mile area around public water supply wells, and an area including ¼ mile on both sides of a river or stream, for 10 miles upstream of the public water supply intake, within the watershed. For lakes and reservoirs, this would include a ¼ mile area around the waterbody. For unavoidable activities in these areas, site specific mitigation will be included to minimize risk of adverse impacts.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
1000 PHYSICAL RESOURCES (PR) – Cave and Karst Resources									
				GOAL PR:6 Conserve significant cave and karst resources and enhance educational and scientific research opportunities relative to cave and karst resources in the Planning Area. **Objectives:** **PR:6.1** Manage significant cave resources as mandated by the Federal Cave Resources Protection Act of 1988. **PR:6.2** Foster public awareness, public use, and provide opportunities for cave and karst research.				
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
1043	X	X	PR:6.1	Cave and karst areas (7,381 acres) are closed to mineral materials disposal, withdrawn from locatable entry, and closed to mineral leasing. These same restrictions apply to important caves or cave passages and karst resources as they are identified.					
1044	X	X	PR:6.1	Manage cave and karst areas as ROW avoidance areas.					
1045	X	X	PR:6.1	Motorized vehicle use is limited to designated roads and trails in areas over important caves or cave passages.					
1046	X	X	PR:6.2	Manage recreational use of caves under a cave management plan. Goals of the plan will include: • Promoting the significance and importance of cave resources through interpretive and educative programs and techniques. • Protecting and maintaining cave resources, including wildlife species and habitat in and around caves by interpreting, restricting, and/or prohibiting nonconforming uses. • Enhancing user experiences and opportunities by managing use at levels compatible with resource carrying capacity and protection.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
1047	X	X	PR:6.2	Do not require a minimum group size in caves.	For safety reasons, group sizes must be at least three people in all caves where use is allowed.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
1048	X	X	PR:6.1	Accomplish cave resource protection and provide for user safety with controls such as timing of use to avoid crowding and closing caves to use during periods of high water runoff.	Same as Alternative A, except close cave and karst areas during all critical periods for bats and when user safety is at risk due to high water, radon, H_2S, and fire.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
1049	X		PR:6.2	Allow commercial recreational use of Spirit Mountain cave on a case-by-case basis.	Same as Alternative A.	Same as Alternative A, except encourage commercial caving tours for Spirit Mountain cave.	Same as Alternative A, except allow for commercial caving tours of Spirit Mountain cave.	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

1000 PHYSICAL RESOURCES (PR) – Cave and Karst Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
1050	X	X	PR:6.2	Manage cave and karst resources as the Worland Caves SRMA to provide for recreational opportunities.	Manage cave and karst resources under a specific cave and karst ERMA.	Do not manage cave and karst resources under a specific cave and karst ERMA. Manage cave and karst areas consistent with resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
1051	X	X	PR:6.2	Allow scientific research of cave and karst areas on a case-by-case basis.	Actively pursue scientific research of cave and karst areas.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
1052	X	X	PR:6.2	No similar action.	Same as Alternative A.	Same as Alternative A.	Manage caves to protect bats from White Nose Syndrome by requiring decontamination protocol under BLM IM 2010-181 or the National White Nose Syndrome protocol.	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
				GOAL MR:1 Provide opportunities for mineral extraction and energy exploration and development to meet national and local needs, while avoiding or mitigating impacts on other resources. **Objectives:** **MR:1.1** Provide opportunities to explore for, sell and/or permit, and develop leasable, salable, and locatable mineral resources. **MR:1.2** Encourage sound, balanced exploration and development of mineral resources in the Planning Area. **MR:1.3** Provide opportunities for exploring, leasing, and developing conventional and unconventional oil and gas, CBNG, coal, sodium, phosphate, and other leasable minerals including, but not limited to, oil shale and geothermal resources. **GOAL MR:2** Manage leasable fluid mineral resources (oil, gas, CBNG, geothermal) in the Planning Area to meet the Nation's energy needs, without compromising long-term health and diversity of public lands and resources. **Objectives:** **MR:2.1** Provide opportunities to explore and develop federal oil and gas resources and other leasable minerals. **MR:2.2** Provide opportunities for collection of subsurface geological (geophysical) data to aid in the exploration of oil and gas resources in areas open to leasing. **MR:2.3** Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of greater sage-grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for greater sage-grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h). **MR:2.4** Where a proposed fluid mineral development project on an existing lease could adversely affect greater sage-grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to sage-grouse or its habitat and will ensure that the best information about the greater sage-grouse and its habitat informs and helps to guide development of such federal leases. **GOAL MR:3** Manage solid leasable mineral resources (coal, oil shale, tar sands, phosphate, sodium, etc.) to help meet local and regional needs, while avoiding or mitigating effects on other resources. **Objective:** **MR:3.1** Provide opportunities for exploration, leasing, and development of solid leasable minerals consistent with goals and objectives of other natural and cultural resources and values. **GOAL MR:4** Manage salable mineral materials to meet local and regional needs, while avoiding or mitigating effects on other resources. **Objectives:** **MR:4.1** Anticipate need and identify areas suitable for ongoing and future mineral materials disposals to meet needs. **MR:4.2** Provide opportunities for exploration and development of salable minerals in suitable locations while avoiding or mitigating effects to other resources. **GOAL MR:5** Manage locatable minerals activities on lands open to mineral entry, while preventing unnecessary and undue degradation of public lands as defined in 43 CFR 3809.5, and while avoiding or mitigating effects of exploration and production on other resources. **Objective:** **MR:5.1** Provide opportunities for exploration and development of locatable minerals while reducing and mitigating effects of mining on other natural resources.					

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
2000 MINERAL RESOURCES (MR)									
				GOAL MR:6 Provide protections for resource values in areas of conflict with mineral exploration and development. **Objectives:** **MR:6.1** Manage oil and gas operations in the Master Leasing Plan areas to prevent degradation of resources. **MR:6.2** Minimize, avoid, and mitigate impacts of environmental risks on fish and wildlife. **MR:6.3** Manage the direct indirect and cumulative impacts so as to maintain a minimal level of user conflict. **MR:6.4** Manage habitat to conserve, recover, and maintain fish and wildlife consistent with appropriate local, state, and federal management plans. **MR:6.5** Utilize a comprehensive approach to travel planning and management to sustain and enhance use. **MR:6.6** Apply guidelines and appropriate measures to all management actions (including reclamation) affecting soil health to decrease erosion and sedimentation, to achieve and maintain stability, and to support the hydrologic cycle by providing for water capture, storage, and release.				
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
2001	X	X	BR:8.3 BR:8.5	Design, construct, and operate evaporation, reserve, work over, and production pits with protective features to reduce mortality livestock and wildlife due to drowning or entrapment as addressed in BLM Wyoming's *Management of Oil and Gas Exploration and Production Pits* (BLM 2011d). Do not allow infrastructure (such as unlined impoundment ponds/pits, reserve pits, evaporation ponds, and other uses) that could impact water resources and cause contamination in order to protect sensitive water resources (within 500 feet of riparian areas and surface waters, Source Water Protection Areas identified in Wellhead or Source Water Protection Plans approved by the local governing body, and "High" and "Moderately High" sensitivity aquifer systems identified through the use of the Wyoming Groundwater Vulnerability Assessment Handbook or similar document as updated over time), unless anticipated impacts are mitigated (Appendix L).				
Locatable Minerals									
2002	X	X	MR:1.1 MR:5.1	Lands not formally withdrawn or segregated from mineral entry are available for mineral entry for bentonite (Map 4), gypsum (Map 5), and other locatable minerals.					
Leasable Minerals – Coal									
2003	X	X	MR:1.1 MR:1.3 MR:3.1	Allow coal exploration on lands through the coal exploration license process.					
2004	X	X	MR:1.1 MR:1.3 MR:3.1	Consider interest in exploration for, or leasing of, federal coal (Map 6), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the *Wyoming BLM Standard Oil and Gas-Lease Stipulations* (Appendix I). Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socio-economic environment of the affected area. If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining greater sage-grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).				

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				Leasable Minerals – Geothermal					
2005	X	X	MR:1.1 MR:1.3 MR:2	Unless otherwise noted, BLM-administered land in the Planning Area that is open to oil and gas leasing is open to geothermal leasing, subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix H. Unless otherwise noted, those lands identified as closed to oil and gas leasing are closed to geothermal leasing.					
2006	X	X	MR:2	Unless otherwise noted, the exploration and development of geothermal resources are subject to restrictions on surface-disturbing activities as they are applied to oil and gas exploration and development activities.					
				Leasable Minerals – Oil and Gas					
2007	X	X	MR:1 MR:2	Protect important resources, including in areas closed to leasing on existing leases (Map 7) to the extent this restriction does not violate the leaseholder/operator lease rights, by applying a NSO restriction and prohibiting surface-disturbing activities. In areas identified as available for leasing, additional planning, analysis, and decision making may be necessary prior to lease issuance under the following criteria: 1) when oil and gas development is resulting in unacceptable multiple-use or natural/cultural resources conflicts, 2) new information evidences increased oil and gas development densities or surface disturbance, or 3) at the discretion of the Field Manager, District Manager, or State Director. Areas closed for oil and gas leasing may be leased with a NSO stipulation to deal with drainage of these resources from federal mineral estate.					
2008	X	X	MR:2.1 MR:2.3 MR:2.4	Determine the routing of access roads and location of well pads after considering the views of the surface owner on split-estate lands (private surface-federal minerals/oil and gas), where possible. Where the federal government owns the mineral estate, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government owns the surface and the mineral estate is in non-federal ownership, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.					
				Leasable Minerals – Oil and Gas/CBNG Exploration and Development					
2009	X	X	MR:1.1 MR:1.3 MR:2.1 MR:2.3	Process oil and gas lease applications on a case-by-case basis.					
2010	X	X	MR:1.1 MR:1.3 MR:2.1 MR:2.3 MR:2.4	Unless otherwise noted, areas that are open to oil and gas leasing are open to geophysical exploration subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix I. Areas closed to oil and gas leasing are closed to geophysical exploration. However, geophysical exploration may be permitted on a case-by-case basis so long as the resource goals and objectives under which the area was closed are not compromised.					
2011	X	X	MR:1.1 MR:1.3 MR:2 MR:2.3	In cases where federal oil and gas leases are or have been issued without stipulated restrictions or requirements that are later found to be necessary, or with stipulated restrictions or requirements later found to be insufficient, consider their inclusion before approving subsequent exploration and development activities. Include these restrictions or requirements only as reasonable measures or as conditions of approval in authorizing APDs or Master Development Plans. Conversely, in cases where leases are or have been issued with stipulated restrictions or requirements that are later found to be excessive or unnecessary, the stipulated					

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
2000 MINERAL RESOURCES (MR)									
			MR:2.4	restrictions or requirements may be appropriately modified, excepted or waived in authorizing actions. Both the application of reasonable measures or COAs and the modification, exception, or waiver of stipulated restrictions or requirements must first be based upon site-specific analysis including the necessary supporting NEPA.					
2012	X	X	MR:2.1	On split-estate lands, at the time of APD review, negotiations among the surface owner, operators, and the BLM may be undertaken to incorporate specific needs of the surface owner.					
2013	X	X	MR:1.2	Utilize BMPs in the exploration, development, production, and abandonment of oil and gas resources.					
Leasable Minerals – Other Solid Leasable Minerals									
2014	X	X	MR:1.1 MR:1.3 MR:3.1	Surface disturbance restrictions for geophysical exploration activities for other solid leasable minerals apply to both leased and un-leased lands.					
2015	X	X	MR:1.1 MR:1.3 MR:3.1	Lease solid minerals such as phosphates or sodium, consistent with other resources, on a case-by-case basis.					
Salable Minerals									
2016	X	X	MR:4.1 MR:4.2	Existing BLM-approved mineral material sites (Map 8) are open to mineral materials disposal. New mineral materials disposal sites in areas open to mineral materials disposal are subject to site-specific analysis prior to approval. Ensure that each community pit has an updated site-specific reclamation fee based on a current mining and reclamation plan. Ensure that reclamation occurs in mined-out areas of community pits.					
2017	X	X	MR:1.1 MR:1.2 MR:4.1 MR:4.2	Dispose of mineral materials on a case-by-case basis, subject to site-specific analysis and appropriate mitigation prior to approval, in areas open to mineral materials disposal.					
2018	X	X	MR:1.1 MR:1.2 MR:4.1 MR:4.2	Prohibit disposal of topsoil.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
Locatable Minerals									
2019	X	X	MR:5.1	4,130,352 acres are available for locatable mineral entry in the Planning Area. Maintain a withdrawal from appropriation under the mining laws for locatable minerals on	3,888,990 acres are available for locatable mineral entry in the Planning Area. Pursue a withdrawal from appropriation under the mining laws for locatable minerals on 314,223 acres	4,155,119 acres are available for locatable mineral entry in the Planning Area. Pursue a withdrawal from appropriation under the mining laws for locatable minerals for 48,095 acres	4,120,325 acres are available for locatable mineral entry in the Planning Area. Pursue a withdrawal from appropriation under the mining laws for locatable minerals for 83,321 acres	2,443,901 acres are available for locatable mineral entry in the Planning Area. Pursue a withdrawal from appropriation under the mining laws for locatable minerals on 1,759,312	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				72,861 acres in the Planning Area (Map 9).	in the Planning Area (Map 10).	in the Planning Area (Map 11).	in the Planning Area (Map 12).	acres in the Planning Area (Map 13).	
2020	X		MR:5.1	No similar action.	Pursue a withdrawal from appropriation under the mining laws for federal mineral estate within the Cody Industrial Park area until such time as the mineral estate is disposed of.	Federal mineral estate within the Cody Industrial Park area is available for locatable mineral entry.	Do not open federal mineral estate within the Cody Industrial Park area to locatable mineral entry.	Same as Alternative B.	Same as Alternative D.
				Leasable Minerals – Coal					
2021	X	X	MR:1.1 MR:1.3 MR:3.1	Terminate all coal and phosphate withdrawals and classifications and return the lands involved to operation of the mining laws.	Continue all coal and phosphate withdrawals and classifications, and do not return the lands involved to operation of the mining laws.	Same as Alternative A.	Continue all coal and phosphate withdrawals and classifications unless no longer needed and do not return the lands involved to operation of the mining laws.	Same as Alternative B.	Same as Alternative D.
				Leasable Minerals – Geothermal Resources					
2022		X	MR:5.1	Lands within 15 miles of Hot Springs State Park are open to geothermal leasing.	BLM-administered land or federal mineral estate within 15 miles of Hot Springs State Park in Thermopolis is closed to geothermal leasing.	Same as Alternative A.	BLM-administered land or federal mineral estate within 5 miles of Hot Springs State Park in Thermopolis is closed to geothermal leasing.	Same as Alternative B.	Same as Alternative D.
2023	X	X	MR:5.1	A total of 151,931 acres are closed to geothermal leasing (Map 14). A total of 3,986,094 acres are open to geothermal leasing.	A total of 2,453,193 acres are closed to geothermal leasing (Map 15). A total of 1,684,832 acres are open to geothermal leasing.	A total of 145,836 acres are closed to geothermal leasing (Map 16). A total of 3,993,194 acres are open to geothermal leasing.	A total of 361,777 acres are closed to geothermal leasing (Map 17). A total of 3,776,248 acres are open to geothermal leasing.	Same as Alternative B.	Same as Alternative D.
				Leasable Minerals – Oil and Gas/CBNG Exploration and Development					
2024	X	X	MR:1.1 MR:1.3 MR:2.1 MR:2.3	Approximately 1,354,593 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of	Approximately 405,620 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of	Approximately 2,565,742 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of	Approximately 911,814 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of	Approximately 384,176 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of	Approximately 912,328 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
			MR:2.4	the **standard** lease form only (Map 18).	the **standard** lease form only (Map 19).	the **standard** lease form only (Map 20).	the **standard** lease form only (Map 21). Require geothermal resource monitoring and protection within 5 miles of Hot Springs State Park and within the Thermopolis Anticline.	the **standard** lease form only (Map 22).	the **standard** lease form only (Map 23).
2025	X	X	MR:1.1 MR:1.3 MR:2.1 MR:2.3 MR:2.4	Approximately 1,633,204 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **moderate** constraints (Map 18).	Approximately 335,109 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **moderate** constraints (Map 19).	Approximately 1,334,491 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **moderate** constraints (Map 20).	Approximately 1,714,685 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **moderate** constraints (Map 21).	Approximately 319,671 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **moderate** constraints (Map 22).	Approximately 1,709,652 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **moderate** constraints (Map 23).
2026	X	X	MR:1.1 MR:1.3 MR:2.1 MR:2.3 MR:2.4	Approximately 889,435 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **major** constraints (Map 18).	Approximately 932,551 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **major** constraints (Map 19).	Approximately 91,956 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **major** constraints (Map 20).	Approximately 1,221,142 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **major** constraints (Map 21).	Approximately 969,432 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **major** constraints (Map 22).	Approximately 1,191,215 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form, as well as **major** constraints (Map 23).
2027	X	X	MR:1.1 MR:1.3 MR:2.1 MR:2.3 MR:2.4	Approximately 260,792 acres of federal mineral estate are **closed** to oil and gas leasing (Map 18).	Approximately 2,464,745 acres of federal mineral estate are **closed** to oil and gas leasing (Map 19).	Approximately 145,836 acres of federal mineral estate are **closed** to oil and gas leasing (Map 20).	Approximately 292,353 acres of federal mineral estate are **closed** to oil and gas leasing (Map 21).	Approximately 2,464,745 acres of federal mineral estate are **closed** to oil and gas leasing (Map 22).	Approximately 324,829 acres of federal mineral estate are **closed** to oil and gas leasing (Map 23).
2028	X	X	MR:1.1 MR:1.3 MR:2.1 MR:2.3 MR:2.4	No similar action.	Prohibit suspension of existing non-producing mineral leases in areas closed to mineral leasing. After such leases expire, do not offer those lands for lease again.	Allow suspension of existing mineral leases (producing or non-producing) in areas closed to mineral leasing. After existing non-producing mineral leases expire in areas closed to mineral leasing, do not offer those lands lease.	Same as Alternative B, except on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Leasable Minerals – Oil and Gas Management Areas, Master Leasing Plan Areas, and Other Areas									
2029	X	X	MR:1.1 MR:1.3 MR:2.1	No similar action.	Do not delineate **Oil and Gas Management Areas.** However, continue to consider surface resources such as wildlife habitat and livestock forage within existing intensively-developed fields and adjacent areas during review and approval of fluid minerals actions.	Delineate **Oil and Gas Management Areas** (Map 24) (566,345 acres of federal mineral estate) around intensively-developed existing fields, using a buffer zone of up to 2 miles from the outer boundary of the existing field (Map 26). Within these areas, manage primarily for oil and gas exploration and development; consider all other surface uses secondary.	Delineate **Oil and Gas Management Areas** (Map 25) (441,662 acres of federal mineral estate) around existing intensively-developed fields, applying a 2-mile buffer from the outer boundary of the existing field (Map 26); adding enhanced oil recovery areas identified by the Governor's Office Enhanced Oil Recovery Institute and excluding greater sage-grouse PHMAs. Manage these areas primarily for oil and gas exploration and development. Oil and gas development, including enhanced oil recovery operations, within Oil and Gas Management Areas is allowed to take place at the same level and density as the existing development in the field, except in the Oregon Basin Oil Field, where new development must result in no net gain of surface disturbance. Levels and densities beyond the existing field development may require additional reclamation or compensatory offsite	Same as Alternative B, except apply NSO conditions of approval on existing leases to the extent consistent with valid existing rights in greater sage-grouse Key Habitat Areas (Map 27).	Same as Alternative D, except apply NSO conditions of approval on existing leases to the extent consistent with valid existing rights in greater sage-grouse PHMAs (Map 28).

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							mitigation. As oil and gas fields expand or exploration reaches beyond the Oil and Gas Management Areas depicted on Map 25, Oil and Gas Management Areas may be enlarged as appropriate. To enlarge Oil and Gas Management Areas, the expansion area would: i) have to be adjacent to the field and under valid oil and gas lease(s) with stipulations allowing surface occupancy and development; ii) have to have a surface density of, on average, at least four well pads per 640-acres; a determination that additional well density is required to efficiently and adequately produce the oil or gas resource; iii) have a project-specific environmental analysis prepared to analyze the impacts and determine operating methods, mitigation, and BMPs to be used in the efficient and comprehensive development of the field; iv) need surface resources to be satisfactorily mitigated; and v) need commitment to		

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							accelerate reclamation as required by the authorized officer.		
2030	X		MR:1.1 MR:1.3 MR:3.1	No similar action.	Federal mineral estate within the Cody Industrial Park area is closed to mineral leasing.	Federal mineral estate within the Cody Industrial Park area is open to mineral leasing.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Leasable Minerals – Other Solid Leasables (Oil Shale, Tar Sands, Phosphate, etc.)									
2031	X	X	MR:1.1 MR:1.3 MR:3.1	Sherard Dome and Trapper Canyon are open to mineral leasing.	Sherard Dome and Trapper Canyon tar sands are closed to solid mineral leasing.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Salable Minerals									
2032	X	X	MR:1.1 MR:4.1 MR:4.2	Dispose of mineral materials (e.g., sand and gravel [Map 29], limestone, and decorative/construction stone) throughout the Planning Area, except where resource values require closure. 3,974,564 acres are open to mineral materials disposal. 228,649 acres are closed to mineral materials disposal (Map 30).	1,612,993 acres are open to mineral materials disposal. 2,590,220 acres are closed to mineral materials disposal (Map 31).	3,859,251 acres are open to mineral materials disposal. 343,962 acres are closed to mineral materials disposal (Map 32).	3,828,320 acres are open to mineral materials disposal. 374,894 acres are closed to mineral materials disposal (Map 33).	1,059,062 acres are open to mineral materials disposal. 3,144,151 acres are closed to mineral materials disposal (Map 34).	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
2033	X		MR:1.1 MR:4.1 MR:4.2	No similar action.	Federal mineral estate within the Cody Industrial Park area is closed to mineral materials disposal.	Federal mineral estate within the Cody Industrial Park area is open to mineral materials disposal.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Geophysical Exploration and Development									
2034	X	X	MR:1.1 MR:1.3 MR:2.2	Allow geophysical exploration if it can be conducted within the constraints necessary to protect other resources.	Same as Alternative A, but geophysical exploration is subject to motorized vehicle use limitations and restrictions on surface-disturbing activities.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Carbon Dioxide (CO_2) Sequestration									
2035	X	X	MR:1.2	No similar action.	Prohibit carbon dioxide sequestration research and projects.	Allow carbon dioxide sequestration research and projects.	Allow carbon dioxide sequestration research and projects when/if they meet and do not detract from other resource objectives.	Same as Alternative B.	Same as Alternative D.
Master Leasing Plans (MLPs) -- Absaroka Front									
2036	X	X	MR:6	No similar action.	Do not apply any MLPs. Consistent with the management of other resources and resources uses under this alternative, the Absaroka Front Management Area is closed to mineral leasing.	Same as Alterative B. Consistent with the management of other resources and resources uses under this alternative, the Absaroka Front Management Area is open to mineral leasing.	Apply a MLP to 253,112 acres in the Absaroka Front MLP Analysis Area (Map 35). Zone 1 – 148,658 acres Zone 2 – 5,604 acres Zone 3 – 98,852 acres	Same as Alterative B.	Same as Alternative D.
2037	X		MR:6.1 MR:6.2 MR:6.4	No similar action.	Consistent with the management of other resources and resources uses under this alternative, the Absaroka Front Management Area is closed to mineral leasing.	Same as Alternative A.	Zone 1 – Areas within elk crucial winter range will be offered for lease only after all parcels outside elk crucial winter range have been offered for lease, sold, and explored. Exploration will be	Same as Alterative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							considered complete when a downhole spacing determination has been made by the WOGCC or BLM Wyoming RMG, as appropriate.		
2038	X		MR:6.1 MR:6.2 MR:6.4	Consistent with the management of other resources and resources uses under this alternative, apply a TLS to avoid surface-disturbing and disruptive activities within big game crucial winter range from November 15 through April 30. Apply CSU stipulation for big game migration corridors, narrow ridges, overlapping big game crucial winter range.	Consistent with the management of other resources and resources uses under this alternative, the Absaroka Front Management Area is closed to mineral leasing.	Consistent with the management of other resources and resources uses under this alternative, the Absaroka Front Management Area is open to mineral leasing.	Zone 1 – Areas outside elk crucial winter range are subject to CSU. Oil and gas-related surface disturbances are restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease at any given time will not exceed 32 acres. A minimum lease size of 640 acres of federal mineral estate would be applied outside elk crucial winter range. The lease can consist of noncontiguous parcels. Smaller parcels may be leased only when 640 acres of federal mineral estate are not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. • Allow additional disturbance pending	Same as Alterative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in elk crucial winter range.		
2039	X		MR:6.1 MR:6.2 MR:6.4	Consistent with the management of other resources and resources uses under this alternative, apply a TLS to avoid surface-disturbing and disruptive activities within big game crucial winter range from November 15 through April 30. Apply CSU stipulation for big game migration corridors, narrow ridges, overlapping big game crucial winter range.	Consistent with the management of other resources and resources uses under this alternative, the Absaroka Front Management Area is closed to mineral leasing.	Consistent with the management of other resources and resources uses under this alternative, the Absaroka Front Management Area is open to mineral leasing.	Zone 1 – Areas inside elk crucial winter range are subject to CSU. Oil and gas-related surface disturbances are restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease at any given time will not exceed 64 acres. A minimum lease size of 1,280 acres of federal mineral estate would be applied inside elk crucial winter range. The lease can consist of noncontiguous parcels. Smaller parcels may be leased only when 1,280 acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization	Same as Alterative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in elk crucial winter range.		
2040	X		MR:6.1 MR:6.2 MR:6.4	Apply a TLS to avoid surface-disturbing and disruptive activities within big game crucial winter range from November 15 through April 30. Apply CSU stipulation for big game migration corridors, narrow ridges, overlapping big game crucial winter range.	The Absaroka Front Management Area is closed to mineral leasing.	Manage the Absaroka Front Management Area consistent with other resource objectives.	Zone 2 – Areas adjoining the Shoshone National Forest are open to oil and gas leasing but will be managed for the protection of wildlife transitional and/or big game habitats, and to enable consistent management across multiple surface owners. The acreage in Zone 2 will be offered only as 2 parcels (Map 35) requiring a Master Development Plan to minimize impacts to big game crucial winter range or transitional habitat. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in big game winter range. The plan must demonstrate to the BLM	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							authorized officer's satisfaction how the operator will meet the following performance standards: • Consult with the Shoshone National Forest and State of Wyoming to ensure consistent management objectives are achieved. • Design oil and gas development to avoid or reduce unnecessary disturbances, wildlife conflicts, and habitat impacts. • Plan the pattern and rate of development to avoid the most important habitats and generally reduce the extent and severity of impacts. • Cluster drill pads, roads and facilities in specific, "low-impact" areas, if geologically feasible. • Consider "liquid gathering systems" (LGS) to eliminate surface storage tanks and reduce truck trips for removal of liquids. • To the extent practicable, place infrastructure within		

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							or near previously disturbed locations. • Minimize infrastructure development and operational activity during life of field by using consolidation (e.g., "unitized") development techniques.		
2041		X	MR:6.1 MR:6.2 MR:6.4	Apply a TLS to avoid surface-disturbing and disruptive activities within big game crucial winter range from November 15 through April 30. Apply CSU stipulation for big game migration corridors, narrow ridges, overlapping big game crucial winter range.	The Absaroka Front Management Area is closed to mineral leasing.	Manage the Absaroka Front Management Area consistent with other resource objectives.	Zone 3 – Areas inside elk crucial winter range are subject to CSU. Oil and gas-related surface disturbances are restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease will not exceed 64 acres. A minimum lease size of 1,280 noncontiguous acres of federal mineral estate is required inside elk crucial winter range. Smaller parcels may be leased only when 1,280 acres of federal mineral estate are not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in elk crucial winter range.		
2042		X	MR:6.1 MR:6.2 MR:6.4	Determine the appropriate DPC to manage vegetation on a case-by-case basis to in areas identified as habitat for special status species, or crucial winter range for big game.	The Absaroka Front Management Area is closed to mineral leasing.	Manage vegetation in areas identified as habitat for special status species, or crucial winter range for big game to the DPC that is a combination community that benefits all grazing/browsing animals.	Zone 3 – Apply a CSU to avoid locating new surface disturbance within forest type vegetation in areas identified as habitat for big game crucial winter range (Map 37).	Same as Alterative B.	Same as Alterative D.
2043		X	MR:6.3	Apply a NSO restriction on portions of the Absaroka Foothills SRMA.	The Absaroka Front Management Area is closed to mineral leasing.	Manage the Absaroka Front Management Area consistent with other resource objectives.	Zone 3 – Apply a TLS for surface-disturbing or disruptive activity from September 1-November 15 to maintain recreational settings for hunting within the Absaroka Mountain Foothills SRMA.	Same as Alterative B.	Same as Alterative D.
Master Leasing Plans (MLPs) – Fifteenmile									
2044		X	MR:6	No similar action.	Do not apply an MLP.	Same as Alterative B.	Apply a MLP to 180,816 acres in the Fifteenmile MLP Analysis Area (Map 35).	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
2045		X	MR:6.3 MR:6.6	Review mineral leases on a case-by-case basis and apply stipulations and mitigation consistent with other resource objectives.	Apply a NSO restriction in the Fifteenmile area.	Same as Alternative A.	Apply a CSU restriction within the Fifteenmile MLP Analysis Area. Allow no more than 1 surface disturbance per lease, to include 1 well pad and ancillary facilities, to maintain recreational settings, and conserve geologic features, LRP soils, allow no more than 1 surface disturbance per lease. Total surface disturbance per lease will not exceed 32 acres. A minimum lease size of 640 acres of federal mineral estate would be applied within the analysis area. The lease can consist of noncontiguous parcels. Smaller parcels may be leased only when 640 acres of federal mineral estate are not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							technically feasible. • Utilize unitization to control the pace and density of development.		
2046		X	MR:6.6	Allow surface-disturbing activities on fragile soils, biological crusts, soils with low reclamation potential, and soils with highly erosive characteristics on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Apply a lease notice to restrict surface disturbance on LRP soils and unique geologic features unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts, which may include, but not be limited to include an Erosion, Revegetation and Restoration Plan. The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: • The disturbed area will be stabilized with no evidence of accelerated erosion features. • The disturbed area shall be managed to ensure soil characteristics approximate an appropriate reference site with regard to erosional features to maintain soil	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							productivity and sustainability. • Slope stability is maintained preventing slope failure and erosion. • Sufficient viable topsoil is maintained for ensuring successful final reclamation. At locations where interim reclamation will be completed, this will be accomplished by respreading all salvaged topsoil over the areas of interim reclamation. • The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation.		
2047		X	MR:6.5	Allow OHV use in areas with limited travel designations for NOS level casual use actions.	Prohibit OHV use in areas with limited travel designations for NOS level casual use actions.	Same as Alternative A.	Limit off-road vehicular use for NOS level casual use actions within the Fifteenmile MLP Analysis Area. Allow OHV and mechanized (mountain bike) travel up to 300 feet from established roads in areas with limited travel designations to allow for staking activities, provided that: 1) no resource damage occurs; 2) no new routes are	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							created; and 3) such access is not otherwise prohibited by the BLM authorized officer.		
				Master Leasing Plans (MLPs) – Big Horn Front					
2048	X	X	MR:6	No similar action.	Manage the Big Horn Front area consistent with other resource objectives.	Do not apply an MLPs.	Apply an MLP to 379,308 acres in the Big Horn Front MLP Analysis Area (Map 35).	Same as Alterative B.	Same as Alterative D.
2049	X	X	MR:6.1 MR:6.2 MR:6.4	Address traditional migration and travel corridors for big game wildlife species and migratory birds on a case-by-case basis.	Prohibit surface-disturbing activities within ½ mile of big game migration corridors.	Identify and develop management for traditional migration and travel corridors for big game wildlife species.	Apply a NSO restriction: Prohibit surface-disturbing activities within ½ mile of big game migration corridors within the Big Horn Front MLP Analysis Area.	Same as Alterative B.	Same as Alterative D.
2050	X	X	MR:6.1 MR:6.2 MR:6.4	Apply a TLS to avoid surface-disturbing and disruptive activities within big game crucial winter range from November 15 through April 30.	Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within big game crucial and winter range.	Same as Alternative A.	Same as Alternative A. In addition, apply a TLS to avoid surface-disturbing and disruptive activities within elk winter range from November 15 through April 30 within the Big Horn Front MLP Analysis Area. Apply a CSU: Within elk crucial winter range, oil and gas-related surface disturbances would be restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. A minimum lease size of 1,280 acres of federal mineral estate would be required. The lease can consist of noncontiguous	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							parcels. Total surface disturbance per lease will not exceed 64 acres. Smaller parcels may be leased only when 1,280 acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in crucial winter range.		

Table 2-9. Detailed Alternatives (Continued)

2000 MINERAL RESOURCES (MR)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
2051	X	X	MR:6.5	Allow OHV vehicle use in areas with limited travel designations for NOS level casual use actions.	Prohibit OHV vehicle use in areas with limited travel designations for NOS level casual use actions.	Same as Alternative A.	Limit off-road vehicular use for NOS level casual use actions within the Big Horn Front MLP Analysis Area. Allow OHV and mechanized (mountain bike) travel up to 300 feet from established roads in areas with limited travel designations to allow for staking activities, provided that: 1) no resource damage occurs; 2) no new routes are created; and 3) such access is not otherwise prohibited by the BLM authorized officer.	Same as Alterative B.	Same as Alterative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
3000 FIRE AND FUELS MANAGEMENT (FM)									
				GOAL FM:1 Reducing risk to firefighters and the public is the first priority in every fire management activity. Protect life, property, and resource values by responding to wildland fires based on ecological and social consequences of the fire and the circumstances under which it occurs. **Objectives:** **FM:1.1** Maintain partnerships with the public and interagency cooperators to strengthen coordination of all fire management activities and encourage the creation of fire safe communities. **FM:1.2** Enhance the wildland fire public education prevention program regarding wildland fire. **FM:1.3** Manage fuels to restore and maintain landscapes, and promote fire-adapted communities and infrastructure. Fire and fuels management actions will focus on restoring natural fire regimes and frequencies, and accomplishing DPC objectives. **FM:1.4** Utilize fire management strategies and tactics that are appropriate for the values at risk while also minimizing impacts on resource values. **FM:1.5** Following wildland fires, conduct appropriate emergency stabilization and rehabilitation when and where needed. In priority sage-grouse habitat areas, prioritize suppression immediately after life and property to conserve the habitat. In general sage-grouse habitat, prioritize suppression where wildfires threaten priority sage-grouse habitat. **FM:1.6** Management of fire and fuels will be as consistent as possible with approved local fire plans in coordination with counties, cooperators, and stakeholders. **GOAL FM:2** Restore natural fire regimes and frequencies to the landscape, and utilize fire and vegetation treatments to accomplish DPC objectives. **Objectives:** **FM:2.1** Consult and cooperate with adjacent landowners, state and local governments, and other stakeholders to plan and implement prescribed fire and other vegetation treatments across the landscape. In areas of general sage-grouse habitat, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. **FM:2.2** Implement and maintain a FMP for the Planning Area; the FMP identifies the site-specific fire management practices and fuels treatment actions needed to meet this RMP's goals and objectives and includes a focus on restoring natural fire regimes and frequencies or accomplishing DPC objectives.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
3001	X	X	FM:2.1	Ensure all prescribed burning activities comply with Wyoming DEQ air quality standards and smoke management rules.					
3002	X	X	FM:1.5	Implement the BLM Emergency Stabilization and Rehabilitation standards located in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a).					
3003	X	X	FM:1.4 FM:1.1	Base the response to wildfires consistent with objectives and the cost/benefits of the resources at risk.					
3004	X	X	FM:1.4 HR:3.3	Restrict or prohibit the use of fire retardant chemicals as appropriate to protect rock art. Avoid aerial application of fire suppressant chemicals within 300 feet of perennial waters. Consider ground-based application on a case-by-case basis.					
3005	X	X	HR:3.3	Prohibit the use of bulldozers in areas of important cultural resources or historic trails for fire suppression unless an archeologist and/or resource advisor is present.					
3006	X	X	HR:1.2	Assign an archeologist to all fires with heavy equipment employed beyond Minimum Impact Suppression Techniques (see Glossary) to assist in determinations of appropriate suppression strategies.					
3007	X	X	FM:1 FM:2	Maintain and implement an FMP consistent with this RMP to address fire management on a landscape scale. Under the appropriate environmental conditions the use of unplanned ignitions for resource benefit and prescribed fire to meet resource management objectives is allowed in the entire Planning Area.					
3008	X	X	FM:1	Suppress fires threatening greater sage-grouse habitats and crucial winter wildlife habitat within Wyoming big sagebrush communities. Where fire would be utilized to meet					

Table 2-9. Detailed Alternatives (Continued)

3000 FIRE AND FUELS MANAGEMENT (FM)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				resource objectives, work closely with resource specialists to protect and improve greater sage-grouse habitat. If prescribed fire is used in greater sage-grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how greater sage-grouse goals and objectives would be met by its use; • how the COT Report objectives would be addressed and met; and • a risk assessment to address how potential threats to greater sage-grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment in greater sage-grouse habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect greater sage-grouse habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known crucial winter wildlife habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in and/or around crucial winter wildlife habitat must be strategically-designed to reduce wildfire risk and protect winter range habitat quality.				
3009	X	X	FM:1	Protect facilities or habitable structures from fire.					
3010	X	X	FM:2	Cooperate with other agencies and landowners to conduct landscape treatments, resulting in enhanced fuels management and/or restoration of fire-adapted ecosystems.					
3011	X	X	FM:1.1 BR:4.3	In cooperation with the WGFD, identify waters that contain high-risk aquatic invasive species. Avoid using these identified water sources for suppression activities except in cases where public and firefighter safety are threatened.					
3012	X	X	FM:1.1 BR:4.3	Clean (i.e., disinfect) fire-fighting equipment where water sources containing high-risk aquatic invasive species must be utilized.					
3013	X	X	FM:2	Reduce hazardous fuels in the wildland urban interface.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
3014	X	X	FM:1.4 FM:1.1	Base the response to wildland fire on the ecological, social, and legal consequences of the fire.	Response to wildland fire may vary from full suppression in areas where fire is undesirable, to monitoring fire behavior in areas where fire can be used as a management tool.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

3000 FIRE AND FUELS MANAGEMENT (FM)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
3015	X	X	FM:2.1 FM:2.2	Utilize wildland fires (wildfires managed for resource benefit and prescribed fires) to restore fire-adapted ecosystems and reduce hazardous fuels.	Utilize wildland fires (wildfires managed for resource benefit and prescribed fires) and other vegetation treatments to restore fire-adapted ecosystems for natural resource systems and reduce hazardous fuels.	Utilize wildland fires (wildfires managed for resource benefit and prescribed fires) and other vegetation treatments to restore fire-adapted ecosystems and enhance forage for commodity production and reduce hazardous fuels.	Utilize wildland fires (wildfires managed for resource benefit and prescribed fires) and other vegetation treatments to restore fire-adapted ecosystems, reduce hazardous fuels, and accomplish resource management objectives.	Same as Alternative B.	Same as Alternative D.
3016	X	X	FM:2.1 FM:2.2	Use mechanical, chemical, and biological treatments across the landscape as needed to restore vegetative diversity and reduce the risk of unnatural fire within those ecosystems.	Use mechanical, chemical, or biological treatments only in the wildland-urban interface to protect structures and private property from the effects of unwanted fire.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Forests, Woodlands, and Forest Products									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL BR:1 Maintain, enhance, or restore forest stand community health, composition, and diversity taking into account density, basal area, canopy cover, age class, stand health, and understory components. **Objectives:** **BR:1.1** Maintain overall forest health by managing forest and woodland stands for endemic populations of native insects and disease. **BR:1.2** Provide for commercial and local forest product needs in consideration of other resource values.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
4001	X	X	BR:1.1 BR:1.2	Close campgrounds to cutting of timber and firewood, except for purposes of public safety and campground management.					
4002	X	X	BR:1.1	Regenerate all harvest areas by natural or artificial means consistent with BLM policy. If at the end of fifteen years any clear-cut area fails to regenerate naturally, use planting and other methods to assure regeneration unless converting vegetation to another type is the objective.					
4003	X	X	BR:1.1	Slash resulting from timber harvesting will be made available for biomass, piled or lopped and scattered, roller chopped, or burned to provide watershed protection, promote reforestation, provide nutrient recycling, and improve wildlife habitat.					
4004	X	X	BR:1.1	Require a permit for harvesting firewood and other forest products on BLM-administered land, except for small amounts used onsite for camping, cooking, or warming.					
4005	X	X	BR:1.1	Surface-disturbing activities associated with all types of forest management are subject to appropriate mitigation developed through use of the mitigation guidelines described in the Wyoming Forestry BMPS (Appendix L).					
4006	X	X	BR:1.1	Consider the commercial harvest of forest products and other vegetative treatments on all forest and woodland areas, except those areas excluded from harvest by law or statute, to accomplish wildlife, watershed, and forest management objectives. Base actual harvest levels on treatments needed to meet management objectives to restore historic processes, composition, and structures of the forests and woodlands.					
4007	X	X	BR:1.1 BR:1.2	Allowable cut figures, when calculated, reflect the level of harvest needed to develop and maintain the desired structure of forestland base.					
4008	X	X	BR:1.2	Allow the sale of permits to meet public demand for personal use and harvest of forest products including posts, poles, firewood, sawlogs, Christmas trees, and other vegetative products consistent with wildlife habitat requirements. After NEPA analysis, authorize commercial use for seed collections for use in habitat restoration or research.					
4009	X	X	BR:1.1	Apply forest management techniques to attain the management goals of timber production and enhancement of other resource values if traditional forms of logging are not possible or if stands are not purchased when offered for sale. These may include: (1) burning instead of logging, (2) disease treatment by spraying, (3) spraying grasses and shrubs to eliminate competition with tree species, or (4) non-commercial mechanical treatments.					
4010	X	X	BR:1	Manage forestland on Rattlesnake Mountain as a restricted management area where forest management and timber and firewood cutting emphasize maintenance or improvement of forest, wildlife, watershed, and recreation resource values.					
4011	X	X	BR:1.2	Manage all forestlands outside the Rattlesnake Mountain area to enhance or maintain resources or multiple resource uses, such as recreation opportunities, livestock grazing, forest products, wildlife, watershed, and scenic values where appropriate for the forest type. Some of these lands are on the west slope of the Big Horn Mountains, Absaroka Mountains, and on Little Mountain.					
4012	X	X	BR:1.1	Apply partial cutting, extended forest crop rotations, or other restrictions on forest management where applicable.					
4013	X	X	BR:1.1	Evaluate the size, extent, distance from roads, and characteristics of forestland vegetation, when forest harvests are considered, to maintain or improve the effectiveness of residual wildlife security areas.					

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Forests, Woodlands, and Forest Products									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4014	X	X	BR:1.1	Maintain sustainable populations of forest and woodland tree species, including limber pine, subalpine fir, whitebark pine, cottonwood, willow, Rocky Mountain juniper, Utah juniper, and aspen, while enhancing the management of intermingled resources and resources uses, such as watersheds, wildlife habitat, scenic values, recreation opportunities, and livestock grazing.					
4015	X	X	BR:1.1	Actively promote aspen regeneration throughout the Planning Area using a variety of vegetation treatments and natural processes.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
4016	X	X	BR:1.1 BR:1.2	Plant conifer areas exposed by wildfire and harvesting with conifer species if they do not regenerate naturally within 15 years.	Same as Alternative A, except plant if exposed areas do not regenerate within 20 years.	Same as Alternative A, except plant if exposed areas do not regenerate within 10 years.	Same as Alternative A, except plant in managed or desired forest and woodland areas on a priority basis.	Same as Alternative B.	Same as Alternative D.
4017	X	X	BR:1.1	No similar action.	Retain old growth forest areas over a 30-year period in an appropriate proportion to other timber classes within a HUC Level 4 sub-basin, unless altered by natural processes. Identify old growth forest characteristics for the various forest types. Adopt connectivity of existing or potential old growth areas if appropriate and consistent with other management.	Retain old growth forest areas at appropriate locations and distribution levels, within a HUC Level 4 sub-basin as evaluations occur. Identify old growth forest characteristics for the various forest types. Adopt connectivity of existing or potential old growth areas whenever feasible.	Projects in old growth stands must fully maintain, or contribute toward the restoration of the structure and composition of old growth stands according to pre-suppression old growth condition characteristics of the forest type, taking into account the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure. Identify old growth forest characteristics for the various forest types. Adopt connectivity of existing or potential old growth areas whenever feasible.	Same as Alternative B.	Same as Alternative D.
4018	X	X	BR:1.1	Allow salvage of dead stands on a case-by-case basis.	Manage outbreaks of endemic insect and disease outbreaks only as necessary for human	Manage endemic insect and disease with the full range of silviculture techniques and treatment	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Forests, Woodlands, and Forest Products									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					health and safety (endemic insect and disease outbreaks are a natural part of the forest life-cycle).	methods.			
4019	X	X	BR:1.1	Allow salvage of dead stands on a case-by-case basis with appropriate levels of snag retention.	Conduct salvage operations where necessary to improve wildlife habitat, including appropriate levels of snag retention and as necessary for human health and safety.	Conduct salvage operations for the removal of dead stands where economically feasible.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
4020	X	X	BR:1.2	Allow precommercial thinning in overstocked areas and regenerated timber sale areas when trees in those areas reach the 20- to 30-year age class.	Do not allow precommercial thinning except for fuels treatment.	Same as Alternative A, except allow precommercial thinning when trees reach the 10- to 20-year age class or when the regenerated trees are 5- to 15-feet tall.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
4021	X	X	BR:1	Assess the need to close existing and future timber access and haul roads on a case-by-case basis. Generally, close spur roads after completion of timber management.	Close roads not required for other existing uses.	Allow spur roads to remain open to meet other resource goals and objectives or for new recreational purposes.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
4022	X	X	BR:1.1	Perform treatments in all woodland types, including but not limited to juniper, aspen, cottonwood, and ponderosa, limber, and whitebark pine woodlands.	Same as Alternative A, except allow treatments only where natural processes are unable to accomplish forest health goals.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
4023	X	X	BR:1.1	Manage wildland fire s and logging or timbering whenever possible to	Use natural processes to revitalize decadent stands, improve stand density, and	Use logging or timbering before wildland fire and other natural processes to	Use logging, timbering, or wildland fire when appropriate to revitalize	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Forests, Woodlands, and Forest Products									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				revitalize decadent stands, improve stand density, and increase canopy cover.	increase canopy cover.	revitalize decadent stands, improve stand density, and increase canopy cover.	decadent stands and improve stand density.		
4024	X	X	BR:1.1	Manage conifer encroachment to improve wildlife habitat and forest health conditions.	Same as Alternative A.	Manage conifer encroachment to enhance livestock grazing.	Manage conifer encroachment to improve wildlife habitat and forest health conditions as well as make progress toward potential natural communities, as determined by the site's ESD.	Same as Alternative B.	Same as Alternative A.
4025	X	X	BR:1.2	Within the areas classified as commercial forestland, conduct timber harvesting in a manner that protects and benefits watershed, wildlife, and riparian/wetland habitat values; emphasize areas where forest health is a primary concern.	Same as Alternative A, except only conduct timber harvesting where natural processes are unable to accomplish forest health goals.	Allow timber harvesting within areas classified as commercial forestland.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
4026	X	X	BR:1.1	Use a variety of silvicultural practices and cutting methods, such as clear cutting, shelterwood, individual tree and group selection, and various regeneration treatments.	First use natural processes to accomplish forest health goals, followed by silvicultural practices if natural processes are not effective.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Forests, Woodlands, and Forest Products									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4027	X	X	BR:1.1	In important seasonal wildlife habitat areas, generally restrict clear cuts to no more than 300 yards in any direction, unless a long-term benefit to wildlife habitat would result.	Prohibit clear cuts and harvest methods that create clear cuts.	Same as Alternative A, except generally restrict clear cuts to no more than 100 acres unless salvaging dead or dying timber.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Grassland and Shrubland Communities									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL BR:2 Manage vegetation resources to meet DPC objectives. **Objectives:** **BR:2.1** Manage native plant communities to restore, maintain, or enhance vegetation community health, composition, and diversity to provide a mix of successional stages that incorporate diverse structure and composition into the desired vegetation types. **BR:2.2** Maintain, improve, enhance, or restore native plant communities to facilitate the conservation, recovery, and maintenance of populations of native and desirable nonnative plant species and wildlife habitat. **BR:2.3** Maintain, improve, or enhance areas of ecological importance, priority plant species and habitats, and unique plant associations with native plant communities. **BR:2.4** Manage native plant communities across landscapes through cooperation with adjacent landowners, state and local governments, and other stakeholders. **BR:2.5** Coordinate with local, state, and federal agencies, and stakeholders to protect and recover native plant communities, and their included vegetative resources and habitat components affected by extreme environmental conditions. **BR:2.6** In PHMAs, the desired condition is to maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6 [BLM2005c]).					
				MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES					
4028	X	X	BR:2.1 BR:2.2 BR:2.4 BR:2.6	Manage native plant communities (Map 36) in accordance with *Wyoming Standards for Healthy Rangelands*. Use ESDs and other available information, resource objectives established in this RMP, and specific management practices to maintain or achieve the standards.					
4029	X	X	BR:2	Continue to monitor and evaluate climatic and vegetative data. Compile and share data with other land management agencies and partners within the Planning Area using a cooperative, collaborative approach. Should the analysis of data indicate that the vegetative resource is either not meeting or making significant progress towards meeting the *Wyoming Standards for Healthy Rangelands* or other site specific vegetative objectives, corrective management actions will be implemented to achieve desired results.					
				MANAGEMENT ACTIONS BY ALTERNATIVE					
4030	X	X	BR:2.1-2.4 BR:2.6	Implement DPC objectives for Watershed Protection, Forestland Management, and Livestock Grazing. Use the following DPC objectives to emphasize watershed protection, forestland health, and livestock grazing on at least 600,000 acres of BLM-administered land in the Planning Area not	Manage to achieve or make progress towards the reference state plant community based on the ESD for the site. The appropriate functional structural plant groups must be present for the site. Manage areas at a lower level of ecological status to provide preferred habitat for wildlife species with	Manage to achieve or make progress toward the appropriate community phase for the site. Manage areas at a lower level of ecological status to provide preferred habitat for wildlife species with unique habitat requirements on a case-by-case basis.	Manage to achieve or make progress toward the In plant communities determined to be meeting *Wyoming Standards for Healthy Rangelands*, manage to maintain or improve those communities. The appropriate community phase for the site. Potentially manage some areas for a higher plant	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Grassland and Shrubland Communities									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				containing important wildlife habitat (all percentages listed below are expressed in terms of composition by weight): • Salt Desert Shrub Communities: shrubs 30 to 60 percent, grasses 30 to 60 percent, forbs 5 to 15 percent, with shrubs increasing on high saline sites • Salt Bottom Communities: shrubs 20 to 40 percent, grasses 50 to 70 percent, forbs 5 to 15 percent • Basin Grassland/Shrub Communities: shrubs 10 to 20 percent, grasses 60 to 80 percent, forbs 10 to 20 percent • Foothills-Mountain Grassland/Shrub Communities: shrubs 10 to 30 percent, grasses 60 to 80 percent, forbs 10 to 20 percent • Low Gradient/Alluvial Riparian Communities: shrubs 0 to 15 percent, grasses and grass-likes 70 to 90 percent, forbs 5 to 15 percent	unique habitat requirements on a case-by-case basis.		community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable. In these areas the desired plant community states or phases will be determined on a site-specific basis at the implementation level. Manage areas at a lower level of ecological status to provide preferred habitat for wildlife species with unique habitat requirements on a case-by-case basis.		

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Grassland and Shrubland Communities									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				• Intermediate Riparian Communities: trees and shrubs 10 to 30 percent, grasses and grass-likes 50 to 70 percent, forbs 10 to 30 percent • Desert Cottonwood Riparian Communities: trees and shrubs 10 to 30 percent, grasses and grass-likes 50 to 70 percent, forbs 10 to 30 percent • Woodland Communities: Same as Foothills-Mountain Grassland/Shrub Communities on areas where invasion of limber pine and juniper has occurred on deeper soils (there is no specific objective where woodlands occur on very shallow soils)					
4031	X	X	BR:2.1-2.3 BR:2.6	No similar action.	Manage to maintain contiguous blocks of native plant communities and minimize fragmentation; allow for appropriate mosaic of interrelated plant communities while allowing for other resource uses.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Riparian/Wetland Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL BR:3 Manage riparian/wetland areas to provide a natural combination of vegetation and landform to provide the habitat and the water conditions necessary for aquatic and terrestrial species. **Objectives:** **BR:3.1** Manage vegetation, soil, landform, and water to meet PFC. **BR:3.2** Manage priority riparian/wetland areas to attain desired future conditions unique to the landscape setting. **BR:3.3** Manage riparian/wetland areas with consideration of the effects of all herbivory. **BR:3.4** Manage riparian/wetland areas in consideration of the working landscape. **BR:3.5** Manage riparian/wetland vegetation communities to attain an appropriate mix of wetland plant species and age-classes, with high vigor and extensive root systems, capable of withstanding high streamflow events.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
4032	X	X	BR:3.1 BR:3.2 BR:3.4 BR:3.5	Manage to meet PFC and *Wyoming Standards for Healthy Rangelands* in lotic and lentic riparian/wetland areas.					
4033	X	X	BR:3.1 BR:3.2 BR:3.4 BR:3.5	Consider linear watercourse crossings on a case-by-case basis.					
4034	X	X	BR:3.1 BR:3.2 BR:3.4 BR:3.5	Ensure all actions comply with EO 11988, *Floodplain Management*, and EO 11990, *Protection of Wetlands,* and the Wyoming DEQ water quality standards, applicable regulations, and permitting requirements, including US Army Corps of Engineers Section 404 permits, storm water, and other Wyoming Pollutant Discharge Elimination System permits.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
4035	X	X	BR:3.1 BR:3.2 BR:3.4 BR:3.5	Manage all riparian/wetland areas (23,957 acres) to meet or make progress towards PFC.	Manage all riparian/wetland areas (23,957 acres) to achieve DPC. Prioritize those areas not meeting PFC.	Manage all riparian/wetland areas to meet or make progress towards PFC giving priority to those areas that are functioning at risk with a downward trend or that are in non-functioning condition.	Same as Alternative C, plus manage streams with unique recreational or aquatic values to obtain PFC.	Same as Alternative B.	Same as Alternative D.
4036	X	X	BR:3.1 BR:3.2 BR:3.4 BR:3.5	Prohibit surface-disturbing activities within 500 feet of surface water and	Prohibit surface-disturbing activities within ¼ mile of or within riparian/wetland areas (162,887 acres).	Allow surface-disturbing activities in flood plains or riparian/wetland areas on a case-by-case basis.	Same as Alternative A.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Vegetation – Riparian/Wetland Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				riparian/wetland areas (70,715 acres) except when such activities are necessary and when their impacts can be mitigated.	Allow sediment reduction structures on a case-by-case basis.				
4037	X	X	BR:3.1 BR:3.2 BR:3.4 BR:3.5	No similar action.	Apply a NSO restriction on wetland areas greater than 40 acres.	Same as Alternative A.	Apply a NSO restriction on wetland areas greater than 20 acres and on designated 100-year flood plains.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
4000 BIOLOGICAL RESOURCES (BR) – Invasive Species and Pest Management									
				GOAL BR:4 Manage for healthy native plant communities by reducing, preventing expansion of, or eliminating the occurrence of undesirable invasive, nonnative species, undesirable, nonnative, or noxious weeds (predatory plant pests or disease) by implementing management actions consistent with national guidance and state and local weed management plans. **Objectives:** **BR:4.1** Maintain internal (BLM) and external support for managing invasive species using an integrated approach for the detection, control, or eradication of new infestations. **BR:4.2** Maintain adequate baseline information regarding the extent and control of invasive species to make informed decisions, evaluate effectiveness of management actions, and assess progress toward goals to improve invasive species management. **BR:4.3** Continue coordination of invasive species detection and control activities across the working landscape including non BLM-administered lands, and include provisions for invasive species management for all BLM-funded or authorized actions.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
4038	X	X	BR:4.1-4.3	Manage invasive plant species in the Planning Area in conjunction with local counties and other stakeholders consistent with the ROD for the Final PEIS addressing *Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States* (BLM 2007b), and current with policy and similar guidance updated over time.					
4039	X	X	BR:4.1-4.3	Manage invasive plant species using an Integrated Pest Management approach consistent with DOI Manual 517, *Integrated Pest Management* (DOI 2007).					
4040	X	X	BR:4	Avoid raptor and migratory bird nesting seasons and other times when loss of cover or disturbance by equipment used in a treatment is determined to be detrimental.					
4041	X	X	BR:4.1-4.3	In cooperation with APHIS and other stakeholders, work to control outbreaks of grasshopper and Mormon crickets on BLM-administered land in the Planning Area in accordance with the MOU between BLM and APHIS.					
4042	X	X	BR:4.1 BR:4.3	Use certified noxious weed-seed free vegetation products on all BLM-administered land in the Planning Area.					
4043	X	X	BR:4	Allow the application of pesticides within the Spanish Point Karst ACEC when drinking water will not be impacted.					
4044	X	X	BR:4.2	Develop and maintain an invasive species and pest management plan. If necessary, review and update this plan annually based on available funding and input from other agencies, organizations, and interested stakeholders.					
4045	X	X	BR:4.2 BR:4.3	Reduce and prevent the expansion of cheatgrass through cooperation with other agencies, organizations, and interested stakeholders.					
4046	X	X	BR:4.2 BR:4.3	Reduce and prevent beet leafhopper infestations on BLM-administered land through cooperation with appropriate government and state agencies, private industry, and other interested stakeholders.					
4047	X	X	BR:4.3	Cooperate and coordinate with appropriate government agencies, private industry, and other interested stakeholders in public education, research, management, and control of aquatic invasive species.					
4048	X	X	BR:4.3	In cooperation with other agencies, organizations, and interested stakeholders, seek opportunities to promote public awareness and prevention of noxious and invasive species through public outreach, volunteer programs, signage, and other appropriate measures.					

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Invasive Species and Pest Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
4049	X	X	BR:4	Allow aerial application of pesticides on a case-by-case basis in coordination with the authorized officer.	Prohibit aerial application of pesticides within ½ mile of riparian/wetland areas and aquatic habitats. Allow exceptions to manage riparian weed species.	Prohibit aerial application of pesticides within 100 feet of riparian/wetlands areas and aquatic habitats. Allow exceptions to manage riparian weed species.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
4050	X	X	BR:4.1-4.3	Require livestock flushing on a case-by-case basis.	Allow the authorized officer to require livestock be flushed for a period of 72 hours before allowing them to move onto or within BLM-administered land when the authorized officer determines that livestock are likely carrying ingested invasive, nonnative plant species seeds.	Do not require livestock flushing.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
4000 BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources									
				GOAL BR:5 In compliance with the *Wyoming Standards for Healthy Rangelands*, manage for the biological integrity of terrestrial and aquatic ecosystems to sustain or enhance fish and wildlife habitat, while providing for multiple uses of BLM-administered lands. **Objectives:** **BR:5.1** Manage habitat to conserve, recover, and maintain fish and wildlife consistent with appropriate local, state, and federal management plans. **BR:5.2** Work cooperatively with the WGFD to recommend adjustments to herd objectives based upon habitat condition trends and recommend wildlife use adjustments if monitoring data indicate adjustments are necessary. **BR:5.3** Manage fish and wildlife habitats in consideration of the working landscape. **GOAL BR:6** Manage environmental risks and associated impacts in a manner compatible with sustaining plant, fish, and wildlife populations. **Objectives:** **BR:6.1** Minimize, avoid, and mitigate impacts of environmental risks on fish and wildlife. **BR:6.2** Manage pesticide, rodenticide, and herbicide application in a manner compatible with fish and wildlife health. **BR:6.3** Coordinate with other agencies to prevent or control diseases that threaten the health of humans, wildlife, livestock, and vegetation. **BR:6.4** Coordinate with other agencies who manage native and nonnative predatory animals that pose a threat to the health or productivity of natural ecosystems.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES (All Fish and Wildlife)									
4051	X	X	BR:5.1 BR:5.3	Coordinate with WGFD to design reservoirs with consideration of fish and wildlife habitat values.					
4052	X		BR:5.1 BR:5.3	Continue the Bald Ridge Area human presence seasonal closure currently January 1 to April 30 in cooperation with stakeholders. The closure date may be adjusted to correspond with big game hunting seasons.					

Table 2-9. Detailed Alternatives (Continued)

4000 – BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Fish									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				Fish					
				MANAGEMENT ACTIONS BY ALTERNATIVE					
4053	X	X	BR:5.1 BR:5.3 BR:6.1	Direct priority management in planning/actions for fisheries to perennial waters containing fish or contributing directly to fisheries on a case-by-case basis.	Direct priority management in planning/actions for fisheries to perennial waters containing fish or contributing directly to fisheries.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
4054	X	X	BR:5.1 BR:5.3	Manage intermittent streams on a case-by-case basis.	Manage intermittent streams judged as having potential to become, or return to being, perennial streams with fish on a watershed scale to acquire perennial flows values in compliance with Wyoming water laws.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
4055	X	X	BR:5.1 BR:5.3 BR:6.1	Apply a NSO restriction and manage surface-disturbing activities using standard restrictions (see surface-disturbing guidelines in Appendix H) within 500 feet of surface water and riparian areas.	Apply a NSO restriction and prohibit surface-disturbing activities within ¼ mile of any waters rated by the WGFD as Blue Ribbon or Red Ribbon (trout streams of national or statewide importance) and the Bighorn River, Nowood River, Paint Rock Creek, Shell Creek, Clarks Fork of the Yellowstone River, Shoshone River and its North and South Forks. All other fisheries are subject to a minimum buffer of 500 feet.	Same as Alternative A.	Apply a NSO restriction and prohibit surface-disturbing activities within 500 feet and apply a CSU and avoid surface-disturbing activities within ¼ mile of any waters rated by the WGFD as Blue Ribbon or Red Ribbon (trout streams of national or statewide importance).	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 – BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Fish									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4056	X	X	BR:5.1 BR:5.3 BR:6.1	Perform restoration of streams and fisheries habitat on a case-by-case basis.	Restore or reclaim important stream segments for fisheries habitat, through upland management and hydrologic function enhancement actions on at least 10 lotic miles and 80 lentic acres.	Same as Alternative A.	On a priority basis and in coordination with stakeholders, restore and reclaim important stream segments for fisheries habitat with the highest priority given to species listed on the *State Species of Greatest Conservation Need*.	Same as Alternative B.	Same as Alternative D.
4057	X	X	BR:5.1 BR:5.3 BR:6.1	Manage fisheries habitat to improve and enhance its value through the implementation of management practices such as vegetation manipulation and planting, installing sediment and erosion control structures, fencing, and acquiring, developing, and maintaining water sources.	Same as Alternative A, plus implement management practices such as acquiring, developing, and maintaining land and water sources.	Manage fisheries habitat to improve and enhance its value without impeding resource development except per law and policy.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

4000 – BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Fish									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4058	X	X	BR:5.1 BR:5.3 BR:6.1	Encourage reservoir design to enhance fisheries and to establish minimum pools sufficient to maintain viable fisheries. Maintain existing reservoir and stream fishery habitat. Existing reservoirs are managed by the ROW stipulations attached to them at the time of their construction and the BLM encourages managing for minimum pool levels, but cannot require them after issuing a ROW.	In cooperation with WGFD, require mitigation that includes minimum pool depths sufficient to maintain viable fisheries and adequate public access routes to the water for applications for ROWs for the construction of new impoundments on BLM-administered land, where practical. Manage existing reservoirs, under existing ROWs, to the extent possible, while encouraging minimum pool management.	Encourage but do not require mitigation for creating or maintaining viable fisheries, unless required by law or policy.	Same as Alternative A.	Same as Alternative B.	Same as Alternative D.
4059	X	X	BR:5.1 BR:5.3 BR:6.1	No similar action.	Design or retrofit culverts in streams containing fish to allow fish passage, both upstream and downstream, in both low and high water flows. Harden low water crossings to minimize sediment movement. Low water crossings should be perpendicular to streams and located in straight stream reaches to avoid flow modification that could cause erosion of banks.	Design culverts and crossings to current standards.	Same as Alternative B, except on a priority basis.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Wildlife									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				Wildlife					
				MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES					
4060	X	X	BR:5.1	Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of *The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management* (Wyoming Interagency Vegetation Committee 2002) and the *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix H), BMPs (Appendix L), and similar guidance updated over time.					
4061	X	X	BR:5.1	Continue to implement the following existing HMPs and update as necessary to include management objectives and prescriptions for wildlife: West Slope HMP, Bighorn River HMP, and Absaroka Front HMP.					
4062	X	X	BR:5.1 BR:6.1	Prohibit surface-disturbing and disruptive activities in the Bighorn River HMP/RAMP tracts and the BLM-administered tracts in Yellowtail WHMA and apply a NSO restriction as appropriate. Exceptions include casual use and uses related to the development of recreation facilities or wildlife habitat, including vegetation treatments.					
4063	X	X	BR:5.1 BR:5.2	In cooperation with the USFS, WGFD, and other stakeholders, work to maintain and enhance healthy bighorn sheep habitat.					
4064	X	X	BR:5.1-5.3	In cooperation with the USFS, USFWS, WGFD, and other stakeholders, work to determine the feasibility of reestablishing bighorn sheep at other suitable locations.					
4065	X	X	BR:5.1-5.3	Consider transmission of disease between wildlife and domestic livestock in grazing authorizations. Follow the recommendations for the protection of bighorn sheep in the *Statewide Bighorn/Domestic Sheep Interaction Report* (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004), and *Western Association of Fish and Wildlife Agencies (WAFWA) Wild Sheep Working Group Initial Subcommittee Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat June 12, 2007* (WAFWA 2007), and similar guidance that is updated over time.					
4066	X	X	BR:5.1 BR:5.2	In cooperation with stakeholders on a case-by-case basis, manage for the augmentation and/or reintroduction of important wildlife species within suitable habitats and in accordance with applicable policy and guidance (e.g., BLM Manual 1745, *Introduction, Transplant, Augmentation and Reestablishment of Fish, Wildlife and Plants*).					
4067	X	X	BR:5.2 BR:6.4	Coordinate authorized animal damage control with federal and state wildlife agencies, and other agencies, as appropriate, using guidance provided by the existing MOU (APHIS and BLM 2003).					
4068	X	X	BR:6.1	Consult with the WGFD in applying mitigation for wildlife needs and before waiving, allowing exceptions to, or modifying wildlife-related land use restrictions and mitigation in conformance with MOU WY131 Appendix 5 (g).					
4069	X	X	BR:6.1	In consideration of other resources, provide, to the extent possible, suitable habitat to support wildlife populations defined in the Cody Region Big Game Job Completion Report (http://gf.state.wy.us/wildlife/index.asp) objectives. Cooperatively consider proposals by the BLM or WGFD to change population objective levels based on habitat capability and availability.					
4070	X	X	BR:5.1	In cooperation with WGFD, local governments, and other stakeholders, limit access (including public access via all modes-of-transport) where necessary in crucial habitat and sensitive species habitat. The type of limitation, if any, depends on the kind of resource value being protected.					
4071	X	X	BR:5.1 BR:5.2	In cooperation with WGFD and other stakeholders, work to develop water sources for wildlife and special status species in coordination with the WGFD and the BLM Water Development Handbook (H-1741-2).					

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Wildlife									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
4072	X	X	BR:5.1 BR:5.3	Conduct prescribed burns on 150-500 acres of BLM-administered land per year, based on potential for initial burns and then as needed for repeat cyclic burning.	Conduct habitat enhancement vegetation treatments within sagebrush communities on at least 200 acres of BLM-administered land per year.	Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow, consistent with EO 2011-5.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
4073	X	X	BR:5.1 BR:6.1	Modify identified hazard fences, and analyze and construct new fences in accordance with appropriate wildlife needs and the BLM Fencing Handbook 1741-1.	When opportunities arise due to fire or permittee interest, modify identified hazard fences and analyze and construct new fences in accordance with appropriate wildlife needs and the BLM fencing handbook, 1741-1.	Same as Alternative A.	Modify identified hazard fences, and analyze and construct new fences in accordance with wildlife needs, the BLM Fencing Handbook 1741-1, and WO IM 2010-022, *Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser Prairie-chicken*, and similar guidance and policy as updated over time.	Same as Alternative B.	Same as Alternative D.
4074	X	X	BR:5.1-5.3	Restore and maintain 25-200 acres of aspen stands per year until 2,000-4,000 acres are under management.	Restore 100 acres per year of aspen stands for wildlife values.	Do not restore aspen stands for wildlife values.	Conduct vegetation treatments within aspen stands for wildlife values as opportunities and funding allow.	Same as Alternative B.	Same as Alternative D.
4075	X	X	BR:5.1 BR:5.3	Pursue exchanges to enhance public access or improve management of important wildlife habitat areas by consolidating public land. Emphasize the acquisition of access to public lands on the Bighorn, Shoshone, Clarks Fork of the Yellowstone, and Greybull rivers; Gooseberry Creek; the upper portions of	Same as Alternative A, plus in cooperation with willing sellers and other stakeholders, consider all land tenure adjustment authorities for the acquisition of, and interest in, lands for the improved management of important wildlife habitat.	Do not acquire lands or interest in lands to enhance public access or improve management of important wildlife habitat.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Wildlife									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				Cottonwood and Grass Creeks; and on lands where other riparian areas occur.					
4076	X	X	BR:6.1	Apply a TLS to avoid surface-disturbing and disruptive activities within big game crucial winter range (1,324,371 acres) from November 15 through April 30.	Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within big game crucial winter range (1,324,371 acres).	Same as Alternative A, except exempt Oil and Gas Management Areas (Map 24) and ROW corridors from discretionary wildlife seasonal stipulations.	Same as Alternative A, except exempt Oil and Gas Management Areas (Map 25) from discretionary big game seasonal stipulations.	Same as Alternative B.	Same as Alternative D.
4077	X	X	BR:6.1	Apply CSU stipulation for big game migration corridors (Map 39), narrow ridges, overlapping big game crucial winter range (72,850 acres of BLM-administered surface land; 145,312 acres of federal mineral estate).	Absaroka Front Management Area (130,872 acres of BLM-administered surface land; 253,117 acres of federal mineral estate): • closed to mineral leasing • manage as a renewable energy avoidance area • close to geophysical exploration • manage as a ROW avoidance area • partially closed to motorized vehicle use and limited to designated roads and trails on the rest of the area Allow and seasonally stipulate, where feasible, vegetative/silviculture treatments; invasive, nonnative pest species control; fuels management; and maintenance of existing facilities.	Absaroka Front Management Area (130,872 acres of BLM-administered surface land; 253,117 acres of federal mineral estate): • open to oil and gas and other leasable minerals • open to locatable mineral entry • open to renewable energy development • open to geophysical exploration • open to ROW authorizations on a case-by-case basis • motorized vehicle use is limited to designated roads and trails and subject to seasonal limitations Allow and seasonally stipulate, where feasible, vegetative/silviculture treatments; invasive, nonnative pest species control; fuels management; and	Same as Alternative B, except: • 130,872 acres of BLM-administered surface land; 253,117 acres of federal mineral estate: • a mix of TLS (4,857 acres), CSU (111,410 acres), NSO (41,177 acres), and closed to leasing (87,755 acres) on the federal mineral estate (Map 37) • areas available for leasing are open to geophysical exploration with specific resource protection	Same as Alternative B.	Same as Alternative B, except: • 130,872 acres of BLM-administered surface land; 253,117 acres of federal mineral estate: • a mix of TLS (23,076 acres), CSU (128,606 acres), NSO (14,209 acres), and closed to leasing (87,755 acres) on the federal mineral estate (Map 38) • areas available for leasing are open to geophysical exploration with specific resource protection

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Wildlife									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
						maintenance of existing facilities.			
4078	X	X	BR:6.1	Prohibit water developments for livestock in elk crucial winter range unless adverse effects can be avoided, minimized and/or compensated based on site-specific analysis. Allow existing uses pending site-specific analysis.	Prohibit new livestock water development projects in big game crucial winter range, greater sage-grouse nesting habitat, and areas important for special status species unless no negative effect on wildlife can be demonstrated.	Allow new livestock water development projects in big game crucial winter range, greater sage-grouse nesting habitat, and areas important for special status species to meet multiple use objectives.	Allow water development projects in crucial elk winter range and in greater sage-grouse nesting habitat with 10 inches or less annual precipitation only when adverse effects can be avoided, minimized and/or compensated based on site-specific analysis. Allow existing uses pending site-specific analysis on a priority basis.	Same as Alternative B.	Same as Alternative D.
4079	X	X	BR:6.1	Determine wildlife seasonal protections for surface-disturbing and disruptive activities related to the maintenance and operation (including production) of project on a case-by-case basis.	Apply wildlife seasonal protections for surface-disturbing and disruptive activities to maintenance and operation (including production) of projects when the actions are determined to be detrimental to wildlife. (Appendix H lists detrimental actions).	Do not apply wildlife seasonal protections to maintenance and operation actions.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
4080	X	X	BR:5.1 BR:6.1	Address traditional migration and travel corridors for big game wildlife species and migratory birds on a case-by-case basis.	Identify and preserve traditional migration and travel corridors for big game wildlife species and migratory birds. Prohibit surface-disturbing activities within ½ mile of big game migration corridors (97,808 acres) (Map 40). Avoid constriction of big game corridors.	Identify and develop management for traditional migration and travel corridors for big game wildlife species and migratory birds (Map 41).	Same as Alternative A, except in the Big Horn Front MLP Analysis Area, prohibit surface-disturbing activities within ½ mile of big game migration corridors (97,808 acres) (Map 42).	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Wildlife									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4081	X	X	BR:5.1	Determine the appropriate DPC to manage vegetation on a case-by-case basis in areas identified as habitat for special status species or crucial winter range for big game.	Manage vegetation in areas identified as habitat for special status species or crucial winter range for big game to the DPC that will be the most beneficial for the identified species while also considering the habitat needs of other species.	Manage vegetation in areas identified as habitat for special status species or crucial winter range for big game to the DPC that is a combination community that benefits all grazing/browsing animals.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
4082	X	X	BR:6.1	Manage the location of wind energy projects on a case-by-case basis consistent with the Wind Energy Programmatic EIS ROD (BLM 2005a) and IM 2009-043, *Wind Energy Development Policy*.	Avoid wind energy projects in big game crucial winter range, raptor concentration areas, and greater sage-grouse nesting, brood-rearing, and winter areas.	Allow wind energy projects on a case-by-case basis in big game winter crucial range, raptor concentration areas, and greater sage-grouse nesting, brood-rearing, and winter areas.	Avoid wind energy projects in big game crucial winter range and raptor concentration areas. Avoid Wind-energy development in sage-grouse PHMAs (Map 42), unless it can be sufficiently demonstrated that the development activity would not result in declines of sage-grouse PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS.	Same as Alternative B.	Same as Alternative D.
4083	X	X	BR:5.1	Use produced water, where reasonable and practical, to develop and enhance waterfowl, special status species, and other wildlife habitats.	Do not use produced water to develop and enhance waterfowl, special status species, and other wildlife habitats (Refer to 1043).	At the discretion of the BLM and its stakeholders, use produced water to develop and enhance waterfowl, special status species, and other wildlife habitats in accordance with federal, state, and local laws and regulations.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Fish and Wildlife Resources – Wildlife									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4084	X	X	BR:5.1 BR:6.1	No similar action.	Motorized vehicle use is limited to designated roads and trails with seasonal closures in the following areas: • Big game crucial winter range (1,324,371 acres) with a seasonal closure November 15 through April 30 (Map 44).	Manage motorized vehicle use in crucial big game winter ranges consistent with other resource objectives.	Allow temporary closures of designated roads, trails, or geographic areas within big game crucial winter range depending on impacts to big game, weather conditions, and/or human caused disturbance levels.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL BR:7	**WILDLIFE –** Manage for the biological integrity and habitat functionality to facilitate the conservation, recovery, and maintenance of populations of fish and wildlife to avoid contributing to the listing of or jeopardizing the continued existence or recovery of special status species and their habitats.				
					Objectives:				
					BR:7.1 Maintain or enhance areas of ecological importance for special status wildlife species.				
					BR:7.2 Conserve and recover special status wildlife species by determining and implementing conservation strategies including restoration opportunities, use restrictions, and management actions.				
					BR:7.3 Manage specific environmental hazards, risks, and impacts in a manner compatible with special status wildlife species health.				
					BR:7.4 Maintain sufficient undisturbed or minimally disturbed habitats to protect special status wildlife species resource values while providing for multiple use management.				
					BR:7.5 Develop and implement HMPs, activity plans, or use other mechanisms to protect high priority special status wildlife species.				
					BR:7.6 Manage special status fish and wildlife species in consideration of the working landscape.				
				GOAL BR:8	**PLANTS –** Manage for the biological integrity and habitat function to facilitate the conservation, recovery, and maintenance of populations of BLM special status plant species and to avoid contributing to the listing of or jeopardizing the continued existence or recovery of special status species and their habitats.				
					Objectives:				
					BR:8.1 Manage the habitats of special status plants to meet or exceed the *Wyoming Standard #4 for Healthy Rangelands.*				
					BR:8.2 Protect or enhance habitat for BLM special status plant species.				
					BR:8.3 Maintain sufficient undisturbed or minimally disturbed habitats to protect special status plant species resource values while providing for multiple use management.				
					BR:8.4 Manage specific environmental hazards, risks, and impacts in a manner compatible with BLM special status plant species' health.				
					BR:8.5 Manage BLM special status plant species in consideration of the working landscape.				
				GOAL BR:9	**SAGE-GROUSE –** Sustain the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of greater sage-grouse and other species by achieving the objectives below.				
					Objectives:				
					BR:9.1 Maintain large patches of high quality sagebrush habitats, with emphasis on patches occupied by greater sage-grouse.				
					BR:9.2 Maintain connections between sagebrush habitats, with emphasis on connections between habitats occupied by greater sage-grouse.				
				GOAL BR:10	Identify the amount of habitat that should undergo restoration and/or rehabilitation during the life of the plan and initiate restoration and/or rehabilitation by achieving the objective below.				
					Objective:				
					BR:10.1 Reconnect large patches of sagebrush habitat with emphasis on reconnecting patches occupied by stronghold and isolated populations of greater sage-grouse.				

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
All Special Status Species									
4085	X	X	BR:7.1-7.4 BR:7.6 BR:8.1-8.5	Postpone or modify projects that may affect special status species to protect these species. Consult with USFWS in such cases, as required by the Endangered Species Act.					
4086	X	X	BR:7.1-7.4 BR:7.6 BR:8.1-8.5	Consult with stakeholders early in the permitting process to design projects in a manner that would minimize or avoid potential adverse effects to special status species.					
4087	X	X	BR:7.2 BR:8.3 BR:9.1 BR:9.2 BR:10.1	Assist authorized agencies in the restoration, reintroduction, augmentation, or re-establishment of threatened, endangered, and other special status species populations and/or habitats.					
4088	X	X	BR:7.1-7.4 BR:7.6 BR:8.1-8.5	Motorized vehicle use is limited to designated roads and trails in essential and recovery habitat for threatened or endangered species as identified and designated by USFWS.					
Greater Sage-Grouse									
4089	X	X	BR:9.1	Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be effective in minimum doses in greater sage-grouse brood-rearing areas. Field Offices may implement treatments within sage-grouse habitat utilizing reduced agent-area treatments (RAATS) protocols.					
4090	X	X	BR:9.1	Avoid aerial pesticide spraying in favor of ground applications to minimize drift into non-target areas in greater sage-grouse habitat unless benefits of treatments are likely to outweigh impacts.					
4091	X	X	BR:9.1	Avoid applying pesticides to greater sage-grouse breeding habitat during the nesting and early brood-rearing season (March 15 through June 30) to reduce the loss of food supply to chicks and avoid the chance of secondary poisoning unless benefits of treatments are likely to outweigh impacts.					
4092	X	X	BR:10.1	Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young greater sage-grouse and other species that depend on forbs and insects associated with these areas. Consider management actions if desirable green vegetation associated with these wet areas is not available, accessible, or cannot be maintained with current livestock, wildlife, or wild horse use, and the impacts are outweighed by the improved habitat quality.					
4093	X	X	BR:10.1	Restore greater sage-grouse brood-rearing habitats in riparian/wetland areas.					

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4094	X	X	BR:10.1	Restore lost riparian functioning systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within greater sage-grouse habitat.					
4095	X	X	BR:9.1	Manage vegetation diversity and structure to provide suitable habitat and adequate cover for greater sage-grouse during nesting periods, determined by ecological site description.					
4096	X	X	BR:10.1	Maintain sagebrush and understory diversity (relative to ecological site description) in crucial seasonal greater sage-grouse habitats unless such removal is necessary to achieve greater sage-grouse habitat management objectives. For example, thinning small patches of dense sagebrush may increase desirable forbs in early brood-rearing habitat.					
4097	X	X	BR:10.1	Increase the composition and canopy cover of Wyoming big sagebrush, within existing nonnative grass seedings with less than 5 percent sagebrush canopy cover, to greater than or equal to neighboring sagebrush communities or historical levels. (See Shrubland-Salt Desert/Salt Bottom on Map 36; deeper soiled, and gentler sloped portions of the Shrubland-Salt Desert/Salt Bottom, colored in pink, would be those areas where sagebrush restoration efforts could be conducted.)					
4098	X	X	BR:10.1	Investigate opportunities to increase sagebrush in lower precipitation zones.					
4099	X	X	BR:9.1	Plan and construct mining and mineral development activities, to the degree possible given state water rights, to minimize disturbances that would result in alterations to springs and riparian greater sage-grouse habitat. Alternative water sources may be developed to replace natural sources that have been affected or destroyed during these development activities.					
4100	X	X	BR:8.3 BR:8.5	Treat constructed or non-natural water storage impoundments to control mosquito breeding (and the associated spread of West Nile virus), to prevent disease spread to greater sage-grouse on priority basis.					
4101	X	X	BR:9.1	In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs needed by greater sage-grouse for seasonal food and concealment.					
4102	X	X	BR:9.1	In cooperation with stakeholders, design and locate fences so as not to disturb important greater sage-grouse habitat areas. Increase the visibility of existing fences in these areas to reduce hazards to flying greater sage-grouse.					
4103	X	X	BR:9.1	Conduct fire management activities to minimize overall wildfire size and frequency in sagebrush plant communities where greater sage-grouse habitat objectives are at risk. General priorities for habitat protection: Priority # 1 – Protection of greater sage-grouse PHMAs. Priority # 2 – Wyoming big sagebrush communities outside greater sage-grouse PHMAs and habitats recovering from disturbance within or adjacent to greater sage-grouse PHMAs.					
4104	X	X	BR:9.1	Annually maintain FMPs to incorporate updated sagebrush habitat information as well as fire suppression priorities in sagebrush habitats. Incorporate fire management objectives for the management of sagebrush ecosystems into FMPs. Provide fire management objectives for sagebrush ecosystems to initial attack personnel at the beginning of each fire season.					
4105	X	X	BR:10.1	Establish fuels treatment projects at strategic locations to minimize size of wildfires and limit loss of greater sage-grouse habitat.					
4106	X	X	BR:10.1	Reintroduce appropriate fire regimes to limit conifer encroachment into the sagebrush plant communities. Take into account invasive herbaceous species and Fire Regime Group and FRCC (measure of departure from historic fire regime) with treatments. Where possible, achieve a balance between treating areas that have significantly departed from the historic fire regime (Condition Class 3) and areas that are functioning within an appropriate fire regime (Condition Class 1).					
4107	X	X	BR:10.1	Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2 as defined in Miller et al. (2005). Refine the location of specific priority areas to be treated by utilizing site-specific analysis and principles like those included in the FIAT report (Chambers et. al. [2014]) and other ongoing modeling efforts to address conifer encroachment.					

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4108	X	X	BR:7.1-7.4 BR:9.1 BR:9.2	The BLM will collaborate with appropriate Federal agencies, and the State of Wyoming as contemplated under Governor Executive Order 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where greater sage-grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and greater sage-grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve greater sage-grouse conservation objectives within the framework.					
				Raptors					
4109	X	X	BR:7.2 BR:7.6	Implement, where appropriate, conservation measures, terms and conditions, and appropriate BMPs and reasonable and prudent measures within existing state programmatic biological opinions for the bald eagle.					
4110	X	X	BR:6.1 BR:10.1	Work with proponents to design powerlines following USFWS guidelines to protect raptors from electrocution and to reduce predation on other special status species. Work with ROW holders to retrofit existing lines.					
				Migratory Birds					
4111	X	X	BR:7.1-7.4 BR:10 BR:11.1	Avoid taking migratory birds through timing limitations, project design modifications, pre-disturbance surveys and buffers. Direct impacts to migratory bird species or their nests/eggs/young can often be avoided by requiring pre-disturbance clearance surveys or using seasonal timing windows and nesting buffers to avoid disturbance during occupancy periods and minimizing habitat loss. USFWS identifies migratory bird nesting periods between February 1 and August 31 for species protected by MBTA. Seasonal timing limitations should be adjusted to shorter periods to match the habitat, species and condition of the project site. Migratory bird mortalities can also be avoided by including or requiring designs that exclude migratory birds from facilities that are known to pose a preventable mortality risk and marking structures that have known collision risks.					
				Mammals					
4112	X	X	BR:7.1-7.4	Implement conservation measures, terms and conditions, and appropriate BMPs and reasonable and prudent measures within existing state programmatic biological opinions for the Canada lynx, gray wolf, and black-footed ferret.					
4113	X	X	BR:7.1-7.4	Control surface-disturbing activities to avoid, minimize and/or compensate adverse effects on about 1,300 BLM-administered surface acres of active prairie dog colonies within the Meeteetse complex. This requirement will remain in effect until completion of a site-specific activity plan being prepared to manage ferrets in this area. The restriction will then be reassessed for its continued appropriateness. This restriction applies to such things as mineral leasing, geophysical exploration (except casual use), and construction activities.					
4114	X	X	BR:7.1-7.4	Implement conservation measures, terms and conditions, BMPs, and reasonable and prudent measures within the existing state programmatic biological opinion for the grizzly bear and in accordance with the Interagency Grizzly Bear Conservation Strategy signed by the BLM in 2006.					
				Fish					
4115	X	X	BR:7.1-7.6	Give priority to special status species fish over other fish species in planning and management.					
				Plants					
4116	X	X	BR:8.2 BR:8.3 BR:8.5	Implement conservation measures, terms and conditions, and appropriate BMPs and reasonable and prudent measures within existing state programmatic biological opinions for the Ute ladies'-tresses.					

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
Greater Sage-Grouse									
4117	X	X	BR:7.2 BR:9.1	Apply a CSU stipulation for discretionary actions to prohibit surface-disturbing and disruptive activities within ¼ mile of occupied greater sage-grouse leks (21,352 acres) (Map 39).	Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a 0.6-mile radius of the perimeter of occupied greater sage-grouse leks (117,398 acres) (Map 40). For discretionary actions, manage areas within a 0.6-mile radius of the perimeter of occupied greater sage-grouse leks (117,398 acres) as ROW exclusion areas. Apply a CSU stipulation for all greater sage-grouse seasonal habitats (nesting and early brood-rearing habitat and winter concentration areas) to allow only 1 to 15 acres of well location, or 15 acres of habitat removal, per 640-acre section. The one location and cumulative disturbance value will not exceed 5 percent of sagebrush habitat within those same 640 acres. Key Habitat Areas (1,232,583 acres) are closed to mineral leasing and are managed as ROW avoidance areas.	Same as Alternative A.	**Inside PHMAs** Prohibit surface-disturbing and disruptive activities and apply a NSO restriction on or within a 0.6-mile radius of the perimeter of occupied sage-grouse leks. The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of greater sage-grouse (Map 42). Leases should be a minimum of 640 contiguous acres of federal mineral estate. Smaller parcels may be leased only when 640 contiguous acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							communitization agreements. Preliminary parcels reviewed for possible offering in a lease sale should comply with this minimum lease size. Expressions of interest that are less than this minimum lease size would be evaluated and modified by the BLM to meet the minimum lease size, where possible, prior to review for possible offering in a lease sale. The BLM's goal inside sage-grouse PHMAs is to maintain or enhance seasonal habitats, thereby providing support for sage-grouse population management objectives of the State of Wyoming. **Outside PHMAs** Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied sage-grouse leks (Map 42). Outside sage-grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the sage-grouse population to facilitate		

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							movement and genetic transfer between core populations, including those found in adjacent states.		

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4118	X	X	BR:7.2 BR:9.1	Apply a TLS to avoid surface-disturbing and disruptive activities in greater sage-grouse nesting and early brood-rearing habitats within 2 mile radius of the perimeter of the occupied greater sage-grouse leks (834,543 acres), or in identified greater sage-grouse nesting and brood-rearing habitat outside the 2 mile buffer (626,564 acres) from March 15 to July 15 (CYFO seasonal restrictions are from Feb 1 to July 31) (Map 39).	Apply a TLS to avoid surface-disturbing and disruptive activities in greater sage-grouse nesting and early brood-rearing habitat within a 3-mile radius of the perimeter of occupied greater sage-grouse leks (1,215,528 acres), or in identified nesting and early brood-rearing habitat outside the 3-mile lek buffer (310,749 acres), from February 1 to July 31 (Map 40).	Apply a TLS to avoid surface-disturbing and disruptive activities in greater sage-grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied leks (834,543 acres), or in identified greater sage-grouse nesting and brood-rearing habitat outside the 2-mile lek buffer (626,564 acres) from March 15 to July 15 (Map 41). Exempt Oil and Gas Management Areas (Map 24) and ROW corridors from discretionary wildlife seasonal stipulations.	**Inside PHMAs** Apply a TLS to restrict disruptive activity within a 0.6-mile radius of the perimeter of occupied sage-grouse leks from March 15 to June 30 (112,249). **Outside PHMAs** Apply a TLS to restrict disruptive activity within a ¼ mile radius of the perimeter of occupied sage-grouse leks from March 15 to June 30 (4,273). **Inside PHMAs** Apply a TLS to prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within PHMAs, regardless of distance from the lek from March 15 to June 30 (1,526,277). **Outside PHMAs** Apply a TLS to prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied sage-grouse leks from March 15 to June 30.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4119	X	X	BR:7.2 BR:9.1	Apply a TLS to avoid surface-disturbing and disruptive activities within greater sage-grouse winter concentration areas (172,779 acres) from November 15 to March 14.	Avoid surface-disturbing and disruptive activities and apply a NSO restriction within greater sage-grouse winter concentration areas (172,779 acres) from November 15 to March 14.	Same as Alternative A, except exempt Oil and Gas Management Areas (Map 24) and ROW corridors from discretionary wildlife seasonal stipulations.	Apply a TLS to prohibit or restrict surface-disturbing and disruptive activities within greater sage-grouse winter concentration areas (172,809 acres) from December 1 to March 14.	Same as Alternative B.	Same as Alternative D.
4120	X	X	BR:7.2 BR:9.1	No similar action.	Same as Alternative A.	Same as Alternative A.	**Density of Disturbances:** In greater sage-grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights. The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat. Utilize the greater sage-grouse density disturbance calculation tool described in Appendix Y. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within greater sage-grouse nesting habitat.	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							Manage PHMAs (1,232,583 acres) as ROW avoidance areas. Work with proponents to design ROW applications to protect greater sage-grouse. Buried utilities constructed in designated utility corridors are not subject to DDCT analysis. Sagebrush Treatment: Sagebrush eradication is considered disturbance and will contribute to the 5 percent disturbance factor. In stands with less than 15 percent cover, treatment should be designed to maintain or improve sagebrush habitat. Sagebrush treatments that maintain sagebrush canopy cover at or above 15 percent total canopy cover within the treated acres will not be considered disturbance. Treatments that reduce sagebrush canopy cover below 15 percent will be allowed if all such treated areas make up less than 20% of the suitable sagebrush habitat within the DDCT, and any point within the treated area is within 60 meters of sagebrush habitat with 5 percent or greater canopy cover. Treatments		

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							to enhance sagebrush/grassland will be evaluated based upon the existing habitat quality and the functional level post-treatment. Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. Although seasonal restrictions on activities may apply, vegetation treatments that do not make the habitat unsuitable for greater sage-grouse are not considered in the density calculation.		
4121	X	X	BR:7.2 BR:9.1	No requirements to locate facilities or reduce noise levels of equipment to minimize the impacts of continuous noise on greater sage-grouse or other species relying on aural cues for successful breeding currently exist.	Limit new noise levels to 10 dBA above ambient noise measured at the perimeter of a lek from 6 PM to 8 AM during initiation of breeding (March 1 to May 15). Actual thresholds may be adjusted upon evaluation and acceptance of ongoing research.	Limit noise sources to 10 dBA above natural, ambient noise measured at the perimeter of occupied greater sage-grouse leks from March 1 to May 15. Exempt Oil and Gas Management Areas (Map 24).	Noise levels at the perimeter of the lek should not exceed 10 dBA above ambient noise. The BLM would work with proponents to limit project-related noise where it would be expected to reduce functionality of habitats that support PHMA area populations. The BLM would evaluate the potential for limitation of new noise sources on a case-by-case basis as	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							appropriate. The BLM's near-term goal would be to limit noise sources that would be expected to negatively impact PHMA sage-grouse populations and to continue to support the establishment of ambient baseline noise levels for occupied PHMA leks. As additional research and information emerges, specific new limitations appropriate to the type of projects being considered would be evaluated and appropriate limitations would be implemented where necessary to minimize potential for noise impacts on sage-grouse PHMA population behavioral cycles. As new research is completed, new specific limitations would be coordinated with the WGFD and partners.		

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4122	X	X	BR:7.1-7.4 BR:9.1 BR:9.2	No similar action.	Motorized vehicle use is limited to designated roads and trails in greater sage-grouse Key Habitat Areas with a seasonal closure from February 1 to July 31. Manage new road construction in and adjacent to greater sage-grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities.	Allow motorized vehicle use in greater sage-grouse PHMAs consistent with other resource objectives. Manage new road construction in and adjacent to greater sage-grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities.	Same as Alternative C, except locate new roads that will have relatively high levels of activity (i.e., accessing multiple wells, housing developments, etc.) greater than 1.9 miles from the perimeter of occupied sage-grouse leks within PHMAs. Locate other new roads greater than 0.6 miles from the perimeter of occupied sage-grouse leks within PHMAs. Construct roads to minimum design standards needed for production activities.	Same as Alternative B.	Same as Alternative D.
				Raptors					
4123	X	X	BR:6.1	Apply a TLS to prohibit any activity or surface-disturbing activity within a ¾ mile radius of any active raptor nest sites (592,529 acres) from February 1 through July 31 (Map 39). Actual distances and dates will vary based on topography, species, season of use, and other pertinent factors.	To protect nesting raptors, apply a TLS to prohibit surface-disturbing and disruptive activities within: • 1 mile of active raptor nests (542,759 acres) during specific species nesting period, or until young birds have fledged (Map 40). See Appendix K for species nesting periods. • 2 miles of active ferruginous hawk nests (47,258 acres) from March 1 to July 31, or until young birds have fledged (Map 40). To protect the actual nest	Apply a TLS to avoid surface-disturbing and disruptive activities within ¼ mile of active raptor nests (47,651 acres) during specific species nesting period, or until young birds have fledged (Map 41). See Appendix K for species nesting periods.	To protect nesting raptors, apply a TLS on 126,241 acres to prohibit surface-disturbing and disruptive activities within: • ¼ mile of active raptor nests and ½ mile of active golden eagle, bald eagle, northern goshawk, merlin, and prairie and peregrine falcon nests during specific species nesting period or until young birds have fledged (Map 42). See Appendix K for species nesting periods. • 1 mile of active	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					site, apply a year-round CSU stipulation within ¼ mile of all raptor nests (47,258 acres) (Map 40). Actual distances and dates will vary based on topography, species, season of use, and other pertinent factors.		ferruginous hawk nests from March 1 to July 31 or until young birds have fledged (Map 42). To protect the actual nest site, apply a year-round CSU stipulation within ¼ mile of all raptor nests (47,651 acres) (Map 42). Actual distances and dates will vary based on topography, species, season of use, and other pertinent factors.		
				Migratory Birds					
4124	X	X	BR:7.1 BR:7.2	Implement conservation measures, terms and conditions, and appropriate BMPs and reasonable and prudent measures within existing state programmatic biological opinions for the mountain plover.	Same as Alternative A, plus manage a portion of the Chapman Bench area (23,326 acres) as the Chapman Bench ACEC for the retention, enhancement, and success of the greater sage-grouse, mountain plover, and long-billed curlew. See ACECs for management of the Chapman Bench ACEC.	Apply a TLS to protect mountain plover identified breeding and nesting habitat from surface-disturbing activities from April 10 through July 10.	Same as Alternative A, plus manage a portion of the Chapman Bench area as the Chapman Bench Management Area (3,425 acres of BLM-administered surface ownership): • manage for the retention and success of the mountain plover, long-billed curlew, and other sensitive species habitat • apply a NSO restriction (Map 37) open to geophysical exploration prohibit mineral materials disposal pursue a withdrawal from appropriation under the mining laws renewable energy and ROW avoidance area • allow surface-	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							disturbing activities consistent with other resource objectives Allow and stipulate, where feasible, vegetative treatments, invasive and nonnative pest species control, fuels management, and maintenance of existing facilities.		
				Mammals					
4125	X	X	BR:7.1-7.4	No similar action.	If the USFWS and WGFD determine that large prairie dog colonies and/or complexes within the Planning Area are suitable for black-footed ferret reintroduction, apply a NSO restriction on these areas.	No similar action.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
4126	X	X	BR:7.1-7.4	Implement, where appropriate, conservation measures, Biological Evaluations, and inter-agency coordination memorandums for all prairie dogs.	Same as Alternative A, plus prohibit prairie dog poisoning.	In the Sage Creek Town area only, implement conservation measures, terms and conditions, BMPs and reasonable and prudent measures for white- and black-tailed prairie dog colonies. Allow surface-disturbing and disruptive activities in all prairie dog colonies.	Same as Alternative A, plus prohibit prairie dog poisoning.	Same as Alternative B.	Same as Alternative D.
4127	X		BR:10.2 BR:10.5	Implement conservation measures outlined in the Biological Evaluation for black-tailed prairie dogs in the Sage Creek Prairie Dog Town (182 acres) (BLM 2005d).	Same as Alternative A, but also apply a NSO restriction on the Sage Creek Prairie Dog Town (182 acres) (Map 40).	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4128	X		BR:10.2 BR:10.5	Manage the Sage Creek Prairie Dog Town (182 acres) as a ROW avoidance area.	Manage the Sage Creek Prairie Dog Town (182 acres) as a ROW Exclusion area.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
				Amphibians and Reptiles					
4129	X	X	BR:7.1-7.4	Stipulate and/or implement the appropriate management guidelines identified in *Habitat Management Guidelines for Amphibians and Reptiles of the Northwestern U.S. and Canada, PARC Technical Publication HMG-4* (Pilliod and Wind 2008), and similar future guidance for activities that have the potential to impact known or potential amphibian/reptile habitat.	Same as Alternative A.	On a case-by-case basis, stipulate and/or implement the appropriate management guidelines identified in *Habitat Management Guidelines for Amphibians and Reptiles of the Northwestern U.S. and Canada, PARC Technical Publication HMG-4* (Pilliod and Wind 2008), and similar future guidance for activities that have the potential to impact known or potential amphibian/reptile habitat.	Same as Alternative A.	Same as Alternative B.	Same as Alternative C.
4130	X	X	BR:7.1-7.4	When cleaning or removing sediment from wet reservoirs, where feasible, retain riparian vegetation such as cottonwoods, willows, cattails, sedges, and rushes for wildlife habitat values.	Same as Alternative A, plus avoid reservoir work during amphibian mating and metamorphosis periods (April – July).	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				Fish					
4131	X	X	BR:7.3	Restore stream segments for fisheries habitat on a case-by-case basis.	Restore or reclaim important fisheries habitat through upland management and hydrologic function enhancement actions on at least 3 miles of lotic stream segments.	Same as Alternative A, except restore or improve important stream segments only for special status species fisheries habitat.	Restore or reclaim fisheries habitat with present or potential special status species fish populations through upland management and hydrologic function enhancement actions on a priority basis consistent with other resource uses.	Same as Alternative B.	Same as Alternative D.
4132	X	X	BR:7.1-7.3 BR:7.6	Construct barriers to prevent nonnative fish from colonizing habitat occupied by native fish species on a case-by-case basis.	Construct barriers to prevent nonnative fish from colonizing habitat occupied by native fish species. Remove barriers or construct fish passageways to enable native fish to occupy all suitable habitats.	Do not construct or remove barriers to prevent nonnative fish from colonizing habitat that would impede or constrain other resource uses.	Same as Alternative B, except on a priority basis.	Same as Alternative B.	Same as Alternative D.
4133	X	X	BR:7.3 BR:7.6	Prohibit surface-disturbing activities within 500 feet of surface water and/or riparian habitat, including those supporting special status fish species, except when such activities are necessary and when their impacts can be mitigated or avoided.	Prohibit surface-disturbing and disruptive activities within ¼ mile of any waters containing special status fish species, except when such activities are necessary and when their impacts can be mitigated or avoided.	Same as Alternative A.	Prohibit surface-disturbing activities within 500 feet and avoid surface-disturbing activities within ¼ mile of perennial surface water and riparian/wetland areas except when their impacts can be mitigated to an acceptable level.	Same as Alternative B.	Same as Alternative D.
4134	X	X	BR:7.1-7.3 BR:7.6	Consider working with WGFD and other stakeholders to restore Yellowstone cutthroat trout to its historically occupied watersheds on a case-by-case basis.	Pursue coordination with WGFD and other stakeholders in restoring Yellowstone cutthroat trout to its historically occupied watersheds wherever feasible.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
4135	X	X	BR:7.1-7.3 BR:7.6	Work with WGFD and other stakeholders to introduce special status fish species to waters outside of their historic range on a case-by-case basis.	If environmentally feasible, pursue coordination with WGFD and other stakeholders to introduce special status fish species to waters outside of their historic range.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
				Plants					
4136	X	X	BR:8.1-8.3 BR:8.5	Review all range improvement projects for potential impacts to BLM special status plant species. Implement avoidance and mitigation measures on a case-by-case basis.	Prohibit range improvement projects such as troughs, reservoirs, fences, and other surface-disturbing activities within ½ mile of known BLM special status plant species, unless the improvement is determined to be beneficial to the plant species.	Prohibit range improvement projects such as troughs, reservoirs, fences, and other surface-disturbing activities within 300 feet of BLM special status plant species, unless the improvement is determined to be beneficial to the plant species. Exceptions may be allowed by the authorized officer.	Avoid range improvement projects that may concentrate herbivory within ¼ mile of BLM special status plant species populations unless the project is determined to be beneficial or neutral to the plant species.	Same as Alternative B.	Same as Alternative D.
4137	X	X	BR:8.1-8.3 BR:8.5	No similar management action.	Prohibit forage supplements within ½ mile of BLM special status species plant populations.	On a case-by-case basis, allow placement of forage supplements after considering the location of BLM special status plant species.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
4138	X	X	BR:8.1-8.3 BR:8.5	Review all action and use authorizations on split-estate lands for potential impacts to BLM special status plant species. Implement avoidance and mitigation measures on a case-by-case basis.	Require surveys for BLM special status species plant species prior to approving any project or activity on federal lands or on split-estate lands in potential habitats for these species that may affect that species. If populations are identified, apply appropriate mitigation.	Require surveys for BLM special status species plant species prior to approving any project or activity on federal lands; however, do not require surveys for BLM special status plant species before approving any project or activity on split-estate lands, except for federally listed, proposed, and candidate	Review all federal actions and authorizations for potential impacts to BLM special status plant species. Implement avoidance, mitigation or compensation measures in coordination with surface owners on split-estate.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Special Status Species									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
						species. If populations are identified, apply appropriate mitigation.			
4139	X	X	BR:8.2-8.4	Review all herbicide treatments for potential impacts on BLM special status species plants. Implement avoidance and mitigation measures on a case-by-case basis.	Prohibit aerial applications of herbicides within 1 mile of BLM special status plant species. Allow vehicle and hand application of herbicides within ½ mile of special status plant species.	Prohibit aerial applications of herbicides within ½ mile of BLM special status plant species. Allow vehicle and hand application of herbicides on a case-by-case basis.	Avoid aerial applications of herbicides within ½ mile of BLM special status plant species. Allow vehicle and hand application of herbicides.	Same as Alternative B.	Same as Alternative D.
4140	X	X	BR:8.5	Review fire suppression effects on BLM special status plant species and implement mitigation measures on a case-by-case basis.	Same as Alternative A, except do not allow the use of fire suppression or chemicals, including foaming agents and surfactants, within ¼ mile of known BLM special status plant species populations.	Same as Alternative A.	Allow the application of fire suppression chemicals within ¼ mile of known/documented populations of BLM special status plant species with the consent of the authorized officer.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
4000 BIOLOGICAL RESOURCES (BR) – Wild Horses									
				GOAL BR:11 Manage and maintain healthy wild horses and herds inside HMAs in a thriving natural ecological balance within the productive capacity of their habitat while preserving multiple use relationships. **Objectives:** **BR:11.1** Adjust and maintain wild horse numbers and HMAs to comply with federal policies. **BR:11.2** Maintain or enhance herd viability and genetic integrity. **BR:11.3** Provide opportunities for wild horse interpretation, scientific research, and viewing. **BR:11.4** Manage wild horses to comply with local planning documents to the greatest extent practicable.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
4141		X	BR:11.1	The size of the Fifteenmile HMA (Map 45) will remain at 70,527 acres of BLM-administered land, out of the original 261,868 acres of BLM-administered land within the Fifteenmile HA.					
4142	X	X	BR:11.1	The Sand Draw HA is 15,302 acres (total acres in Planning Area, including BLM-administered, BOR, state, and private lands). The Zimmerman Springs HA is 12,277 acres (total acres in Planning Area, including BLM-administered, BOR, state, and private lands). The Alkali Spring Creek HA is 5,183 acres (total acres in Planning Area, including BLM-administered, BOR, state, and private lands). The Foster Gulch HA is 141,300 acres (total acres in Planning Area, including BLM-administered, BOR, state, and private lands). The North Shoshone HA is 22,626 acres (total acres in Planning Area, including BLM-administered, BOR, state, and private lands). These HAs (Map 45) will not be managed for wild horses.					
4143		X	BR:11.1	Manage the Fifteenmile HMA for an initial appropriate management level of 70 to 160 wild horses, not counting foals, in an attempt to maintain a population of 100 adult wild horses adjusted as necessary based upon monitoring.					
4144	X		BR:11.1	Manage the McCullough Peaks HMA for an initial appropriate management level of 70 to 140 wild horses, not counting foals, in an attempt to maintain a population of 100 adult wild horses adjusted as necessary based upon monitoring.					
4145	X	X	BR:11.1	Base future adjustments to the appropriate management level on monitoring information and multiple use considerations through development of and/or revisions to HMA Plans. Update HMA plans to include greater sage-grouse objectives.					
4146	X	X	BR:11.1	Manage BLM-administered land within the Fifteenmile and McCullough Peaks HMAs to maintain or enhance conformance with the *Wyoming Standards for Healthy Rangelands*.					
4147	X	X	BR:11.2	Employ selective removal criteria, in accordance with current national policies, during periodic gathers to increase desired genetic characteristics and avoid genetic depression.					
4148	X	X	BR:11.1	Consider the use of natural and artificial population control measures as needed to maintain the wild horse populations within the established appropriate management level ranges.					
4149	X	X	BR:11.1	Conduct all activities in compliance with relevant court orders and agreements as applicable to the management situation.					

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Wild Horses									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
4150	X		BR:11.3	Provide opportunity for the public to view wild horses in the McCullough Peaks HMA.	Same as Alternative A.	Same as Alternative A, except actively promote opportunities for public viewing, education, and interpretation of wild horses within the McCullough Peaks HMA.	Promote opportunities for public viewing, education, and interpretation of wild horses within the McCullough Peaks HMA.	Same as Alternative B.	Same as Alternative D.
4151		X	BR:11.3	Provide opportunity for the public to view wild horses in the Fifteenmile HMA.	Do not actively promote the Fifteenmile HMA to the public and retain the current remote natural characteristics.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
4152	X	X	BR:11.1	Within the Fifteenmile HMA, subject surface-disturbing and disruptive activities (public land uses) associated with wild horse management to appropriate mitigation developed through use of the mitigation guidelines.	Apply seasonal restrictions from February 1 to July 31 to prevent foal abandonment or jeopardy of wild horse health and welfare, as appropriate, to surface-disturbing and disruptive activities in the McCullough Peaks and Fifteenmile HMAs.	Do not apply seasonal restrictions.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
4153	X	X	BR:11.3	Consider organized special recreation permit-related base camps, events, or activities in the McCullough Peaks and Fifteenmile HMAs on a case-by-case basis.	Prohibit organized special recreation permits using domestic horses in the McCullough Peaks and Fifteenmile HMAs.	Allow organized special recreation permit-related base camps, events, or activities with horses.	Avoid and discourage organized special recreation permits using domestic horses in the McCullough Peaks and Fifteenmile HMAs.	Same as Alternative B.	Same as Alternative D.
4154	X		BR:11.1	Maintain the McCullough Peaks HMA at about 103,863 acres, out of the original 177,863 acres within the McCullough Peaks HA (Map 45).	Adjust the western boundary of the McCullough Peaks HMA (113,938 acres) to resolve resource conflicts (Map 45). Expansion of the HMA would not be the basis for a change to the appropriate management	Same as Alternative A.	Adjust the western boundary of the McCullough Peaks HMA (113,714 acres) to resolve resource conflicts (Map 45). Expansion of the HMA would not be the basis for a change to livestock AUMs or the appropriate	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

4000 BIOLOGICAL RESOURCES (BR) – Wild Horses									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					level, and any future changes to the appropriate management level would be done through the HMAP.		management level, and any future changes to these numbers would be done through the HMAP or the grazing permit renewal process.		
4155	X	X	BR:11.1	Do not allow wild horse gathers to occur between March 1 and June 30.	Avoid wild horse gathers 6-weeks before or 6-weeks after peak foaling season. To the extent possible, conduct wild horse gathers in the fall, after peak foaling has occurred and when temperatures are lower to reduce stress on the animals.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
4156	X		BR:11.2	Evaluate fences in the McCullough Peaks HMA on a case-by-case basis.	Evaluate and remove, on a case-by-basis, interior fences in the McCullough Peaks HMA to provide for wild horse movement and improved retention of genetic viability.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
5000 HERITAGE AND VISUAL RESOURCES (HR) – Cultural Resources									
				GOAL HR:1 Identify, preserve, and protect cultural resources and ensure that they are available for appropriate uses by present and future generations (FLPMA, Section 103(c), 201(a) and (c); National Historic Preservation Act, Section 110(a); Archeological Resources Protection Act, Section 14(a)). **Objectives:** **HR:1.1** Manage each type of cultural resource according to their proper use allocation, and monitor those resources' condition and use. **HR:1.2** Reduce imminent threats to cultural resources from natural or human-caused deterioration. **HR:1.3** Develop and maintain working relationships with those tribes having an interest in the area through regular meetings. Consult with tribal governments regarding proposed land uses having the potential to impact cultural resources identified as having tribal interests or concerns. Determine the types of resources of concern to various tribes, and take tribal views into consideration when making land use allocations or decisions. **HR:1.4** Develop activity plans for special areas or cultural resources identified as high risk for adverse impacts. **GOAL HR:2** Promote stewardship, conservation, and appreciation of cultural resources. **Objectives:** **HR:2.1** Maintain and enhance programs that provide opportunities for scientific research of cultural resources. **HR:2.2** Provide opportunities for public education, interpretation, and scientific research of cultural resources. Continue Project Archeology teaching courses, and continue to conduct public presentations for schools, community organizations, and the public. Provide for appropriate interpretation of sites of high public interest. Provide selected cultural resources for scientific research. **HR:2.3** Coordinate with other BLM programs preplanning measures to prevent potential conflicts before they occur. **GOAL HR:3** Protect important cultural resources while minimizing economic and social impacts to private landowners and local communities. **Objectives:** **HR:3.1** Consult and coordinate with affected landowners and local communities when devising protection measures for cultural resources. **HR:3.2** Consult and coordinate with affected landowners and local communities when devising recreational use plans for cultural resources. **HR:3.3** Preserve and stabilize important cultural resources, especially resources that face immediate threat or are in high public use areas.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
5001	X	X	HR:1.2	Investigate all alleged violations of the Archaeological Resources Protection Act.					
5002	X	X	HR:1.1	Categorize all cultural properties according to six use allocations: scientific use, conservation use, public use, traditional use, experimental use, and discharged from public use. Develop programmatic guidance for the first five categories of use that promote appropriate educational, recreational, and scientific interpretive use. Through the NEPA process, develop appropriate management prescriptions and monitoring plans to protect the identified use.					
5003	X	X	HR:1.4	Complete emergency site stabilization and long-term protection projects on important sites as appropriate, including the Hanson Site and several rock art occurrences.					
5004	X	X	HR:1.3	Continue existing relationships and develop new relationships with Native American tribes, in order to identify sites, areas, and resources important to them. Document and keep confidential sites, areas, and resources which are worthy of protection. Incorporate the information obtained from the tribes into the planning system, to identify conflicts in the earliest stages, and to avoid conflicts whenever possible. Manage identified areas of tribal importance to minimize disturbance to them and to ensure continued access.					
5005	X	X	HR:1.3	Ensure that areas of importance to Native American Tribes are not transferred from federal ownership, physically modified, or affected by management actions in ways that restrict or deny access and/or use.					

Table 2-9. Detailed Alternatives (Continued)

5000 HERITAGE AND VISUAL RESOURCES (HR) – Cultural Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
5006	X	X	HR:1.1-1.4 HR:2.3	Appropriately protect sites listed on the NRHP. Protect and manage sites that are eligible for or listed on the NRHP. Manage sites allocated for conservation, traditional use, or public use to avoid adverse effects; manage sites allocated for scientific or experimental use for their research potential. Protect and manage National Historic Landmarks through management of non-compatible uses.					
5007	X	X	HR:1.4	Identify areas of significant prehistoric cultural resources, which are at high risk from development, as data becomes available.					
5008	X	X	HR:1.1 HR:2.3	Pursuant to Section 106 of the National Historic Preservation Act of 1966 as amended, the National Programmatic Agreement (BLM, ACHP, and National Conference of SHPO 2012), and the State Protocol (BLM and Wyoming SHPO 2014), case-by-case reviews for specific undertakings require analysis and assessments of effects. Such analysis and assessment may reveal the need for additional restrictions beyond those specifically described in this RMP.					
5009	X	X	HR:1.1-1.4 HR:2.1-2.3 HR:3.1-3.3	In cooperation with local government and stakeholders, consider the economic and social impacts of protecting cultural resources.					
5010	X	X	HR:3.1	Coordinate with affected landowners, local communities, and agencies on any decisions that could affect their use or operations. Consistent with cultural resource protection goals and objectives, devise management actions that complement the objectives of private landowners or local communities.					
5011	X	X	HR:1.3	Inventory potentially sensitive cultural places identified during Native American consultation independent of specific land-use actions. Apply tools (such as site avoidance and SCZ to protect sensitive cultural sites, as necessary.					
5012	X	X	HR:1.4 HR:2.1-2.3 HR:3.1-3.3	Prepare Activity Plans for important sites as appropriate, including the Hanson Site and several rock art occurrences, Ten Sleep Raid, Minick Sheep Camp Raid, historic trails including the Bridger Trail, and the Fort Washakie to Red Lodge stage route.					
5013		X	HR:1.1-1.4 HR:2.3	Manage the Legend Rock Petroglyph Site for public education in cooperation with the Sate of Wyoming. Work to acquire the private land portions of the Legend Rock Petroglyph Site from willing landowners, preferably through an exchange.					
5014	X	X	HR:3.3	Apply a NSO restriction on the Legend Rock Petroglyph Site.					
5015	X	X	HR:1.1-1.4 HR:2.1-2.3 HR:3.1-3.3	Surface-disturbing activities associated with the construction and use of sites and facilities are subject to appropriate mitigation developed through implementation of the National Programmatic Agreement (BLM, ACHP, and National Conference of SHPO 2012) and the State Protocol (BLM and Wyoming SHPO 2014).					
5016	X	X	HR:1.2	For the protection of important cultural sites, pursue a withdrawal from appropriation under the mining laws on a case-by-case basis.					

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
5000 HERITAGE AND VISUAL RESOURCES (HR) – Cultural Resources									
5017	X	X	HR:2.2	Develop additional cultural resource interpretive sites making use of scenic overlooks, signs, and walking trails. Sites could include congressionally designated Nez Perce (Neeme-poo), and historic trails such as the Thermopolis to Meeteetse Trail, the Fort Washakie to Red Lodge Trail, the Mexican Pass Trail, and the Bridger Trail.					
5018	X	X	HR:1.2 HR:3.3	Motorized vehicle use is limited to designated roads and trails in areas containing important cultural and paleontological resources.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
5019	X		HR:1.1-1.4 HR:2.3	Gain additional information on the remaining intact deposits of the Hanson Prehistoric Occupation to facilitate nomination of the site as a National Historic Landmark. Upon Landmark designation, if feasible, nominate the site to the World Heritage List.	Same as Alternative A, except identify and test other deposits of similar age in the drainage to determine the full extent of the Folsom age deposits.	Same as Alternative A, except identify and test other deposits of similar age in the drainage to determine the full extent of the Folsom age deposits and do not seek to nominate the Hanson Prehistoric Occupation site to the World Heritage List.	Same as Alternative A, except do not seek to nominate the site to the World Heritage List.	Same as Alternative B.	Same as Alternative D.
5020	X	X	HR:1.1-1.4 HR:2.3	Manage rock art, as well as other prehistoric and historic archeological sites and districts associated with specific time periods or cultures, for scientific, public, and socio-cultural use. Manage general areas for research, with emphasis on interpreting former ecosystems. Preserve specific sites or areas for future study and use.	Same as Alternative A, except avoid surface-disturbing activities (see Glossary) and ROW authorizations in view within 5 miles of important cultural sites where integrity of setting is a contributing element of NRHP significance, except within designated utility corridors.	Same as Alternative A, except avoid surface-disturbing activities (see Glossary) and ROW authorizations in view within 1/4 mile of important cultural sites where integrity of setting is a contributing element of NRHP significance, except within designated utility corridors.	Same as Alternative A, except avoid surface-disturbing activities and protect the foreground of important cultural sites (see Glossary for definitions of these terms) up to 3 miles or the visual horizon, whichever is closer (the SCZ), where setting is an important aspect of the integrity for the site. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.	Same as Alternative B.	Same as Alternative D.
5021	X	X	HR:1.2	Pursue leasable mineral restrictions for the protection of cultural sites on a case-by-case basis.	Apply a NSO restriction for leasable minerals within 3 miles and a CSU stipulation in view within 5 miles of important cultural sites	Apply a NSO restriction for leasable minerals within ¼ mile and a CSU stipulation within 1 mile of important cultural sites (see Glossary	Protect the foreground of important cultural sites (see Glossary for definitions of these terms) up to 3 miles or the visual	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

5000 HERITAGE AND VISUAL RESOURCES (HR) – Cultural Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					(see Glossary and Appendix L).	and Appendix L).	horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the site. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.		
5022	X	X	HR:1.2	Pursue restrictions on mineral materials disposal for the protection of important cultural sites on a case-by-case basis.	Prohibit mineral materials disposal within 3 miles, or in view within 5 miles of important cultural sites.	Prohibit mineral materials disposal within ¼ mile, or in view within 1 mile of important cultural sites.	Avoid surface-disturbing activities and protect the foreground of important cultural sites (see Glossary for definitions of these terms) up to 3 miles or the visual horizon, whichever is closer (the SCZ) where setting is an important aspect of the integrity for the site. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.	Same as Alternative B.	Same as Alternative D.
5023	X	X	HR:1.1 HR:1.3	Determine the location of renewable energy development on a case-by-case basis consistent with applicable policy and guidance and other resource management and objectives.	Manage areas within 5 miles of trails and sites eligible for the NRHP and Traditional Cultural Properties as renewable energy (specifically wind turbine) exclusion areas, unless structures are screened from the site by intervening topography.	Manage areas within 5 miles of trails and sites eligible for the NRHP and Traditional Cultural Properties as renewable energy (specifically wind turbine) avoidance areas, unless structures are screened from the site by intervening topography.	Avoid surface-disturbing activities and protect the foreground of important cultural sites (see Glossary for definitions of these terms) up to 3 miles or the visual horizon, whichever is closer (the SCZ) where setting is an important aspect of the integrity for the site. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects and manage these areas as renewable energy avoidance areas.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

5000 HERITAGE AND VISUAL RESOURCES (HR) – Cultural Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
5024		X	HR:1.1-1.4 HR:2.3	Manage portions of the town of Gebo and adjacent coal mining areas on BLM-administered land for preservation and interpretation of cultural and historic values.	Same as Alternative A, except identify additional trails for foot travel. Include comprehensive information, photographs, and maps on the BLM web site.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
5025	X	X	HR:1.1-1.4 HR:2.3	Manage historic resources in oil and gas fields for scientific and public use. Include the following fields: Elk Basin, Silvertip, Oregon Basin, Hamilton Dome, Grass Creek, Little Buffalo Basin, Walker Dome, Enos Creek, Golden Eagle, Gooseberry, Hidden Dome, Little Grass Creek, and Gebo.	No similar action.	Same as Alternative A, plus include the installation of interpretive signs where fields can be safely viewed.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
5026	X	X	HR:3.3	No similar action.	Motorized vehicle use is limited to designated roads and trails on BLM-administered land along the Bighorn Slope, Bridger, Owl Creek, and Absaroka Foothills to manage (minimize issues such as looting) for cultural and paleontological resources.	Same as Alternative B.	Motorized vehicle use is limited to existing roads and trails, except where other resources impose more restrictive conditions, on BLM-administered land along the Bighorn Slope, Bridger, Owl Creek, and Absaroka Foothills to manage (minimize issues such as looting) for cultural and paleontological resources.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
5000 HERITAGE AND VISUAL RESOURCES (HR) – Paleontological Resources									
				GOAL HR:4 Manage, preserve, and protect paleontological resources and areas on BLM-administered land in the Planning Area. **Objectives:** **HR:4.1** Reduce threats to paleontological resources from natural or human-caused deterioration. **HR:4.2** Implement the PFYC as a standard part of review for all surface-disturbing activities in the Planning Area. **GOAL HR:5** Promote and enhance scientific knowledge of paleontological resources in the Planning Area. **Objectives:** **HR:5.1** Provide paleontological research opportunities for qualified scientists/academia on public lands within the Planning Area in conjunction with the Wyoming State Office Paleontologist, implementing the paleontology permitting program. **HR:5.2** Provide opportunities for research projects relative to paleoclimate studies in the Planning Area. **GOAL HR:6** Promote and implement stewardship, conservation, and appreciation of paleontological resources in the Planning Area. **Objectives:** **HR:6.1** Provide opportunities for the public to enjoy limited recreational collection of common invertebrate and plant fossils in portions of the Planning Area. **HR:6.2** Develop interpretive areas relative to paleontological resources.				
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
5027	X	X	HR:4.1	Enlist assistance of permittees, consultants, and the interested public in preventing theft, trespass, and vandalism of paleontological resources.					
5028	X	X	HR:4.2	Protect vertebrate and scientifically significant paleontological resources on BLM-administered land from proposed surface-disturbing activities that could damage or destroy these resources.					
5029	X	X	HR:4.1	Avoid surface-disturbing activities in areas in the immediate vicinity of scientifically significant paleontological resource sites.					
5030	X	X	HR:4	Avoid adverse effects on resource values to sites listed in National Park Service inventories of possible National Natural Landmarks.					
5031	X	X	HR:5.1	Manage scientifically significant paleontological resources for scientific and public use.					
5032	X	X	HR:4.1	Standard stipulations for paleontological resources permits include protection of cultural resources, human remains, and potential areas of concern to Native Americans.					
5033	X	X	HR:6.1	Provide opportunities for the public to enjoy limited recreational collection of common invertebrate and plant fossils in portions of the Planning Area.					
5034	X	X	HR:6.1	Allow for personal casual-use collection of common invertebrate or plant fossils in reasonable quantities on BLM-administered land.					
5035	X	X	HR:4.1	Close or restrict uses upon discovery of vertebrate or scientifically significant paleontological resources on a case-by-case basis.					
5036	X	X	HR:5.1	Recommend application of Standard Terms and Conditions (see Glossary) for Paleontological Resources Excavation permits, issued by the State Office, to address: 1. Permit assignment 2. Approved timeframes for the permit 3. Costs 4. Access 5. Ownership of the paleontological resources 6. Removal of stakes, flagging, or other site identification materials 7. Citing in reports 8. Restoration of surface disturbance					

Table 2-9. Detailed Alternatives (Continued)

5000 HERITAGE AND VISUAL RESOURCES (HR) – Paleontological Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				9. Reports 10. Stipulations regarding cultural resources, human remains, or areas of religious or cultural concern to Native Americans					
				MANAGEMENT ACTIONS BY ALTERNATIVE					
				Law Enforcement/Protection					
5037	X	X	HR:4.1	Close areas with vertebrate or other scientifically significant paleontological resources that are at risk for damage from illegal activities, including theft and vandalism, on a case-by-case basis.	Protect areas with vertebrate or other scientifically significant paleontological resources that are at risk for damage from illegal activities, including theft and vandalism.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
5038	X	X	HR:4.2	Implement the PFYC system (Map 46) as a standard part of review for all surface-disturbing activities in the Planning Area (see Glossary).	Same as Alternative A.	Implement the PFYC system for permitted use exceeding 5 acres.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
5039	X	X	HR:4.1 HR:4.2	Require an on-the-ground survey prior to approval of a surface-disturbing activity or land-disposal action, and monitor surface-disturbing activities for all PFYC 4 and 5 formations. PFYC 3 formations may or may not require a survey prior to approval of these actions.	Require an on-the-ground survey prior to approval of a surface-disturbing activity or land-disposal action, and monitor surface-disturbing activities for PFYC 3, 4, and 5 formations.	Require an on-the-ground survey prior to approval of a surface-disturbing activity or land-disposal action, and monitor surface-disturbing activities for PFYC 5 formations.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
5040	X	X	HR:4.2	Attach standard Paleontological Resources Protection Stipulations (see Glossary) to authorizations for surface-disturbing activities on PFYC 3, 4 or 5 formations.	Attach standard Paleontological Resources Protection Stipulations (see Glossary) to authorizations for surface-disturbing activities in all areas, regardless of PFYC (i.e., 1 through 5).	Attach standard Paleontological Resources Protection Stipulations (see Glossary) to authorizations for surface-disturbing activities in PFYC 4 or 5 only.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

5000 HERITAGE AND VISUAL RESOURCES (HR) – Paleontological Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
5041	X	X	HR:4.1	Within 50 feet of a paleontological discovery, prohibit the resumption of activity until written authorization to proceed is issued by the authorized officer.	Within 100 feet of a paleontological discovery, prohibit the resumption of activity until written authorization to proceed is issued by the authorized officer.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
5042	X	X	HR:4.1	Prohibit surface-disturbing activities within at least 50 feet of the outer edge of the paleontological locality.	Prohibit surface-disturbing activities within at least 100 feet of the outer edge of the paleontological locality.	Same as Alternative A.	Allow surface-disturbing activities within at least 100 feet of the outer edge of the paleontological locality if the impacts can be adequately mitigated.	Same as Alternative B.	Same as Alternative D.
5043	X	X	HR:4.1	Consider retention and acquisition of lands for significant paleontological resources on a case-by-case basis.	Retain BLM-administered land having vertebrate or other scientifically significant paleontological resources. Pursue opportunities to acquire private lands with vertebrate or other scientifically significant paleontological resources and values adjacent to public lands for protection, via exchange, purchase, or donation on a willing seller, willing buyer basis.	Same as Alternative B, except do not acquire private lands with vertebrate or other scientifically significant paleontological resources and values.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
5044	X	X	HR:5.1 HR:5.2	Provide paleontological research opportunities for qualified scientists/academia on BLM-administered land within the Planning Area in conjunction with the Wyoming State Office Paleontologist, implementing the paleontology permitting program.	Same as Alternative A, except actively solicit paleontological research.	Same as Alternative A.	Same as Alternative A, except encourage paleontological research.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

5000 HERITAGE AND VISUAL RESOURCES (HR) – Paleontological Resources									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Education & Interpretation									
5045	X	X	HR:6.1	Do not specifically identify areas for casual use collection of common invertebrate or plant fossils by the public.	Identify and designate areas for casual use/collection of common invertebrate or plant fossils by the public. Manage these areas by restricting all surface use as necessary and restricting paleontological resource collecting as necessary.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
5046	X	X	HR:6.2	Consider development of additional paleontological interpretive areas on a case-by-case basis.	Do not develop, or pursue only minimal development, of additional paleontological resources interpretive areas in the Planning Area.	Develop paleontological interpretive areas within the Planning Area where scientifically significant paleontological resources are known to occur, such as designated paleontological areas or ACECs.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
5000 HERITAGE AND VISUAL RESOURCES (HR) – Visual Resource Management									
				GOAL HR:7 Maintain the overall scenic (visual) quality of BLM-administered land where consistent with resource values. **Objectives:** **HR:7.1** Class 1 Objective: Preserve the existing character of the landscape. Provide for natural ecological changes; however, preserving the landscape will not preclude very limited management activity. The level of change to the characteristic landscape will be very low and will not attract attention. **HR:7.2** Class 2 Objective: Retain the existing character of the landscape. The level of change to the characteristic landscape will be low. Management activities may be seen, but will not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. **HR:7.3** Class 3 Objective: Partially retain the existing character of the landscape. The level of change to the characteristic landscape will be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes will repeat the basic elements found in the predominant natural features of the characteristic landscape. **HR:7.4** Class 4 Objective: Provide for management activities which require major modification to the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt will be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.					
				MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES					
5047	X	X	HR:7	Manage visual resources in accordance with VRM class objectives.					
5048	X	X	HR:7	Meet the VRM objectives before authorizing land uses that may affect the visual character of the landscape.					
5049	X	X	HR:7	Allow surface-disturbing activities in areas managed as VRM Class II only if the level of change to the landscape from the activities are low, and will not attract the attention of the casual observer, or the project can be mitigated to meet these objectives.					
5050	X	X	HR:7.1	Manage WSAs under VRM Class I objectives.					
				MANAGEMENT ACTIONS BY ALTERNATIVE					
5051	X	X	HR:7	VRM Class allocations for BLM-administered surface lands (Map 47) are as follows: • Class I – 141,127 acres (4.4%) • Class II – 340,784 acres (10.6%) • Class III – 890,482 acres (27.9%) • Class IV – 1,815,043 acres (56.9%) • Unclassified – 23 acres (0.001%)	VRM class allocations for BLM-administered surface lands (Map 48) are as follows: • Class I – 154,359 acres (4.8%) • Class II – 1,784,854 acres (55.9%) • Class III – 394,106 acres (12.3%) • Class IV – 858,263 acres (26.9%) • Unclassified – 24 acres (0.001%)	VRM class allocations for BLM-administered surface lands (Map 49) are as follows: • Class I – 140,976 acres (4.4%) • Class II – 333,027 acres (10.4%) • Class III – 510,535 acres (16.0%) • Class IV – 2,202,825 acres (69.1%) • Unclassified – 24 acres (0.001%)	VRM class allocations for BLM-administered surface lands (Map 50) are as follows: • Class I – 141,127 acres (4.4%) • Class II – 731,812 acres (22.9%) • Class III – 738,531 acres (23.1%) • Class IV – 1,580,470 acres (49.5%) • Unclassified – 37 acres (0.001%)	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

5000 HERITAGE AND VISUAL RESOURCES (HR) – Visual Resource Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
5052	X	X	HR:7.1-7.3	The project proponent may be required to submit VRM contrast rating worksheets on a case-by-case basis.	The project proponent must complete VRM contrast rating worksheets for all proposed actions in areas managed as VRM Classes I, II, or III.	Same as Alternative A, except the project proponent is exempt for all mineral actions and activities in designated ROW corridors.	The project proponent must complete VRM contrast rating worksheets for all proposed actions in areas managed as VRM Classes I or II and for all projects with a high degree of visual impact.	Same as Alternative B.	Same as Alternative D.
5053	X	X	HR:7.1-7.3	The project proponent may be required to submit visual simulations on a case-by case-basis.	The project proponent will complete a visual simulation and mitigation design where required prior to approval for all proposed actions within or viewable from areas managed as VRM Classes I and II (Map 48).	The project proponent is not required to submit visual simulations on any projects.	Same as Alternative A.	Same as Alternative B.	Same as Alternative D.
5054	X	X	HR:7.1 HR:7.2	No similar action.	Work with willing landowners and partners to pursue conservation easements on lands adjacent to areas managed as VRM Classes I and II.	Do not pursue conservation easements on lands adjacent to areas managed as VRM Classes I and II.	Work with willing landowners and partners to pursue conservation easements on lands adjacent to areas managed as VRM Classes I and II on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
5055	X	X	HR:7	Motorized vehicle use is limited to designated roads and trails in areas managed as VRM Classes I and II.	Motorized vehicle use is limited to designated roads and trails in areas managed as VRM Class II. Areas managed as VRM Class I are closed to motorized vehicle use.	Motorized vehicle use is not limited by VRM Classes.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Lands and Realty									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL LR:1 Manage the acquisition, disposal, withdrawal, and use of public lands to meet the needs of internal and external customers and to preserve important resource values. **Objectives:** **LR:1.1** Develop and maintain a land-ownership pattern that will provide access for managing and protecting public lands. **LR:1.2** Use appropriate actions such as disposal and acquisition to resolve issues related to intermixed land-ownership patterns and to acquire non-federal land having high resource/recreation value(s). **LR:1.3** Maintain availability of public lands to meet the habitation, trade, mineral development, recreation, and manufacturing needs of external customers and the general public. **LR:1.4** Utilize withdrawals to meet resource protection needs.					
				MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES					
6001	X	X	LR:1.1 LR:1.3	Consider land use authorizations (permits, leases, etc.) on a case-by-case basis consistent with other resource objectives. Do not classify, open, or make available any BLM-administered lands for agricultural leasing or agricultural entry under the Desert Land Act that meet one or more of the following criteria: unsuitable topography, presence of sensitive resources or resource conflicts, lack of water or access, small parcel size, or unsuitable soils.					
6002	X	X	LR:1.4	When supported by RMP decisions to protect or manage other resources, pursue newly proposed BLM protective withdrawals and other agency withdrawal requests on a case-by-case basis.					
6003	X	X	LR:1.3 LR:1.4	Retain all public water reserve withdrawals (2,765 acres), except where no longer needed.					
6004	X	X	LR:1.3 LR:1.4	Review 14,381 acres of other agencies' withdrawals within the Planning Area under Section 204 of FLPMA.					
6005	X	X	LR:1.3 LR:1.4	Review of 16,143 acres of BLM-administered power withdrawals and classifications within the Planning Area.					
6006	X	X	LR:1.3	Revoke 3,287 acres of C&MU lands. Upon revocation, manage the lands in accordance with adjacent BLM-administered lands.					
6007	X		LR:1.3	Open restored BOR lands to mineral location on a case-by-case basis, except where said lands should remain closed to mineral entry in order to meet other resource objectives.					
6008	X	X	LR:1.3 LR:1.4	Continue existing classifications/segregations on 156,617 acres, unless no longer needed.					
6009	X	X	LR:1.1 LR:1.3	Manage lands and/or interests in lands acquired, and former withdrawn lands relinquished, in a manner consistent with adjacent or nearby BLM-administered land including surface and mineral estate management and pursuing withdrawals as appropriate. Subject to further NEPA analysis, where there is a reversionary interest, land may be disposed where the land is not suitable for return to the public domain.					
6010	X	X	LR:1.1-1.3	Acquire private or state lands or interest in land from willing sellers on a case-by-case basis to consolidate land ownership and enhance the ability to manage important recreation opportunities and wildlife habitats such as migration corridors, crucial big game habitat, and riparian/wetland areas. Except for lands acquired using monies from the Westside Irrigation project conveyance described below, exchange is the preferred method of acquisition.					

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Lands and Realty									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6011		X	LR:1.1-1.3	Convey all right, title, and interest (excluding federal mineral interest) in a parcel of public land located in Big Horn County and Washakie County, comprising approximately 16,122 acres, after completion of an environmental analysis under NEPA. Acreage may be added to or subtracted from the land to be conveyed as necessary to satisfy any mitigation requirements under NEPA consistent with resource considerations. Conveyance is to be made to the Westside Irrigation District at current appraised value. Lands within the boundary of the project which are not conveyed under the final decision for this transfer, will be retained in federal ownership, and not available for other disposal actions. Monies paid for Westside Irrigation project lands will be used to acquire lands, also within the Bighorn Basin, with priority purchases defined by BLM in cooperation with stakeholder agencies (WGFD and SHPO).					
6012	X	X	LR:1.1 LR:1.2	Unauthorized use (trespass) on public land will be investigated and resolved on a priority basis. Resolution may include requiring the trespassing party to remove the trespass and restore public lands. Resolution for inadvertent trespass, and especially for long-term, unknowing trespass, may include the sale or exchange of lands at fair market value to the trespassing party, or by modified competitive sale. In the interim, until a decision is made, continued use may be authorized, if determined to be in the public interest. If disposal is selected to resolve the trespass, and the disposal method is to be a FLPMA sale, the parcel size would be the smallest affected parcel, and in accordance with policy.					
6013	X	X	LR:1.3	Consider access easements (including acquisition and exchange) across private lands for access to BLM-administered land. See Appendix M for a list of general areas of interest for easement acquisition based on recreation needs.					
6014	X	X	LR:1.1-1.3	Consider classifications for Recreation and Public Purpose lease and conveyance of BLM-administered land on a case-by-case basis.					
6015	X		LR:1	Retain classification of BLM-administered land south of Cody for the future expansion of Park County landfill and lands to the north, south, and west of the Worland landfill.					
6016	X	X	LR:1.1 LR:1.3	Consider R&PP Act applications from qualified applicants on a case-by-case basis. NOTE: The entire Planning Area is open to applications for conveyances to qualified applicants under the Recreation and Public Purpose Act.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
Retention, Disposal, and Acquisition									
6017	X	X	LR:1.1 LR:1.2	Retain approximately 3,071,909 acres of BLM-administered land. 115,905 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 51) (Appendix M). Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate.	Retain approximately 3,164,261 acres of BLM-administered land. 24,042 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 52) (Appendix M). Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). Note: All land actions to acquire or dispose of lands would require a site specific analysis under	Retain approximately 3,069,967 acres of BLM-administered land. 117,845 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 53) (Appendix M). Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). Note: All land actions to acquire or dispose of lands would require a site specific analysis under	Retain approximately 3,121,558 acres of BLM-administered land. 66,363 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 54) (Appendix M). Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Lands and Realty									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					NEPA.	NEPA.	all of the mineral estate. Lands classified as PHMAs for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of the greater sage-grouse. For lands in GHMAs that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase greater sage-grouse abundance and distribution. Note: All land actions to acquire or dispose of lands would require a site specific analysis under NEPA.		
				Disposal					
6018	X		LR:1.2	No similar action.	Dispose of the locatable mineral estate in the Cody Industrial Park area to entities who wish to purchase the surface	Maintain the locatable mineral estate in the Cody Industrial park area in federal ownership. A mineral potential report	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Lands and Realty									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					estate, depending on locatable mineral potential for the property and as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate.	would determine if a surface estate disposal includes none, some, or all of the mineral estate.			
				Land Use Classification[3]					
6019	X	X	LR:1.3	1,409 acres are classified as open for entry under the Desert Land Act. Consider DLE applications for unclassified lands on a case-by-case basis subject to DLE criteria (43 CFR §2520).	Revoke 1,409 existing acres of classified DLE lands. Do not classify new lands for DLE.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
				Withdrawals					
6020	X	X	LR:1.4	Continue the withdrawal of 188,803 acres in the Planning Area (Map 9).	Withdraw 314,223 acres in the Planning Area (Map 10).	Withdraw 48,095 acres in the Planning Area (Map 11). Existing withdrawals and segregations that are not carried forward will be allowed to expire.	Withdraw 83,321 acres in the Planning Area (Map 12).	Same as Alternative B.	Same as Alternative D.
6021	X		LR:1.4	Pursue a withdrawal from appropriation under the mining laws for the Beck Lake Scenic Area (708 acres).	Same as Alternative A.	Do not pursue a withdrawal from appropriation under the mining laws in the Beck Lake Scenic Area (708 acres).	Same as Alternative A, further do not issue an order that opens the land to mineral entry.	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
6000 LAND RESOURCES (LR) – Renewable Energy									
				GOAL LR:2 Manage and provide opportunities for appropriate renewable energy facilities on public lands. **Objectives:** **LR:2.1** Make lands available for renewable energy development consistent with goals and objectives of other resources. **LR:2.2** In cooperation with project proponents, promote and enhance scientific knowledge of renewable energy resources in the Planning Area (Map 56).				
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
6022	X	X	LR:2.1 LR:2.2	Programmatic policies and BMPs for wind-energy development are identified in the *Record of Decision for Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments* (BLM 2005e) and IM 2009-043.					
6023	X	X	LR:2.1	Consider authorization of renewable energy projects consistent with the management of other resource values.					
6024	X	X	LR:2.1	Initiate government-to-government consultation with the appropriate Tribal governments if it is determined that renewable energy development proposals might directly and substantially affect the Tribe.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
6025	X	X	LR:2.1	Consider renewable energy development on a case-by-case basis.	The Planning Area is open to renewable energy development unless managed as renewable energy or ROW exclusion or avoidance areas to meet other resource objectives (Map 57). A total of 251,203 acres is open to renewable energy development. Manage a total of 1,691,663 acres as renewable energy avoidance areas. Manage a total of 1,244,948 acres as renewable energy exclusion areas. Geothermal resources are discussed in the minerals section.	The Planning Area is open to renewable energy development unless managed as renewable energy or ROW exclusion or avoidance areas to meet other resource objectives (Map 58). A total of 1,428,360 acres is open to renewable energy development. Manage a total of 1,611,040 acres as renewable energy avoidance areas. Manage a total of 148,413 acres as renewable energy exclusion areas. Geothermal resources are discussed in the minerals section.	The Planning Area is open to renewable energy development unless managed as renewable energy or ROW exclusion or avoidance areas to meet other resource objectives (Map 59). A total of 1,315,309 acres is open to renewable energy development. Manage a total of 1,500,395 acres as renewable energy avoidance areas. Manage a total of 372,110 acres as renewable energy exclusion areas. Geothermal resources are discussed in the minerals section.	The Planning Area is open to renewable energy development unless managed as renewable energy or ROW exclusion or avoidance areas to meet other resource objectives (Map 60). A total of 254,151 acres is open to renewable energy development. Manage a total of 988,459 acres as renewable energy avoidance areas. Manage a total of 1,945,204 acres as renewable energy exclusion areas. Geothermal resources are discussed in the minerals section.	The Planning Area is open to renewable energy development unless managed as renewable energy or ROW exclusion or avoidance areas to meet other resource objectives (Map 61). A total of 607,429 acres is open to renewable energy development. Manage a total of 2,507,581 acres as renewable energy avoidance areas. Manage a total of 292,949 acres as renewable energy exclusion areas. Geothermal resources are discussed in the minerals section.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
6000 LAND RESOURCES (LR) – Rights-of-Way and Corridors									
				GOAL LR:3 Manage public lands to meet transportation and ROW needs consistent with goals and objectives of other resources. **Objectives:** **LR:3.1** Provide opportunities to meet ROW demands while protecting important resources. **LR:3.2** Maintain and acquire appropriate ingress, egress, and access routes across state/private lands to BLM-administered land for recreational opportunities and management of public land resources. **LR:3.3** Maintain a transportation management system in cooperation with appropriate state and local agencies to meet public and resource management needs.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
6026	X	X	LR:3.1	In accordance with the *Record of Decision for Programmatic Environmental Impact Statement, Designation of Energy Corridors on Federal Land in the 11 Western States* (DOE and BLM 2008a), designate energy corridor 79-216 in the Planning Area.					
6027	X	X	LR:3.1	Develop communication site management plans for all communication site concentration areas (Map 63).					
6028	X	X	LR:3.1 LR:3.3	The preferred location of new ROW will be in or adjacent to existing disturbed areas associated with existing ROW or high traffic gravel roads or highways, where possible.					
6029	X	X	LR:3.1	Avoid ROW authorizations in areas having a 25 percent or greater average slope (Map 62).					
6030	X	X	LR:3.1	Provide reasonable access across BLM-administered land to private land, subject to other resource concerns.					
6031	X	X	LR:3.1 LR:3.2	Acquire and maintain access easements to BLM-administered land across private/state lands from willing sellers on a case-by-case basis to meet other resource needs.					
MANAGEMENT ACTIONS BY ALTERNATIVE[4]									
6032	X	X	LR:3.1	Authorize communication site facilities on a case-by-case basis. Encourage development within designated areas. Co-locate new communication sites where possible.	Allow communication sites in all areas not managed as ROW avoidance or exclusion areas. Require co-location of new communication sites unless there is a demonstrated need to locate communication sites in other locations.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6033	X	X	LR:3.1	Designate ROW corridors as shown on Map 63.	Designate ROW corridors as shown on Map 64.	Designate ROW corridors as shown on Map 65.	Designate ROW corridors as shown on Map 66. In PHMA, major overhead powerlines will not be authorized unless co-located with an existing 115 kilovolt or greater	Designate ROW corridors as shown on Map 67.	Designate ROW corridors as shown on Map 68.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Rights-of-Way and Corridors									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							powerline, as close as technically feasible, not to exceed 0.5 miles or within a designated corridor authorized for overhead powerlines. Distribution lines may be authorized when effectively mitigated to protect greater sage-grouse and the Authorized Officer determines that overhead installation is the action alternative with the fewest adverse impacts. Agricultural and residential lines will be considered to be adequately mitigated for greater sage-grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and installation of raptor deterrents. These ROW authorizations will be subject to approval by the State Director.		
6034	X	X	LR:3.1	Manage 940,943 acres as ROW avoidance areas (Map 63).	Manage 2,710,695 acres as ROW avoidance areas (Map 64).	Manage 1,173,162 acres as ROW avoidance areas (Map 65).	Manage 2,408,662 acres as ROW avoidance areas (Map 66).	Manage 1,610,792 acres as ROW avoidance areas (Map 67).	Manage 2,315,730 acres as ROW avoidance areas (Map 68).
6035	X	X	LR:3.1	Manage 61,147 acres as ROW exclusion areas (Map 63).	Manage 225,447 acres as ROW exclusion areas (Map 64).	Manage 7,586 acres as ROW exclusion areas (Map 65).	Manage 40,802 acres as ROW exclusion areas (Map 66).	Manage 1,322,879 acres as ROW exclusion areas (Map 67).	Manage 133,734 acres as ROW exclusion areas (Map 68).
6036	X		LR:3.1	Avoid placement of above-ground facilities, such as powerlines, along major transportation routes.	Where possible, concentrate placement of above-ground facilities along major	Same as Alternative A.	Avoid placement of above-ground powerlines within one mile on each side of the Greybull	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Rights-of-Way and Corridors									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					transportation routes. Where not possible, do not construct above-ground facilities in exclusion areas, and apply adequate mitigation in consideration of resource values within avoidance areas.		Highway (14-16-20) from the City of Cody to the intersection with Highway 32 near the community of Emblem. Avoid placement of above-ground powerlines within one mile on each side of Highway 32 between Emblem and the BLM-BOR boundary to the north. Avoid placement of above-ground powerlines within one mile on each side of Highway 120 between the City of Cody and the Wyoming-Montana state line. Avoid placement of above-ground powerlines within 1 mile on each side of Highway 120 between the City of Cody and the Meeteetse Rim to the south. Avoid placement of above-ground powerlines within one mile on each side of Highway 14-16-20 between the City of Cody and the community of Wapiti.		
6037	X	X	LR:3 LR:3.3	No similar action.	Consider night skies in evaluation of ROW applications and apply BMPs as appropriate.	Do not consider night skies in the evaluation of ROW applications.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL LR:4 Utilize a comprehensive approach to travel planning and management to sustain and enhance use. **Objectives:** **LR:4.1** All BLM-administered lands will be classified as open, limited, or closed to motorized travel in consideration of other resource program goals and objectives, primary travelers, objectives for allowing travel in the area, setting (recreation, visual, archeological) characteristics that are to be maintained, and primary means of travel. **LR:4.2** Integrate concepts of habitat connectivity into OHV planning to minimize habitat fragmentation. **LR:4.3** Manage OHV use by type, season, intensity, distribution, and/or duration to minimize the impact on plant and wildlife habitats. If seasonal closures become appropriate to minimize adverse OHV impact(s) on public lands resources, strive to preserve public access by designating alternative routes. **GOAL LR:5** Manage the use of OHVs in partnership with other land-management agencies, local governments, communities, and stakeholders. **Objectives:** **LR:5.1** Pursue the acquisition of resources for implementing transportation and travel management. **LR:5.2** Coordinate public outreach efforts when implementing travel management decisions. **GOAL LR:6** Utilize adaptive trails and travel management to protect public land natural resources and settings, promote safety for all public land users, and minimize conflicts among OHV users and various other uses of public lands. **Objectives:** **LR:6.1** Promote responsible-use recreational opportunities and experiences, visitor access/safety, and resource conservation and education. **LR:6.2** Promote trail etiquette, environmental ethics, and a responsible-use stewardship ethic (e.g., tread lightly, leave no trace). **LR:6.3** Promote user safety and minimize user conflict.				
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
6038	X	X	LR:4.1	Unless otherwise specified in other management actions, motorized vehicle use on BLM-administered land is limited to existing roads and trails on an interim basis until completion of travel management planning. Designation changes from "limited to existing roads and trails" to "limited to designated roads and trails" upon the completion of a travel management plan. Terms "interim existing roads and trails", or "existing roads and trails" are used throughout the document to identify areas of low travel management planning priority. Interim existing roads and trails may be maintained for continued access until completion of a travel management plan.					
6039	X		LR:4	The Lovell shooting range and the Cody Archery Range are closed to motorized and mechanized vehicle use, except where permitted.					
6040	X	X	LR:4	The following areas are closed to motorized vehicle use: Duck Swamp-Bridger Trail Environmental Education Area, the rifle range west of Worland, Salt Lick Trail, Gooseberry Badlands Interpretive Trail, Paint Rock Trail, Lone Tree Trail, Canyon Creek Access Trail, Cottonwood Canyon Trail, and Five Springs Road beyond the locked gate in the CYFO.					
6041	X	X	LR:4	Route designation will be through site specific travel management planning, motorized vehicle use is limited to existing roads and trails unless and until route designations are implemented. Subsequent travel management plans will address maintenance of roads, ways, and trails on a site specific basis, in cooperation with stakeholders.					
6042	X	X	LR:6	Motorized travel use is allowed throughout the Planning Area for emergency and administrative use, through other authorities, and maintenance and operations as authorized by permit on case-by-case basis.					
6043	X	X	LR:4	Pedestrian and equestrian travel are not restricted, and use may occur on or off-roads or trails, except for very limited seasonal restrictions that are specifically defined elsewhere in this section, or specifically defined in subsequent travel management plans.					

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6044	X	X	LR:5	Implement the existing travel management plans within the following areas: • Carter Mountain ACEC • Little Mountain • Upper Nowood • South Brokenback • Renner (Upper and Lower) Wildlife Habitat Management Units • Medicine Lodge Wildlife Habitat Management Units • Paint Rock Area • Cooperative Management Agreement between Bureau of Land Management, Worland District, LU Sheep Company, the Wyoming Game and Fish Department, and the Wyoming State Board of Land Commissioners (LU Management Agreement) • Rattlesnake Mountain					
6045	X	X	LR:4 LR:5	Motorized vehicle use (including snowmobile use) is limited to designated roads and trails with a seasonal closure in the following areas: • Little Mountain Travel Management Plan area (9,898 acres), with a seasonal closure, currently December 1 – April 30, in accordance with the travel management plan. • Bald Ridge Area (5,739 acres), with a seasonal closure currently January 1 – April 30 in accordance with the travel management plan. • Twin Creek Trail, with a seasonal closure currently January 1 – April 30 in accordance with the travel management plan. • Carter Mountain Travel Management Plan area (10,951 acres), with a seasonal closure currently November 15 – June 15 in accordance with the travel management plan. • Medicine Lodge Wildlife Habitat Management Area (1,791 acres), with a seasonal closure currently December 1 – June 30 in accordance with the travel management plan. • Upper Renner Wildlife Habitat Management Area (9,184 acres), with a seasonal closure currently December 1 – May 31 in accordance with the travel management plan. Seasonal closure dates may be adjusted to correspond to with big game hunting seasons.					
6046	X	X	LR:4	Over-the-snow vehicles are subject to the same requirements and limitations as all other motorized vehicles until activity planning specifically addresses their use or unless precluded by other resource needs.					
6047	X	X	LR:6.3	Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent. In PHMAs and GHMAs, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.					
6048	X	X	LR:4.2 LR:4.3	Canada lynx analysis units are closed to motorized over-snow travel (Map 39).					

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
6049	X	X	LR:4	Allow off-road motorized (OHV) (and/or mechanized) vehicle use in areas with limited travel designations to allow direct access for big game retrieval and dispersed campsites, provided that: 1) no resource damage occurs, 2) no new routes are created, and 3) such access is not otherwise prohibited by the BLM authorized officer.	Prohibit off-road motorized (OHV) (and/or mechanized) vehicle use for big game retrieval or dispersed campsites in areas with limited travel designations.	Allow off-road motorized (OHV) (and/or mechanized) vehicle use in areas with limited travel designations to allow direct access for big game retrieval and dispersed campsites, provided that: 1) no resource damage occurs; 2) such access is not otherwise prohibited by the BLM authorized officer; 3) new, dispersed campsites are established on a case-by-case basis.	Allow off-road motorized (OHV) and mechanized travel up to 300 feet from established roads in areas with limited travel designations to allow direct access for big game retrieval and dispersed campsites, provided that: 1) no resource damage occurs; 2) no new routes are created; and 3) such access is not otherwise prohibited by the BLM authorized officer.	Same as Alternative B.	Same as Alternative D.
Comprehensive Travel Management									
6050	X	X	LR:4	To protect resource values, approximately 68,115 acres of BLM-administered land in the Planning Area are closed to motorized vehicle use (Map 69). Areas closed to motorized vehicle use are defined in the corresponding special designation and resource alternatives, and also include: • Owl Creek WSA, Red Butte WSA, Bobcat Draw Badlands WSA, and Sheep Mountain WSA • Paint Rock • Duck Swamp Environmental Education Area	To protect resource values, approximately 170,253 acres of BLM-administered land in the Planning Area are closed to motorized vehicle use (Map 70). Areas closed to motorized vehicle use are defined in the corresponding special designation and resource alternatives, and also include: • Cottonwood Creek Trail (also closed to mechanized use) • Five Springs Road • Pete's Canyon Trail • Spanish Point Karst ACEC • Threatened and	To protect resource values, approximately 9,274 acres of BLM-administered land in the Planning Area are closed to motorized vehicle use (Map 71). Areas closed to motorized vehicle use are defined in the corresponding special designation and resource alternatives, and also include: • Cottonwood Creek Trail (also closed to mechanized use) • Five Springs Road • Pete's Canyon Trail • Spanish Point Karst ACEC	To protect resource values, approximately 61,010 acres of BLM-administered land in the Planning Area are closed to motorized vehicle use (Map 72). Areas closed to motorized vehicle use are defined in the corresponding special designation and resource alternatives, and also include: • Owl Creek WSA, Sheep Mountain WSA, Red Butte WSA, and Bobcat Draw Badlands WSA • Paint Rock • Duck Swamp Environmental Education Area	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				• Cottonwood Creek Trail (also closed to mechanized use) • Five Springs Road • Pete's Canyon Trail • Spanish Point Karst ACEC • Threatened and endangered species habitat (14,238 acres)	endangered species habitat (14,238 acres)		• Spanish Point Karst ACEC • Cottonwood Creek Trail (also closed to mechanized use) • Five Springs Road beyond the locked gate • Pete's Canyon Trail • Lovell Shooting Range • Cody Archery Range		
6051	X	X	LR:4	To protect resource values until each route is designated as open or closed in a corresponding travel management plan, motorized vehicle use is limited to existing roads and trails on approximately 2,315,896 acres of BLM-administered land in the Planning Area (Map 69). Areas where motorized vehicle use is limited to existing roads and trails are defined in the corresponding special designation and resource alternatives, and also includes: • Gebo/Crosby Area (13,350 acres)	To protect resource values until each route is designated as open or closed in a corresponding travel management plan, motorized vehicle use is limited to existing roads and trails on approximately 592,563 acres of BLM-administered land in the Planning Area (Map 70). Areas where motorized vehicle use is limited to existing roads and trails are defined in the corresponding special designation and resource alternatives.	To protect resource values until each route is designated as open or closed in a corresponding travel management plan, motorized vehicle use is limited to existing roads and trails on approximately 2,137,574 acres of BLM-administered land in the Planning Area (Map 71). Areas where motorized vehicle use is limited to existing roads and trails are defined in the corresponding special designation and resource alternatives, and also includes: • Gebo/Crosby Area (13,350 acres)	To protect resource values until each route is designated as open or closed in a corresponding travel management plan, motorized vehicle use is limited to existing roads and trails on approximately 1,955,943 acres of BLM-administered land in the Planning Area (Map 72).	Same as Alternative B.	To protect resource values until each route is designated as open or closed in a corresponding travel management plan, motorized vehicle use is limited to existing roads and trails on approximately 1,295,072 acres of BLM-administered land in the Planning Area (Map 74).

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6052	X	X	LR:4 LR:5	To protect resource values, travel management to designate roads and trails is prioritized on approximately 797,077 acres of BLM-administered land in the Planning Area (Map 69). Areas where motorized vehicle use is limited to designated roads and trails are defined in the corresponding special designation and resource alternatives, and also include: • Areas with fragile soils	To protect resource values, travel management to designate roads and trails is prioritized on approximately 2,416,378 acres of BLM-administered land in the Planning Area (Map 70). Areas where motorized vehicle use is limited to designated roads and trails are defined in the corresponding special designation and resource alternatives, and also includes: • Gebo/Crosby Area (13,350 acres)	To protect resource values, travel management to designate roads and trails is prioritized on approximately 1,020,748 acres of BLM-administered land in the Planning Area (Map 71). Areas where motorized vehicle use is limited to designated roads and trails are defined in the corresponding special designation and resource alternatives.	To protect resource values, travel management to designate roads and trails is prioritized on approximately 1,159,557 acres of BLM-administered land in the Planning Area (Map 72). Areas where motorized vehicle use is limited to designated roads and trails are defined in the corresponding special designation and resource alternatives, and also include: • Essential and recovery habitat for threatened and endangered species • Areas over important caves or cave passages • The West Slope of the Big Horn Mountains, Canyon Creek, Middle Fork of the Powder River, Bighorn River, Newton Lake Ridge, Rivers (North and South Forks of the Shoshone River and Clarks Fork of the Yellowstone River), Beck Lake, Absaroka Mountain Foothills, and Badlands SRMAs • The Absaroka, Southern Bighorns, and Red Canyon Creek	Same as Alternative B.	To protect resource values, travel management to designate roads and trails is prioritized on approximately 1,820,427 acres of BLM-administered land in the Planning Area (Map 74). Areas where motorized vehicle use is limited to designated roads and trails are defined in the corresponding special designation and resource alternatives, and also include: • Essential and recovery habitat for threatened and endangered species • Areas over important caves or cave passages • The West Slope of the Big Horn Mountains, Canyon Creek, Middle Fork of the Powder River, Bighorn River, Newton Lake Ridge, Rivers (North and South Forks of the Shoshone River and Clarks Fork of the Yellowstone River), Beck Lake, Absaroka Mountain Foothills, and Badlands SRMAs • The Absaroka, Southern Bighorns, and Red Canyon Creek

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							ERMAs • The Cedar Mountain, Alkali Creek, Medicine Lodge, Trapper Creek, and Honeycombs WSAs • Absaroka Front Management Area • The Red Gulch Dinosaur Tracksite and Upper Owl Creek ACECs • McCullough Peaks (including McCullough Peaks WSA), Little Mountain, Rattlesnake Mountain, and Carter Mountain TMP Areas.		ERMAs • The Cedar Mountain, Alkali Creek, Medicine Lodge, Trapper Creek, and Honeycombs WSAs • Absaroka Front Management Area • The Greater Sage-Grouse PHMAs, Red Gulch Dinosaur Tracksite, and Upper Owl Creek ACECs • McCullough Peaks (including McCullough Peaks WSA), Little Mountain, Rattlesnake Mountain, and Carter Mountain TMP Areas.
6053	X	X	LR:4	Approximately 1,311 acres of BLM-administered land in the Planning Area are open to motorized vehicle use (after an activity plan is developed) (Map 69). Areas open to motorized vehicle use are: • Worland OHV Area (1,044 acres) • Hills Area near Lovell (Bentonite Hills) (42 acres) • Lovell Lakes "Motocross" area (158 acres) • Red Lakes OHV Play Area (67 acres)	Approximately 3,132 acres of BLM-administered land in the Planning Area are open to motorized vehicle use (after an activity plan is developed) (Map 70). Areas open to motorized vehicle use are: • Worland OHV Area (1,311 acres) • Basin Gardens Play Area RMZ (1,821 acres)	Approximately 14,830 acres of BLM-administered land in the Planning Area are open to motorized vehicle use (after an activity plan is developed) (Map 71). Areas open to motorized vehicle use are: • Worland OHV area (1,311 acres) • Hills area near Lovell (Bentonite Hills) (273 acres) • Lovell Lakes "Motocross" area (158 acres) • Hill climbing areas near Cowley (272 acres)	Approximately 5,885 acres of BLM-administered land in the Planning Area are open to motorized vehicle use (after an activity plan is developed) (Map 72). Areas open to motorized vehicle use are: • Worland OHV area (1,044 acres) • Basin Gardens Play Area SRMA (4,421 acres) • Hills area near Lovell (Bentonite Hills) (273 acres) • Lovell Lakes "Motocross" area (146 acres) Additional Open OHV	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
						• Diamond Basin area near Cody (unidentified area) • Red Lakes area near Cody (67 acres) • Rattlesnake Ridge SRMA (7,996 acres) • Basin Gardens Play Area ERMA (4,421 acres) • Areas near Powell and Greybull (unidentified areas) • Area near Park County Landfill (619 acres).	Areas may be pursued through R&PP leases or patent.		
				Over-Snow Travel					
6054	X	X	LR:4	Areas open to over-snow vehicle use are considered on a case-by-case basis.	In consideration of the presence of resources, areas opened through activity planning to over-snow vehicle use must have a minimum average of 12 inches of snow or be recognized as a groomed motorized trail. If these conditions do not exist then the over-land travel decisions regulate travel in the area.	Areas are open to over-snow vehicle use unless precluded by other resource needs.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6055	X	X	LR:4	No similar action.	The following areas are closed to over-snow vehicle use: • All ACECs (302,490 acres) • All lands with wilderness characteristics (476,349 acres)	Areas are closed to over-snow vehicle use on a case-by-case-basis.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Comprehensive Travel and Transportation Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					• All WSAs (141,068 acres) • All WSRs 27,317 acres) • Greater sage-grouse winter concentration Areas • Big game crucial winter ranges (1,324,371 acres) (Map 44)				

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
6000 LAND RESOURCES (LR) – Recreation									
				GOAL LR:7 Respond to distinct recreation customer demand by providing for customer realization of diverse activity, experience, and benefit opportunities. **Objectives:** **LR:7.1** Manage SRMAs for specific: visitors, affected community residents, local governments and private sector businesses, or other constituents and the communities or other places where these customers originate (recreation-tourism market). Manage ERMAs in order to address recreation use, demand or recreation and visitor services program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. **LR:7.2** Manage for outcome focused objectives, recreation setting character conditions, and the administrative, marketing, and monitoring framework. **LR:7.3** Manage subunits, also known as RMZs, within SRMAs using planning tools to establish distinct recreation niches. **LR:7.4** Manage areas outside of RMAs (i.e., not within an SRMA or ERMA) in a custodial manner so as to maintain public health and safety, use and user conflicts, and resource protection. **LR:7.5** Increase awareness understanding and a sense of stewardship in recreational activity participants so their conduct safeguards cultural and natural resources as defined by Wyoming Standards for Public Land and Health or reach specific objectives. **LR:7.6** Ensure visitors are not exposed to unhealthy or unsafe human created conditions. **LR:7.7** Manage the direct indirect and cumulative impacts so as to maintain a minimal level of user conflict. **LR:7.8** Provide public education regarding appropriate use of BLM-administered land. **LR:7.9** Coordinate with other programs to provide opportunities for public visitation, interpretation, education, and appreciation of natural and cultural resources. **LR:7.10** Provide and manage events with special recreation permits that eliminate or minimize resource impacts and user conflicts. **GOAL LR:8** Develop and maintain appropriate recreational facilities, balancing public demand, protection of public land resources, and fiscal responsibility. **Objective:** **LR:8.1** Manage and maintain recreation sites and facilities to acceptable operational standards.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
6056	X	X	LR:7.1-7.3	Areas allocated as an SRMA or RMZ will continue to allow for all recreation activity types unless otherwise specified in this RMP or subsequent activity level plan (see Appendix O).					
6057	X	X	LR:7.4-7.7	Utilize on the ground monitoring to ensure Bighorn Basin wide objectives 7.4-7.7 are achieved. Utilize the minimum necessary remedial actions to achieve the stated objective(s) in areas outside of RMAs.					
6058	X	X	LR:7.4-7.7 LR:7.10	Issue SRPs to authorize commercial, competitive, and organized recreational use. Evaluate existing BLM outfitter/guide activities for needs to establish future commercial use limitations and related policies (see Appendix O).					
6059	X	X	LR:7.4-7.7	Manage recreational use to maintain or improve wetland habitat conditions along intensively used streams and reservoirs, consistent with the Wyoming Standards for Healthy Rangelands or other guidance (see Appendix N).					

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
6000 LAND RESOURCES (LR) – Recreation									
6060		X	LR:7.6 LR:7.7 LR:7.9	Continue a withdrawal from appropriation under the mining laws in the Castle Gardens Recreation Site.					
6061	X	X	LR:7.4-7.7 LR:8	Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. In PHMAs, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development would have a net conservation gain to greater sage-grouse habitat (such as concentrating recreation, diverting use away from important habitat areas, etc.), or unless the development is required for visitor health and safety or resource protection.					
6062	X	X	LR:8	Establish new fee sites on a case-by-case basis consistent with the provisions of the Recreation Enhancement Act and as necessary to support management and maintenance of developed sites and related amenities.					
6063	X	X	LR:7.4-7.7 LR:8	Mitigate surface-disturbing and disruptive activities associated with the construction, maintenance, and use of roads, campgrounds, interpretive sites, and other recreational facilities, as described in Appendix H.					
6064	X	X	LR:7.4-7.7	Apply a 16-day campsite occupancy limit throughout the Planning Area unless modified by action through the authorized officer.					
6065	X		LR:7.1-7.9	Maintain an easement across private land for the public to access Rainbow Canyon.					
6066	X	X	LR:7.1-7.9	Retain recreational access in the Bighorn River HMP/RAMP area.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
Developed Site Management									
6067	X	X	LR:7.4-7.7 LR:7.9	Apply a NSO restriction at the time of lease offering on the following: • Fishing and hunting access areas (8,025 acres) • Five Springs Falls Campground (approximately 372 acres) • The Cody Archery Range (374 acres) • R&PP lease area for the Lovell Rod and Gun Club shooting range	Same as Alternative A, plus apply a NSO restriction on areas within ¼ mile of campgrounds, trailheads, day use areas, and similar recreational sites. At the time of APD submittal, apply a CSU stipulation (site-specific relocation) if the lease does not contain a NSO restriction under other resource management on: • Developed (and future) recreation sites, • To mapped (and	Same as Alternative A, except new sites and trails will be relocated or removed in the event leasable mineral activity cannot be sufficiently mitigated.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				(139 acres).	future) national/regional trails, • Local system trails that connect communities.				
6068	X	X	LR:7.3-7.7 LR:7.9	Prohibit surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat), in the following areas: • Fishing and hunting access (8,025 acres) • Five Springs Falls Campground (approximately 372 acres) • The Cody Archery Range (374 acres) • R&PP lease area for the Lovell Rod and Gun Club shooting range (139 acres)	Same as Alternative A.	Allow surface-disturbing activities such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat), on a case-by-case basis in the following areas: • Fishing and hunting access (8,025 acres) • Five Springs Falls Campground (approximately 372 acres) • The Cody Archery Range (374 acres) • R&PP lease area for the Lovell Rod and Gun Club shooting range (139 acres)	Allow surface-disturbing activities such as geophysical exploration, salable minerals exploration and development, and construction activities in recreational sites and trails on a case-by-case basis if the effects can be avoided, minimized and/or compensated based on site-specific analysis (including those related to development of recreation facilities or wildlife habitat). Recreational sites and trails include areas such as campgrounds, trailheads, day use areas, and river access sites.	Same as Alternative B.	Same as Alternative D.
6069	X	X	LR:7.7	No similar action.	Minimize noise and light pollution in sensitive areas (e.g., special status species habitat, developed campgrounds, and river corridors) using best available technology.	Minimize noise pollution in sensitive areas (e.g., special status species habitat, developed campgrounds, and river corridors) on a case-by-case basis using best available technology.	Minimize noise and light pollution in sensitive areas (e.g., developed campgrounds, and river corridors) on a case-by-case basis using best available technology.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6070	X	X	LR:7.4-7.7 LR:7.9	Establish interpretive areas (e.g., geological, wildlife, wild horses, cultural interpretive sites, etc.) making use of scenic overlooks, signs, and walking trails.	Unless otherwise noted, do not establish interpretive areas.	Same as Alternative A, plus include facilities and amenities such as hiking trails, picnic areas, etc.	Establish interpretive areas (e.g., geological, wildlife, wild horses, cultural interpretive sites, etc.) making use of scenic overlooks, signs, facilities and amenities, and walking trails on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
6071		X	LR:7.4-7.7	Manage portions of the town of Gebo and adjacent coal mining areas on BLM-administered land for preservation and interpretation of cultural and historic values.	Do not develop additional interpretation facilities for recreational use around the town of Gebo.	Same as Alternative A, plus include development of an interpretive road loop or roadside turnout.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
6072	X	X	LR:7.4-7.7 LR:8	Avoid surface-disturbing activities, except those related to recreation facility development and maintenance, at campgrounds, trailheads, day use areas, and similar recreational sites on a case-by-case basis.	Manage areas within ¼ mile of campgrounds, trailheads, day use areas, and similar recreational sites as ROW avoidance areas, except those related to recreation facility development and maintenance.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
				Recreation and Visitor Services Overview (Additional management of SRMAs can be found in Appendix O)					
6073	X	X	LR:7.1-7.3	The 1988 Washakie Resource Area RMP (BLM 1988a), the 1998 Grass Creek Resource Area RMP (BLM 1998a), and the 1990 Cody Resource Area RMP (BLM 1990) recognized seven areas to be managed as SRMAs (Map 75): • Absaroka Foothills SRMA (72,130 acres) • Badlands SRMA	Same as Alternative A, excluding Worland Caves SRMA and Historic Trails SRMA, and with the following additions (Map 76): **Badlands SRMA** (220,687 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions	Administratively recognize the following area to be managed as an SRMA (Map 77): **Rattlesnake Ridge SRMA** (7,996 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Appendix O).	Administratively recognize the following areas to be managed as SRMAs (Map 78): **Absaroka Mountain Foothills SRMA** (42,615 acres) – Manage for an undeveloped recreation strategy for the protection of the recreation outcomes and setting prescriptions	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				(213,981 acres) • Bighorn River SRMA (15,256 acres) • West Slope SRMA (375,888 acres) • The Rivers SRMA (18,247 acres) • Historic Trails SRMA (12,065 acres) • Worland Caves SRMA	(Appendix O). The Badlands SRMA will include the following RMZs: • Tour de Badlands (122,616 acres) • Wild Badlands (51,158 acres) • Tatman Mountain (46,912 acres) **West Slope SRMA** (276,538 acres for WFO, 129,771 acres for CYFO) – Manage for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Appendix O). The West Slope SRMA will include the following RMZs: • Trapper Creek (83,806 acres) • Paint Rock (45,017 acres) • Brokenback/Logging Road (63,725 acres) • South Bighorns (83,991 acres) **Canyon Creek SRMA** (3,677 acres) – Manage for a community strategy for the protection of the recreation outcomes and setting prescriptions (Appendix O). **Red Canyon Creek SRMA** (8,435 acres) – Manage for a community recreation strategy for the protection		(Appendix O). **Badlands SRMA** (211,561 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). The Badlands SRMA will include the following RMZs: • Tour de Badlands (111,051 acres) • Wild Badlands (51,155 acres) • Tatman Mountain (49,354 acres) **Bighorn River SRMA** (2,496 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). **West Slope SRMA** (129,766 acres in CYFO) – Manage for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). **Rivers SRMA** (6,047acres) – Manage for a destination recreation strategy for the protection of the recreation outcomes and setting		

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					of the recreation outcomes and setting prescriptions (Appendix O). **Horse Pasture SRMA** (144 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Appendix O). **McCullough Peaks SRMA** (160,838 acres) – Manage for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Appendix O). **Basin Garden SRMA** (19,771 acres) – Manage for community recreation for the protection of the recreation outcomes and setting (Appendix O). Basin Garden SRMA will include the following RMZs: • Basin Gardens Play Area (1,821 acres) • Basin Gardens (17,949 acres) **Beck Lake SRMA** (6,483 acres for CYFO) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Appendix O). **Newton Lake Ridge SRMA** 1,997 acres for CYFO) – Manage for a community		prescriptions (Map 78) (Appendix O). **McCullough Peaks SRMA** (160,838 acres) – Manage for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). **Basin Gardens Play Area SRMA** (4,421 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). **Canyon Creek SRMA** (3,675 acres) – Manage for a community strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). **Horse Pasture SRMA** (144 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). **Middle Fork of the Powder River SRMA** (14,644 acres) – Manage for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map		

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					recreation strategy for the protection of the recreation outcomes and setting prescriptions (Appendix O).		78) (Appendix O). **West Slope SRMA** (190,928 acres in WFO) – Manage for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). The West Slope of the Bighorns SRMA will include the following RMZs: • Canyons RMZ (141,603 acres) • Brokenback/Logging Road RMZ (49,325 acres) **Beck Lake SRMA** (6,473 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). **Newton Lake Ridge SRMA** (1,949 acres) – Manage for a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O). Additional Recreation Management prescriptions for each SRMA/RMZ appear in Appendix O.		

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6074	X	X	LR:7.3-7.10	The 1988 Washakie Resource Area RMP, the 1998 Grass Creek Resource Area RMP, and the 1990 Cody Resource Area RMP identified 2,390,282 acres not to be designated as RMAs.	Identify the following area as an ERMA: **Worland Caves ERMA** – Manage cave and karst resources under a specific caves and karst ERMA. BLM lands not managed under ERMA or SRMA objectives are not designated as RMAs and are managed under other multiple-use objectives.	Identify the following areas as ERMAs: • Basin Gardens ERMA (15,349 acres) • Basin Gardens Play Area ERMA (4,421acres) BLM lands not managed under ERMA or SRMA objectives are not designated as RMAs and are managed under other multiple-use objectives.	Identify the following areas as ERMAs: • Absaroka ERMA (28,998 acres) • Bighorn River ERMA (1,522 acres) • Rattlesnake Ridge ERMA (7,982 acres) • Red Canyon Creek ERMA (8,435 acres) • Southern Bighorns ERMA (69,325 acres) BLM lands not managed under ERMA or SRMA objectives are not designated as RMAs and are managed under other multiple-use objectives.	Same as Alternative B.	Same as Alternative D.
Absaroka Foothills Area									
6075		X	LR:7.1-7.3	Manage the Absaroka foothills as an SRMA (72,130 acres). The Owl Creek WSA and the Upper Owl Creek ACEC are contained within the Absaroka Foothills SRMA. See the WSA and ACEC sections for management prescriptions.	Manage the Absaroka foothills as an SRMA (72,130 acres) with a destination recreation strategy responsive to, but not restricted to, recreationists and tourists.	Do not manage the Absaroka foothills area as an RMA.	Manage 42,615 acres of the Absaroka foothills as the Absaroka Mountain Foothills SRMA with an undeveloped recreation strategy, and manage 26,846 acres as the Absaroka ERMA.	Same as Alternative B.	Same as Alternative D.
6076		X	LR:7.1-7.7	Manage the Absaroka Foothills SRMA to maximize primitive recreational experiences.	Manage the Absaroka Foothills SRMA for nonmotorized recreationists to engage in hiking, wildlife viewing, and nature viewing so that they realize a "moderate" level of the targeted experience and benefit	Manage the Absaroka foothills to address use and user conflicts, public health and safety, and resource protection.	Manage the Absaroka Mountain Foothills SRMA the same as Alternative B. Manage the Absaroka ERMA to address resource protection, use and user conflicts, and public health and safety. Manage for desired	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					outcomes listed in Appendix O.		recreation setting character conditions, experiences, and benefits as listed in Appendix O.		
6077		X	LR:7.1-7.7	Apply a NSO restriction on portions of the Absaroka Foothills SRMA.	Apply a NSO restriction on the Absaroka Foothills SRMA.	The Absaroka foothills area is open to mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Absaroka Mountain Foothills SRMA and Absaroka ERMA.	Same as Alternative B.	Same as Alternative D.
6078		X	LR:7.1-7.7	Allow surface-disturbing activities in the Absaroka Foothills SRMA such as geophysical exploration, salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Close Absaroka Foothills SRMA to surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Absaroka foothills such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Outside of the Absaroka Front Management Area, allow surface-disturbing activities in the Absaroka Mountain Foothills SRMA and Absaroka ERMA such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
6079		X	LR:7.1-7.7	Co-locate ROW authorizations whenever possible in the Absaroka Foothills SRMA.	Manage the Absaroka Foothills SRMA as a ROW avoidance area except to provide access to private property or to accommodate a demonstrated need. Evaluate existing ROW on a case-by-case-basis at renewal.	The Absaroka foothills area is open to ROW authorizations.	Manage the Absaroka Mountain Foothills SRMA and the Absaroka ERMA as ROW avoidance areas, except to accommodate a demonstrated need if the effects can be adequately mitigated. Evaluate existing ROW on a case-by-case-basis at renewal.	Same as Alternative B.	Same as Alternative D.
6080		X	LR:7.1-7.7	The Absaroka Foothills SRMA is open to renewable energy development.	Manage the Absaroka Foothills SRMA as a renewable energy avoidance area.	The Absaroka foothills area is open to renewable energy development.	Manage the Absaroka Mountain Foothills SRMA and the Absaroka ERMA as renewable energy avoidance areas.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6081		X	LR:7.1-7.7	Manage the Absaroka Foothills SRMA as VRM Classes II, III, and IV.	Manage the Absaroka Foothills SRMA as VRM Class II.	Manage the Absaroka foothills as VRM Classes II, III, and IV.	Manage the Absaroka Foothills SRMA as VRM Class II. Manage VRM in the Absaroka ERMA consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6082		X	LR:7.1-7.7	Motorized vehicle use is limited to designated roads and trails in the Absaroka Foothills SRMA.	Motorized vehicle use is limited to designated roads and trails in the Absaroka Foothills SRMA. Identify lands within the SRMA as closed to motorized vehicle use.	Motorized vehicle use is limited to existing roads and trails in the Absaroka foothills.	Motorized vehicle use is limited to designated roads and trails in the Absaroka Mountain Foothills SRMA and the Absaroka ERMA.	Same as Alternative B.	Same as Alternative D.
Bighorn River Area									
6083	X	X	LR:7.1-7.9	Manage the Bighorn River area as an SRMA (15,256 acres).	Manage the Bighorn River area as an SRMA (15,113 acres) with a community recreation strategy responsive to, but not restricted to, local area residents and their guests.	Do not manage the Bighorn River area as an RMA.	Manage the Bighorn River area within the CYFO as the Bighorn River SRMA (2,496 acres), with a recreation strategy the same as Alternative B. Manage the Bighorn River area within the WFO as an ERMA.	Same as Alternative B.	Same as Alternative D.
6084	X	X	LR:7.1-7.7	Manage the Bighorn River SRMA to maximize river related recreational opportunities.	Manage the Bighorn River SRMA for river recreation use for visitors to engage in sightseeing, hunting, photography, fishing, and floating so that they report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Bighorn River area to address use and user conflicts, public health and safety, and resource protection.	Manage the Bighorn River SRMA the same as Alternative B. Manage the Bighorn River ERMA to address use and user conflicts, public health and safety, resource protection, and to achieve the desired recreation setting character conditions as listed in Appendix O.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6085	X	X	LR:7.1-7.9 LR:8.1	Manage recreational uses of lands along the Bighorn River for fishing, and float boating under the Bighorn River HMP/RAMP. Place emphasis on acquisition of access to public lands on the Bighorn and Greybull rivers to enhance recreational opportunities and wildlife management.	Same as Alternative A, plus include coordination with other land uses and resources.	Manage lands along the Bighorn River for habitat, river heath, and wildlife resources under the Bighorn River HMP/RAMP, including coordination with other land uses and resources.	Same as Alternative C, plus include the Eggert Tract and any additional river tracts acquired over the life of the plan.	Same as Alternative B.	Same as Alternative D.
6086	X	X	LR:7.1-7.9	Consider the acquisition of legal and/or physical access for hunting, fishing, boating, and camping in the Bighorn River SRMA. Areas to be considered for acquisition include: • Basin Bridge • Dry Bear Creek • Heron West • Kane East • Kane West • Lovell Draw • Manderson Bridge • Perkins Bottom-East • Rairden Bridge • Red Bluff View • Red Rim Meadows-South • Sheep Mountain West • South Flat Bridge • Stucco South	Same as Alternative A.	Consider public access for recreational uses to address use and user conflicts, public health and safety, and resource protection in the Bighorn River area.	Manage the Bighorn River SRMA and the Bighorn River ERMA the same as Alternative A.	Same as Alternative B.	Same as Alternative D.
6087	X	X	LR:7.1-7.9	Apply a NSO restriction on lands within the Bighorn River SRMA.	Same as Alternative A.	The Bighorn River area is open to mineral leasing subject to standard protection measures.	Apply a NSO restriction on lands within the Bighorn River SRMA and the Bighorn River ERMA.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6088	X	X	LR:7.1-7.9	Manage the Bighorn River SRMA as a ROW avoidance area. Co-locate ROW whenever possible.	Manage the Bighorn River SRMA as a ROW exclusion area.	The Bighorn River area is open to new ROW authorizations.	Manage the Bighorn River SRMA and the Bighorn River ERMA as ROW avoidance areas. Co-locate ROW whenever possible.	Same as Alternative B.	Same as Alternative D.
6089	X	X	LR:7.1-7.9	Close the Bighorn River SMRA to surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Close the Bighorn River SRMA to surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Bighorn River area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities within the Bighorn River SRMA and the Bighorn River ERMA such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis if the effects can be avoided, minimized and/or compensated based on site-specific analysis.	Same as Alternative B.	Same as Alternative D.
6090	X	X	LR:7.1-7.7	The Bighorn River SRMA is open to renewable energy development.	Manage the Bighorn River SRMA as a renewable energy exclusion area.	The Bighorn River area is open to renewable energy development.	Manage the Bighorn River SRMA and the Bighorn River ERMA as renewable energy avoidance areas.	Same as Alternative B.	Same as Alternative D.
6091		X	LR:7.1-7.9	Manage the Bighorn River SRMA as VRM Classes II and III.	Manage the Bighorn River SRMA as VRM Class II.	Same as Alternative A.	Manage VRM in the Bighorn River ERMA consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6092	X		LR:7.1-7.9	Manage the Bighorn River SRMA as VRM Classes II, III, and IV.	Manage the Bighorn River SRMA as VRM Class II.	Same as Alternative A.	Manage the Bighorn River SRMA as VRM Class II.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
6000 LAND RESOURCES (LR) – Recreation									
6093	X	X	LR:7.1-7.9	Motorized vehicle use is limited to designated and existing roads and trails in the Bighorn River SRMA.	Motorized vehicle use is limited to designated roads and trails in the Bighorn River SRMA.	Motorized vehicle use is limited to existing roads and trails in the Bighorn River area.	Manage the Bighorn River SRMA the same as Alternative B. Manage motorized vehicle use in the Bighorn River ERMA consistent with underlying resources.	Same as Alternative B.	Same as Alternative D.
Badlands – Tour de Badlands Area									
6094		X	LR:7.1-7.7	The Tour de Badlands area is contained within the Badlands SRMA.	Manage the Tour de Badlands area as an RMZ (122,616 acres) within the Badlands SRMA (220,687 acres).	Do not manage the Tour de Badlands area as an RMA.	Manage the Tour de Badlands area as an RMZ (111,051 acres) within the Badlands SRMA (221,561 acres).	Same as Alternative B.	Same as Alternative D.
6095		X	LR:7.1-7.7	Manage the Tour de Badlands area to maximize recreational opportunities such as sightseeing, hiking, and scenic driving.	Manage the Tour de Badlands RMZ for motorized recreationists to engage in motorized sightseeing, touring, wildlife viewing, and nature viewing so that affected community residents report realizing a "moderate" level of recreation experience and benefit from outcomes listed in Appendix O.	Manage the Tour de Badlands area to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6096		X	LR:7.1-7.9	Develop one or more scenic interpretive sites and driving loops in the Tour de Badlands area within the Badlands SRMA to highlight the area's scenic values. These could involve the Fifteenmile Creek and Dorsey Creek roads and the Murphy Draw Road with overlooks at the Painted Canyon of Elk Creek and at Bobcat Draw.	Same as Alternative A, except provide for additional interpretive areas in the Tour de Badlands RMZ on a case-by-case basis.	Develop recreation facilities (i.e., trailheads, trails, etc.) in the Tour de Badlands area only to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6097		X	LR:7.1-7.7	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning.	Apply a NSO restriction on the Tour de Badlands RMZ.	The Tour de Badlands area is open to mineral leasing subject to standard protection measures.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6098		X	LR:7.1-7.7	Allow surface-disturbing activities in the Tour de Badlands area such as geophysical exploration, salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the Tour de Badlands RMZ such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Tour de Badlands area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the Tour de Badlands RMZ such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat), on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
6099		X	LR:7.1-7.7	Co-locate ROW whenever possible in the Tour de Badlands area.	Manage the Tour de Badlands RMZ as a ROW avoidance area.	The Tour de Badlands area is open to ROW authorizations.	Manage the Tour de Badlands RMZ as a ROW avoidance area and co-locate ROWs whenever possible.	Same as Alternative B.	Same as Alternative D.
6100		X	LR:7.1-7.7	The Tour de Badlands area is open to renewable energy development.	Manage the Tour de Badlands RMZ as a renewable energy avoidance area.	The Tour de Badlands area is open to renewable energy development.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6101		X	LR:7.1-7.7	Manage the Tour de Badlands area as VRM Classes II, III, and IV.	Manage the Tour de Badlands RMZ as VRM Class II.	Same as Alternative A.	Manage VRM in the Tour de Badlands RMZ consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6102		X	LR:7.1-7.7	Motorized vehicle use is limited to existing roads and trails in the Tour de Badlands area.	Motorized vehicle use is limited to designated roads and trails in the Tour de Badlands RMZ.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Badlands – Wild Badlands Area									
6103		X	LR:7.1-7.7	The Wild Badlands area is contained within the Badlands SRMA and managed under the authority of BLM Manual 6330, *Management of Wilderness Study Areas*. All lands within the Wild Badlands are Bobcat Draw Badlands, Sheep Mountain, and Red Butte WSAs. See WSA section for management prescriptions.	Manage the Wild Badlands area as an RMZ (51,158 acres) within the Badlands SRMA.	Do not manage the Wild Badlands area as an RMA. All lands within the Wild Badlands area will continue to be managed under BLM Manual 6330. See WSA section for management prescriptions.	Manage the Wild Badlands area as an RMZ (51,155 acres) within the Badlands SRMA.	Same as Alternative B.	Same as Alternative D.
6104		X	LR:7.1-7.4	Manage the Wild Badlands area for naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation. See WSA section for management prescriptions.	Manage the Wild Badlands RMZ exclusively for nonmotorized recreation opportunities, such as hiking, wildlife viewing, and nature viewing so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O. See WSA section for management prescriptions.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Badlands – Tatman Mountain Area									
6105		X	LR:7.1-7.9	The Tatman Mountain area is contained within the Badlands SRMA.	Manage the Tatman Mountain area as an RMZ (46,912 acres within the Badlands SRMA).	Do not manage the Tatman area as an RMA.	Manage the Tatman Mountain area as an RMZ (49,354 acres) within the Badlands SRMA.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6106		X	LR:7.1-7.9	Manage the Tatman Mountain area to maximize recreational opportunities such as sightseeing, hiking, and driving for pleasure.	Manage the Tatman Mountain RMZ for nonmotorized recreation opportunities such as hiking, mountain biking, and nature viewing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Tatman Mountain area to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6107		X	LR:7.1-7.9	Emphasize opportunities for recreational access to the Tatman Mountain area.	Same as Alternative A.	Opportunities for recreational access in the Tatman Mountain area will only be to address use and user conflicts, public health and safety, or resource protection.	Emphasize opportunities for recreational access to the Tatman Mountain RMZ.	Same as Alternative A.	Same as Alternative D.
6108		X	LR:7.1-7.9	Consider the acquisition of legal and/or physical access for recreational opportunities in the Tatman Mountain area.	Acquire legal and physical access to maximize recreational opportunities in the Tatman Mountain RMZ.	Acquisition of legal and/or physical access in the Tatman Mountain area will only be to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6109		X	LR:7.1-7.9	Review mineral leases in the Tatman Mountain area on a case-by-case basis and apply mitigation through activity level planning.	Apply a NSO restriction on the Tatman Mountain RMZ.	The Tatman Mountain area is open to mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Tatman Mountain RMZ.	Same as Alternative B.	Same as Alternative D.
6110		X	LR:7.1-7.9	Allow surface-disturbing activities in the Tatman Mountain area such as geophysical exploration, salable minerals exploration and development, and construction activities (except those related to development of recreation	Prohibit surface-disturbing activities in the Tatman Mountain RMZ such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities	Allow surface-disturbing activities in the Tatman Mountain area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities	Allow surface-disturbing activities in the Tatman Mountain RMZ, such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				facilities or wildlife habitat) on a case-by-case basis.	(except those related to development of recreation facilities or wildlife habitat).	(including those related to development of recreation facilities or wildlife).	development of recreation facilities or wildlife habitat), on a case-by-case basis.		
6111		X	LR:7.1-7.9	Co-locate ROW whenever possible in the Tatman Mountain area.	Manage the Tatman Mountain RMZ as a ROW avoidance area.	The Tatman Mountain area is to open ROW authorizations.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6112		X	LR:7.1-7.9	The Tatman Mountain area is open to renewable energy development.	Manage the Tatman Mountain RMZ as a renewable energy avoidance area.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6113		X	LR:7.1-7.9	Manage the Tatman Mountain area as VRM Classes III and IV.	Manage the Tatman Mountain RMZ as VRM Class II.	Same as Alternative A.	Manage VRM in the Tatman Mountain RMZ consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6114		X	LR:7.1-7.9	Motorized vehicle use is limited to existing roads and trails in the Tatman Mountain area.	Motorized vehicle use is limited to designated roads and trails in the Tatman Mountain RMZ.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
West Slope of the Bighorns Area Cody Field Office									
6115	X		LR:7.1-7.3	Manage the West Slope of the Bighorns as the West Slope SRMA (375,888 acres). Five Springs Falls and Little Mountain ACECs are contained within the West Slope SRMA. Please refer to the ACEC section for management prescriptions.	Manage the West Slope SRMA (406,309 acres) for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 76) (Appendix O).	Do not manage the West Slope of the Bighorns area as an RMA.	Manage the West Slope SRMA (320,704 acres) for a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O).	Same as Alternative B.	Same as Alternative D.
6116	X		LR:7.1-7.3	Manage the West Slope SRMA for motorized and nonmotorized dispersed recreation.	Manage the West Slope SRMA for motorized and nonmotorized recreation opportunities such as hunting, hiking, horseback riding, wildlife viewing, and nature viewing so that recreationists report	Manage the West Slope of the Bighorns to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.				
6117	X		LR:7.1-7.9	Develop a recreation site at Rainbow Canyon in the West Slope SRMA.	Do not develop a recreation site at Rainbow Canyon in the West Slope SRMA.	Same as Alternative A, plus include amenities such as an access road, parking, trail, and interpretive signs at Rainbow Canyon in the West Slope of the Bighorns area.	Same as Alternative A, plus include amenities such as an access road, parking, trail, and interpretive signs at Rainbow Canyon in the West Slope SRMA.	Same as Alternative B.	Same as Alternative D.
6118	X		LR:7.1-7.9	Install additional directional and interpretive signs to facilitate recreational use of the West Slope SRMA.	Same as Alternative A.	Do not install interpretive signs in the West Slope of the Bighorns area. Install directional signs.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
6119	X		LR:7.1-7.7	Allow surface-disturbing activities in the West Slope SRMA such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the West Slope SRMA such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the West Slope of the Bighorns area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the West Slope SRMA such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Same as Alternative B.	Same as Alternative D.
6120	X		LR:7.1-7.7	The West Slope SRMA is open to renewable energy development.	Manage the West Slope SRMA as a renewable energy avoidance area.	The West Slope of the Bighorns area is open to renewable energy development.	The West Slope SRMA is open to renewable energy development	Same as Alternative B.	Same as Alternative D.
6121	X		LR:7.1-7.9	Manage the West Slope SRMA as VRM Classes II, III, and IV.	Manage the West Slope SRMA as VRM Class II.	Same as Alternative A.	Manage the West Slope SRMA as VRM Classes II and III.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6122	X		LR:7.1-7.9	Motorized vehicle use is limited to designated roads and trails in the West Slope SRMA.	Motorized vehicle use is limited to designated roads and trails in the West Slope SRMA.	Motorized vehicle use is limited to existing roads and trails in the West Slope of the Bighorns area.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
West Slope of the Bighorns Worland Field Office – Trapper Creek Area									
6123		X	LR:7.1-7.9	The Trapper Creek area (which includes Trapper Creek and Alkali Creek WSAs, and Spanish Point Karst ACEC) is contained within the West Slope SRMA. See the WSA and ACEC sections for management prescriptions.	Manage the Trapper Creek area as an RMZ (83,806 acres) contained within the West Slope SRMA.	Do not manage the Trapper Creek area as an RMA.	Manage the Trapper Creek area as part of the Canyons RMZ (141,603 acres) contained within the West Slope of the Bighorns SRMA (320,704 acres in WFO).	Same as Alternative B.	Same as Alternative D.
6124		X	LR:7.1-7.9	Manage the Trapper Creek area for motorized and nonmotorized dispersed recreation.	Manage the Trapper Creek RMZ for motorized and nonmotorized recreation opportunities such as hiking, wildlife viewing, nature viewing, and driving for pleasure so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Trapper Creek area to address use and user conflicts, public health and safety, and resource protection.	Manage the Trapper Creek area of the Canyons RMZ for motorized and non-motorized recreation opportunities such as hiking, wildlife viewing, nature viewing, and driving for pleasure so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Same as Alternative B.	Same as Alternative D.
6125		X	LR:7.1-7.9	Consider the acquisition of legal and/or physical access for hunting, fishing, and camping. Consider acquiring areas such as Horse Mountain, Trapper Creek, and White Creek.	Same as Alternative A, plus acquire legal public access for motorized and/or mechanized vehicle use in the Trapper Creek RMZ.	Acquisition of legal and/or physical access in the Trapper Creek area will only be to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative A, plus acquire legal public access for motorized and/or mechanized vehicle use in the Trapper Creek area of the Canyons RMZ.	Same as Alternative B.	Same as Alternative D.
6126		X	LR:7.1-7.9 LR:8.1	Develop facilities necessary for site protection and visitor management at the	Same as Alternative A, plus develop the following facilities in the Trapper	Facility development to maximize recreational opportunities in the	Same as Alternative A, plus develop the following facilities in the Trapper	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				trailhead in the Trapper Creek area. Facilities may include fire rings, comfort stations, fencing, parking areas, road improvements and vehicle barriers, and trail and bridge repair, depending on the needs of the specific site.	Creek RMZ: • Trailheads for White Creek, Black Mountain areas. • Trailheads to accommodate mountain bike users. • Pull-offs along the Red Gulch/Alkali Road National Back Country Byway. • Designate motorized touring loops within the Trapper Creek RMZ, as well as connecting with the Paint Rock RMZ and the Bighorn National Forest, which may include new construction. • Other sites will be determined on a case-by-case basis.	Trapper Creek area will be a low priority. Facility development will only be to address use and user conflicts, public health and safety, or resource protection.	Creek area of the Canyons RMZ: • Trailheads for White Creek, Black Mountain areas. • Trailheads to accommodate mountain bike users. • Pull-offs along the Red Gulch/Alkali Road National Back Country Byway. • Designate motorized touring loops within the Trapper Creek area, as well as connecting with the Paint Rock area and the Bighorn National Forest, which may include new construction. • Other sites will be determined on a case-by-case basis.		
6127		X	LR:7.1-7.9	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the Trapper Creek area.	Apply a NSO restriction on the Trapper Creek RMZ.	The Trapper Creek area is open to mineral leasing subject to standard protection measures, with the exception of Trapper Creek WSA, and Spanish Point ACEC.	Apply a CSU stipulation on the Trapper Creek area of the Canyons RMZ.	Same as Alternative B.	Same as Alternative D.
6128		X	LR:7.1-7.9	Allow surface-disturbing activities in the Trapper Creek area such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to	Prohibit surface-disturbing activities in the Trapper Creek RMZ such as geophysical exploration (except casual use), salable minerals exploration and development, and	Allow surface-disturbing activities in the Trapper Creek area such as geophysical exploration (including casual use), salable minerals exploration and development, and	Allow surface-disturbing activities in the Trapper Creek area of the Canyons RMZ such as geophysical exploration, salable minerals exploration and development, and construction activities	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				development of recreation facilities or wildlife habitat) on a case-by-case basis.	construction activities (except those related to development of recreation facilities or wildlife habitat).	construction activities (including those related to development of recreation facilities or wildlife), except in the Trapper Creek WSA.	(including those related to development of recreation facilities or wildlife habitat) if the effects can be avoided, minimized and/or compensated based on site-specific analysis.		
6129		X	LR:7.1-7.7	Manage lands within the Trapper Creek area as ROW avoidance areas. Co-locate ROW whenever possible.	Manage the Trapper Creek RMZ as a ROW avoidance area.	The Trapper Creek area is open to ROW authorizations.	Manage the Trapper Creek area of the Canyons RMZ as a ROW avoidance area.	Same as Alternative B.	Same as Alternative D.
6130		X	LR:7.1-7.7	The Trapper Creek area is open to renewable energy development.	Manage the Trapper Creek RMZ as a renewable energy avoidance area.	Same as Alternative A.	Manage the Trapper Creek area of the Canyons RMZ as a renewable energy avoidance area.	Same as Alternative B.	Same as Alternative D.
6131		X	LR:7.1-7.7	Manage the Trapper Creek area as VRM Classes II, III, and IV.	Manage the Trapper Creek RMZ as VRM Class II.	Same as Alternative A.	Manage the Trapper Creek area of the Canyons RMZ area as VRM Classes I, II, and III.	Same as Alternative B.	Same as Alternative D.
6132		X	LR:7.1-7.7	Motorized vehicle use is limited to designated roads and trails in the Trapper Creek area.	Motorized vehicle use is limited to designated roads and trails in the Trapper Creek RMZ.	Same as Alternative A.	Motorized vehicle use is limited to designated roads and trails in the Trapper Creek area of the Canyons RMZ.	Same as Alternative B.	Same as Alternative D.
West Slope of the Bighorns Worland Field Office – Paint Rock Area									
6133		X	LR:7.1-7.9	The Paint Rock area is contained within the West Slope SRMA. Medicine Lodge WSA and the Spanish Point Karst ACEC are contained within this area. See WSA and ACEC sections for management prescriptions.	Manage the Paint Rock area (45,017 acres) as an RMZ contained within the West Slope SRMA.	Do not manage the Paint Rock area as an RMA.	Manage the Paint Rock area as part of the Canyons RMZ (141,603 acres) contained within the West Slope of the Bighorns SRMA.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6134		X	LR:7.1-7.9	Manage the Paint Rock area for motorized and nonmotorized dispersed recreation.	Manage the Paint Rock RMZ for motorized and nonmotorized recreation opportunities to engage in hiking, wildlife viewing, nature viewing, and driving for pleasure so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Paint Rock area to address use and user conflicts, public health and safety, and resource protection.	Manage the Paint Rock area of the Canyons RMZ for motorized and nonmotorized recreation opportunities to engage in hiking, wildlife viewing, nature viewing, and driving for pleasure so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Same as Alternative B.	Same as Alternative D.
6135		X	LR:7.1-7.9	Emphasize opportunities for recreational access, especially in the Laddie Creek and Paint Rock Creek areas.	Same as Alternative A, plus pursue yearlong access to the Paint Rock canyon via the Paint Rock Trail in the Paint Rock RMZ.	Opportunities for recreational access in the Paint Rock area will only be to address use and user conflicts, public health and safety, or resource protection.	Emphasize opportunities for recreational access, especially in the Laddie Creek and Paint Rock Creek areas and pursue yearlong access to the Paint Rock canyon via the Paint Rock Trail in the Paint Rock area of the Canyons RMZ.	Same as Alternative B.	Same as Alternative D.
6136		X	LR:7.1-7.9 LR:8.1	Develop facilities necessary for site protection and visitor management at the trailheads on Paint Rock Creek and Medicine Lodge Creek in the Paint Rock area. Facilities may include fire rings, comfort stations, fencing, parking areas, road improvements and vehicle barriers, and trail and bridge repair, depending on the needs of the specific site.	Develop facilities to enhance recreation and visitor services for the following areas in the Paint Rock RMZ: • Trailheads/pull-offs along the Red Gulch/Alkali Road National Back Country Byway. • Upgrade Access route and Trailhead at the Lone Tree Trail. • Trailhead at the Wapati Ridge.	Facility development to maximize recreational opportunities in the Paint Rock area will be a low priority. Facility development will only be to address use and user conflicts, public health and safety, or resource protection.	Develop facilities to enhance recreation and visitor services for the following areas in the Paint Rock area of the Canyons RMZ: • Trailheads/pull-offs along the Red Gulch/Alkali Road National Back Country Byway. • Upgrade Access route and Trailhead at the Lone Tree Trail. • Designate motorized touring loops	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					• Hiking trails in Wet and Dry Medicine Lodge Canyons. • Designate motorized touring loops connecting with the Bighorn National Forest, the Trapper Creek RMZ, and the Brokenback/Logging Road RMZ, which may include new construction. • Other sites will be determined on a case-by-case basis.		connecting with the Bighorn National Forest, the Trapper Creek area, and the Brokenback/Logging Road RMZ, which may include new construction. • Other sites, trailheads, and trails will be determined on a case-by-case basis.		
6137		X	LR:7.1-7.9	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the Paint Rock area.	Apply a NSO restriction on the Paint Rock RMZ.	The Paint Rock area will be open to mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Paint Rock area of the Canyons RMZ.	Same as Alternative B.	Same as Alternative D.
6138		X	LR:7.1-7.9	Allow surface-disturbing activities in the Paint Rock area such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the Paint Rock RMZ such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Paint Rock area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the Paint Rock area of the Canyons RMZ such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) if the effects can be avoided, minimized and/or compensated based on site-specific analysis.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6139		X	LR:7.1-7.7	Manage the Paint Rock area as a ROW avoidance area. Co-locate ROW authorizations whenever possible.	Manage the Paint Rock RMZ as a ROW avoidance area.	The Paint Rock area is open to ROW authorizations, with the exception of the Medicine Lodge WSA.	Manage the Paint Rock area of the Canyons RMZ as a ROW avoidance area.	Same as Alternative B.	Same as Alternative D.
6140		X	LR:7.1-7.7	The Paint Rock area is open to renewable energy development.	Manage the Paint Rock RMZ as a renewable energy avoidance area.	The Paint Rock area, with the exception of the Medicine Lodge WSA and the Spanish Point ACEC, is open to renewable energy development.	Manage the Paint Rock area of the Canyons RMZ as a renewable energy avoidance area.	Same as Alternative B.	Same as Alternative D.
6141		X	LR:7.1-7.7	Manage the Paint Rock area as VRM Classes II, III, and IV.	Manage the Paint Rock RMZ as VRM Class II.	Same as Alternative A.	Manage the Paint Rock area of the Canyons RMZ as VRM Class I and II.	Same as Alternative B.	Same as Alternative D.
6142		X	LR:7.1-7.7	Motorized vehicle use is limited to designated roads and trails in the Paint Rock area. Continue to implement travel management plans in the Paint Rock area.	Motorized vehicle use is limited to designated roads and trails in the Paint Rock RMZ.	Motorized vehicle use is limited to existing roads and trails in the Paint Rock area. Maintain implemented travel management plans.	Motorized vehicle use is limited to designated roads and trails in the Paint Rock area of the Canyons RMZ.	Same as Alternative B.	Same as Alternative D.
West Slope of the Bighorns Worland Field Office – Brokenback/Logging Road Area									
6143		X	LR:7.1-7.9	The Brokenback/Logging Road area is contained within the West Slope SRMA.	Manage Brokenback/ Logging Road as an RMZ (63,725 acres) contained within the West Slope SRMA.	Do not manage the Brokenback/Logging Road area as an RMA.	Manage Brokenback/ Logging Road as an RMZ (49,325 acres) contained within the West Slope of the Bighorns SRMA.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6144		X	LR:7.1-7.9	Manage the Brokenback/ Logging Road area for motorized and nonmotorized dispersed recreation.	Manage the Brokenback/ Logging Road RMZ for motorized and nonmotorized recreation opportunities such as hiking, wildlife viewing, nature viewing, and driving for pleasure so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Brokenback/ Logging Road area to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6145		X	LR:7.1-7.9	Emphasize opportunities for recreational access, especially in the Laddie Creek areas of the Brokenback/Logging Road area.	Same as Alternative A, also including additional areas within the Brokenback/Logging Road RMZ to be determined on a case-by-case basis.	Opportunities for recreational access in the Brokenback/Logging Road area will only be to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6146		X	LR:7.1-7.9	Consider the acquisition of legal and/or physical access for hunting, fishing, boating, and camping in the Brokenback/Logging Road area. Consider areas for acquisition including North and South Brokenback Creek.	Same as Alternative A, with the following additions in the Brokenback/Logging Road RMZ: • Luman Creek Road. • Military Creek Road. • Dorn Draw Road. • Other sites will be determined on a case-by-case basis.	Acquisition of legal and/or physical access in the Brokenback/Logging Road area will only be to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6147		X	LR:7.1-7.9 LR:8.1	Develop facilities necessary for site protection and visitor management in the Brokenback/Logging Road area.	Develop facilities to enhance recreation and visitor services for the following areas in the Brokenback/Logging Road RMZ: • Trailheads for North and South Brokenback areas, Laddie Creek, and the Hyattville Logging Road Back Country Byway. • Pull-outs along the Hyattville Logging Road Back Country Byway. • Improve Salt Lick Trail and trailhead. • Construct additional trailheads and trails. • Designate motorized touring loops within the Brokenback/Logging road RMZ as well as connecting with the Paint Rock RMZ and the Bighorn National Forest, which may include new construction. • Other sites will be determined on a case-by-case basis.	Facility development to maximize recreational opportunities in the Brokenback/Logging Road area will be a low priority. Facility development will only be to address use and user conflicts, public health and safety, or resource protection.	Develop facilities to enhance recreation and visitor services for the following areas in the Brokenback/Logging Road RMZ: • Trailheads for North and South Brokenback areas, Laddie Creek, and the Hyattville Logging Road. • Pull-outs along the Hyattville Logging Road. • Improve Salt Lick Trail and trailhead. • Designate motorized touring loops within the Brokenback/Logging road RMZ as well as connecting with the Paint Rock area and the Bighorn National Forest, which may include new construction. • Other sites, trailheads and trails will be determined on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
6148		X	LR:7.1-7.9	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the Brokenback/Logging Road area.	Apply a NSO restriction on the Brokenback/Logging Road RMZ.	The Brokenback/Logging Road area is open to mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Brokenback/Logging Road RMZ.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6149		X	LR:7.1-7.7	Allow surface-disturbing activities in the Brokenback/Logging Road area such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the Brokenback/Logging Road RMZ such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Brokenback/Logging Road area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the Brokenback/Logging Road RMZ such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) if the effects can be avoided, minimized and/or compensated based on site-specific analysis.	Same as Alternative B.	Same as Alternative D.
6150		X	LR:7.1-7.7	Manage the Brokenback/Logging Road area as a ROW avoidance area. Co-locate ROW authorizations whenever possible.	Manage the Brokenback/Logging Road RMZ as a ROW avoidance area.	The Brokenback/Logging Road area is open to ROW authorizations.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6151		X	LR:7.1-7.7	The Brokenback/Logging Road area is open to renewable energy development.	The Brokenback/Logging Road RMZ is closed to renewable energy development.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6152		X	LR:7.1-7.7	Manage the Brokenback/Logging Road area as VRM Classes II, III, and IV.	Manage the Brokenback/Logging Road RMZ as VRM Class II.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6153		X	LR:7.1-7.7	Motorized vehicle use is limited to designated roads and trails in the Brokenback/Logging Road area. Implement travel management plans in the Brokenback/Logging Road.	Motorized vehicle use is limited to designated roads and trails in the Brokenback/Logging Road RMZ.	Motorized vehicle use is limited to existing roads and trails in the Brokenback/Logging Road area. Maintain implemented travel management plans.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
West Slope of the Bighorns Worland Field Office – South Bighorns Area									
6154		X	LR:7.1-7.9	The South Bighorns area is contained within the West Slope SRMA.	Manage the South Bighorns area as an RMZ (83,991 acres) contained within the West Slope SRMA.	Do not manage the South Bighorns area as an RMA.	Manage a portion of the South Bighorns area as the Middle Fork of the Powder River SRMA (14,644 acres) and a portion as the Southern Bighorns ERMA (69,325 acres).	Same as Alternative B.	Same as Alternative D.
6155		X	LR:7.1-7.9	Manage the South Bighorns area for motorized and nonmotorized dispersed recreation.	Manage the South Bighorns RMZ for motorized and nonmotorized recreation opportunities such as hiking, wildlife viewing, nature viewing, hunting, fishing and driving for pleasure so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the South Bighorns area to address use and user conflicts, public health and safety, and resource protection.	Manage the Middle Fork of the Powder River SRMA for motorized and nonmotorized recreation opportunities such as hiking, wildlife viewing, nature viewing, hunting, fishing and driving for pleasure so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O. Manage the Southern Bighorns ERMA to address use and user conflicts, public health and safety, resource protection, and for desired recreation setting character conditions as listed in Appendix O.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6156		X	LR:7.1-7.9	Emphasize opportunities for recreational access, especially in the Upper Nowood River areas in the South Bighorns area.	Emphasize recreational access to maximize recreational opportunities in the South Bighorns RMZ.	Opportunities for recreational access in the South Bighorns area will only be in response to use and user conflicts, public health and safety, or to address resource protection.	Emphasize recreational access to maximize recreational opportunities in the Middle Fork of the Powder River SRMA and the Southern Bighorns ERMA.	Same as Alternative B.	Same as Alternative D.
6157		X	LR:7.1-7.9	Consider the acquisition of legal and/or physical access for hunting, fishing, boating, and camping in the South Bighorns area. Areas considered for acquisition include Otter Creek, Deep Creek, Little Canyon Creek, and public land tracts along the Nowood River area.	Same as Alternative A, with the following additions in the South Bighorns RMZ: • Cherry Creek Road to Hazelton Road. • Access to land parcels within Spring Creek. • Spring Creek Road to Rome Hill Road. • Lysite Mountain. • Other sites will be determined on a case-by-case basis.	Acquisition of legal and/or physical access in the South Bighorns area will only be to address use and user conflicts, public health and safety, or resource protection.	Manage the Middle Fork of the Powder River SRMA and the Southern Bighorns ERMA the same as Alternative A. Other sites will be determined on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
6158		X	LR:7.1-7.9 LR:8.1	In the South Bighorns area, develop facilities necessary for site protection and visitor management at the Middle Fork camping area and the Cherry Creek stock driveway crossing of Deep Creek, and in Otter Creek. Facilities may include fire rings, comfort stations, fencing, parking areas, road improvements and vehicle barriers, and trail and bridge repair, depending on the needs of the specific site.	In the South Bighorns RMZ, develop facilities necessary to maximize recreational opportunities in the areas the same as Alternative A, with the following additions: • Trailheads for Middle Fork Campground, Mahogany Butte, Deep Creek, Upper Nowood areas, and in other areas determined on a case-by-case basis.	Facility development to maximize recreational opportunities in the South Bighorns area will be a low priority. Facility development will only be to address use and user conflicts, public health and safety, or resource protection.	In the Middle Fork of the Powder River SRMA and the Southern Bighorns ERMA, develop facilities necessary to maximize recreational opportunities in the areas the same as Alternative A, with the following additions: • Trailheads for Middle Fork Campground, Mahogany Butte, Deep Creek, Upper Nowood areas, and in other areas determined on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6159		X	LR:7.1-7.9	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the South Bighorns area.	Apply a NSO restriction on the South Bighorns RMZ.	The South Bighorns area will be open to mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Middle Fork of the Powder River SRMA. Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the Southern Bighorns ERMA.	Same as Alternative B.	Same as Alternative D.
6160		X	LR:7.1-7.7	Allow surface-disturbing activities in the South Bighorns area such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the South Bighorns RMZ such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the South Bighorns area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the Middle Fork of the Powder River SRMA such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) if the effects can be avoided, minimized and/or compensated based on site-specific analysis. Allow surface-disturbing activities in the Southern Bighorns ERMA.	Same as Alternative B.	Same as Alternative D.
6161		X	LR:7.1-7.7	Manage the South Bighorns area as a ROW avoidance area. Co-locate ROW authorizations whenever possible.	Manage the South Bighorns RMZ as a ROW avoidance area.	The South Bighorns area is open to ROW authorizations.	Manage the Middle Fork of the Powder River SRMA and the Southern Bighorns ERMA as ROW avoidance areas.	Same as Alternative B.	Same as Alternative D.
6162		X	LR:7.1-7.7	The South Bighorns area is open to renewable energy development.	Manage the South Bighorns RMZ as a renewable energy avoidance area.	The South Bighorns area is open to renewable energy development.	The South Bighorns ERMA is open to renewable energy development.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6163		X	LR:7.1-7.7	Manage the South Bighorns area as VRM Classes II, III, and IV.	Manage the South Bighorns RMZ as VRM Class II.	Same as Alternative A.	Manage VRM in the Southern Bighorns ERMA consistent with other resource objectives. Manage the Middle Fork of the Powder River SRMA as VRM Class II.	Same as Alternative B.	Same as Alternative D.
6164		X	LR:7.1-7.7	Motorized vehicle use is limited to designated roads and trails in the South Bighorns area. Implement Travel management plans in areas within this area.	Motorized vehicle use is limited to designated roads and trails in the South Bighorns RMZ.	Motorized vehicle use is limited to existing roads and trails in the South Bighorns area. Maintain implemented travel management plans.	Motorized vehicle use is limited to designated roads and trails in the Middle Fork of the Powder River SRMA and the Southern Bighorns ERMA.	Same as Alternative B.	Same as Alternative D.
Canyon Creek Area									
6165		X	LR:7.1-7.9	The Canyon Creek area is contained within the West Slope SRMA.	Manage Canyon Creek area as an SRMA (3,675 acres) with a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 76) (Appendix O).	Do not manage the Canyon Creek area as an RMA.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6166		X	LR:7.1-7.9	Manage the Canyon Creek area for motorized and nonmotorized dispersed recreation.	Manage the Canyon Creek SRMA for nonmotorized recreation opportunities such as hiking, fishing, nature viewing, and wildlife viewing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Canyon Creek area to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6167		X	LR:7.1-7.9	Emphasize opportunities for recreational access to the Canyon Creek area.	Emphasize opportunities for recreational access to the Canyon Creek SRMA.	Opportunities for recreational access in the Canyon Creek area will only be to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6168		X	LR:7.1-7.9	Consider the acquisition of legal and/or physical access for hunting, fishing, and camping in the Canyon Creek area.	Acquire legal and physical access to maximize recreational opportunities in the Canyon Creek SRMA.	Acquisition of legal and/or physical access in the Canyon Creek area will only be to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6169		X	LR:7.1-7.9 LR:8.1	Develop facilities necessary for site protection and visitor management in the Canyon Creek area. Facilities may include fire rings, comfort stations, fencing, parking areas, road improvements and vehicle barriers, and trail and bridge repair, depending on the needs of the specific site.	Develop facilities to enhance recreation and visitor services for the following areas in the Canyon Creek SRMA: • Looping hiking trails in Canyon Creek and off of Smilo Road. • Trailhead at Canyon Creek and Smilo Road. • Other sites will be determined on a case-by-case basis.	Facility development to maximize recreational opportunities in the Canyon Creek area will be a low priority. Facility development will only be in response to use and user conflicts, public health and safety, or to address resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6170		X	LR:7.1-7.9	Apply a NSO restriction on the Canyon Creek area. Review mineral leases on a case-by-case basis and apply mitigation through activity level planning.	Apply a NSO restriction on the Canyon Creek SRMA.	The Canyon Creek area is open to mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Canyon Creek SRMA.	Same as Alternative B.	Same as Alternative D.
6171		X	LR:7.1-7.7	Allow surface-disturbing activities in the Canyon Creek area such as geophysical exploration, salable minerals exploration and development, and	Prohibit surface-disturbing activities in the Canyon Creek SRMA such as geophysical exploration (except casual use), salable minerals	Allow surface-disturbing activities in the Canyon Creek area such as geophysical exploration (including casual use), salable minerals	Allow surface-disturbing activities in the Canyon Creek SRMA such as geophysical exploration, salable minerals exploration and	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	development, and construction activities (including those related to development of recreation facilities or wildlife habitat) if the effects can be avoided, minimized and/or compensated based on site-specific analysis.		
6172		X	LR:7.1-7.7	Manage the Canyon Creek area as a ROW avoidance area. Co-locate ROW whenever possible.	Manage the Canyon Creek SRMA as a ROW avoidance area.	The Canyon Creek area is open to ROW authorizations.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6173		X	LR:7.1-7.7	The Canyon Creek area is open to renewable energy development.	Manage the Canyon Creek SRMA as a renewable energy avoidance area.	The Canyon Creek area is open to renewable energy development.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6174		X	LR:7.1-7.7	Manage the Canyon Creek area as VRM Classes II, III, and IV.	Manage the Canyon Creek SRMA as VRM Class II.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6175		X	LR:7.1-7.7	Motorized vehicle use is limited to designated roads and trails in the Canyon Creek area.	Motorized vehicle use is limited to designated roads and trails in the Canyon Creek SRMA.	Motorized vehicle use is limited to existing roads and trails in the Canyon Creek area.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
				Red Canyon Creek Area					
6176		X	LR:7.1-7.7	The Red Canyon Creek area is contained within the Worland ERMA.	Manage Red Canyon Creek as an SRMA (8,435 acres) with a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 76) (Appendix O).	Do not manage the Red Canyon Creek area as an RMA.	Manage the Red Canyon Creek as an ERMA (8,435 acres).	Same as Alternative B.	Same as Alternative D.
6177		X	LR:7.1-7.7	Manage the Red Canyon Creek area to address use and user conflicts, public health and safety, and resource protection.	Manage the Red Canyon Creek SRMA for motorized and nonmotorized recreation opportunities such as hiking, wildlife	Manage the Red Canyon Creek area to address use and user conflicts, public health and safety, and resource protection.	Manage the Red Canyon Creek ERMA to maximize back country recreational opportunities and to address use and user	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					viewing, and nature viewing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.		conflicts, public health and safety, resource protection, and for desired recreation setting character conditions as listed in Appendix O.		
6178		X	LR:7.1-7.7 LR:8.1	Consider establishing trailheads in the Red Canyon Creek area consistent with an overall objective to emphasize primitive recreation.	Same as Alternative A.	Consider establishing trailheads in Red Canyon Creek area only to address use and user conflict, public health and safety, or resource protection.	Consider establishing trailheads in the Red Canyon Creek ERMA consistent with an overall objective to emphasize primitive recreation.	Same as Alternative A.	Same as Alternative D.
6179		X	LR:7.4-7.7	Review mineral leases on a case-by-case basis. The Red Canyon Creek area is available for locatable mineral entry. Authorize mineral materials disposal and/or free use permits. Apply mitigation through activity level planning.	Apply a NSO restriction on the Red Canyon Creek SRMA.	The Red Canyon Creek area is open to mineral leasing subject to standard protection measures.	Review mineral leases on a case-by-case basis. The Red Canyon Creek ERMA is available for locatable mineral entry. Authorize mineral materials disposal and/or free use permits. Apply mitigation through activity level planning.	Same as Alternative B.	Same as Alternative D.
6180		X	LR:7.4-7.7	Allow surface-disturbing activities in the Red Canyon Creek area such as geophysical exploration and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the Red Canyon Creek SRMA such as geophysical exploration (except casual use) and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Red Canyon Creek area such as geophysical exploration (including casual use) and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the Red Canyon Creek ERMA.	Same as Alternative B.	Same as Alternative D.
6181		X	LR:7.4-7.7	Co-locate ROW whenever possible in the Red Canyon Creek area.	Manage the Red Canyon Creek SRMA as a ROW avoidance area.	The Red Canyon Creek area is open to new ROW authorizations.	Manage the Red Canyon Creek ERMA as a ROW avoidance area.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6182		X	LR:7.4-7.7	The Red Canyon Creek area is open to renewable energy development.	Manage the Red Canyon Creek SRMA as a renewable energy avoidance area.	The Red Canyon Creek area is open to renewable energy development.	Manage the Red Canyon Creek ERMA as a renewable energy avoidance area.	Same as Alternative B.	Same as Alternative D.
6183		X	LR:7.4-7.7	Manage the Red Canyon Creek area as VRM Class II.	Same as Alternative A.	Manage the Red Canyon Creek area as VRM Class IV.	Manage the Red Canyon Creek ERMA as VRM Classes II and III.	Same as Alternative A.	Same as Alternative D.
6184		X	LR:7.4-7.7	Motorized vehicle use is limited to designated roads and trails in the Red Canyon Creek area.	Same as Alternative A.	Motorized vehicle use is limited to existing roads and trails in the Red Canyon Creek area.	Motorized vehicle use is limited to designated roads and trails in the Red Canyon Creek ERMA.	Same as Alternative A.	Same as Alternative D.
The Rivers Area									
6185	X		LR:7.1-7.7	Manage the North and South Forks of the Shoshone, the Shoshone, and the Clarks Fork of the Yellowstone Rivers as The Rivers SRMA (18,247 acres).	Manage the North and South Forks of the Shoshone, the Shoshone, and the Clarks Fork of the Yellowstone Rivers, including a ¼ mile buffer on either side, as The Rivers SRMA (18,247 acres) with a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 76) (Appendix O).	Do not manage the North and South Forks of the Shoshone, the Shoshone, and the Clarks Fork of the Yellowstone Rivers areas as an RMA.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6186	X		LR:7.1-7.7	Manage The Rivers SRMA for recreational benefit.	Manage The Rivers SRMA for motorized and nonmotorized recreation opportunities such as fishing, floating, hunting, hiking, and nature viewing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Rivers area to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6187	X		LR:7.1-7.7	Manage lands within 1 mile of the Shoshone, Greybull, and Clarks Fork of the Yellowstone Rivers as avoidance areas for construction of above ground powerlines.	Manage lands within 1 mile of the Shoshone, Greybull, and Clarks Fork of the Yellowstone Rivers as avoidance areas for construction of above ground powerlines.	Allow construction of above ground powerlines within 1 mile of the Shoshone, Greybull, and Clarks Fork of the Yellowstone Rivers.	Manage lands within 1 mile of the Shoshone and Clarks Fork of the Yellowstone Rivers as avoidance areas for construction of above ground powerlines, except in designated corridors.	Same as Alternative B.	Same as Alternative D.
6188	X		LR:7.1-7.7	Retain recreational access to the North and South Forks of the Shoshone, the Shoshone, and the Clarks Fork of the Yellowstone Rivers.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A, plus increase emphasis on float access and facilities where appropriate.	Same as Alternative A.	Same as Alternative D.
6189	X		LR:7.1-7.7	Apply a NSO restriction in The Rivers SRMA on some lands within The Rivers SRMA (WGFD/BLM access areas on the Clarks Fork of the Yellowstone and the North and South Forks of the Shoshone River).	Same as Alternative A.	WGFD/BLM access areas on the Clarks Fork of the Yellowstone and the North and South Forks of the Shoshone Rivers are open to oil and gas leasing subject to standard protection measures.	Apply a NSO restriction on areas within ¼ mile of campgrounds, trailheads, day use areas, river access sites, and similar recreational sites (Map 78) within The Rivers SRMA.	Same as Alternative A.	Same as Alternative D.
6190	X		LR:7.1-7.7	Prohibit surface-disturbing activities in The Rivers SRMA such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Same as Alternative A.	Allow surface-disturbing activities in the Rivers area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) within campgrounds, trailheads, day use areas, river access sites, and similar recreational sites and trails within The Rivers SRMA if the effects can be avoided, minimized	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							and/or compensated based on site-specific analysis.		
6191	X		LR:7.1-7.7	The Rivers SRMA is open to renewable energy development.	Manage The Rivers SRMA as a renewable energy avoidance area.	The Rivers area is open to renewable energy development.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6192	X		LR:7.1-7.7	Within The Rivers SRMA, manage the North and South Forks of the Shoshone and the Clarks Fork of the Yellowstone Rivers as VRM Class II and manage the Shoshone River as VRM Class III.	Manage The Rivers SRMA as VRM Class II.	Manage the North and South Forks of the Shoshone and the Clarks Fork of the Yellowstone Rivers as VRM Class II and manage the Shoshone River as VRM Class III.	Manage the Rivers SRMA as VRM Class II.	Same as Alternative B.	Same as Alternative D.
6193	X		LR:7.1-7.7	Motorized vehicle use in The Rivers SRMA is limited to designated roads and trails for the North and South Forks of the Shoshone and the Clarks Fork of the Yellowstone Rivers area; and is limited to existing roads and trails for the Shoshone River area.	Same as Alternative A.	Motorized vehicle use is limited to existing roads and trails in the Rivers area.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
Historic Trails Area									
6194	X	X	LR:7.1-7.7	Manage significant segments of the Historic Trails area as an SRMA (12,065 acres) (not including NHTs) to retain their resource values.	Do not manage the Historic Trails area as an RMA**.** Management of historic trails resources will be under custodial recreation management addressing public health and safety, use and user conflicts, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6195	X		LR:7.1-7.7	See Cultural Resources and NHT alternatives for management associated with the Historic Trails area.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
				Worland Caves (Caves in Cody FO)					
6196	X		LR:7.1-7.7	Manage cave and karst resources as the Worland Caves SRMA.	Manage cave and karst resources as the Caves and Karst ERMA. Site-specific management actions will address issues specific to each cave(s) addressing use and user conflict, public health and safety, and resource protection.	Do not manage the cave and karst resources as an RMA. Management of cave and karst resources will address public health and safety, use and user conflicts, and resource protection.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
6197	X		LR:7	See Cave and Karst Resources alternatives for management of these resources.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
				McCullough Peaks Area					
6198	X		LR:7.1-7.7	Manage the McCullough Peaks under the Cody ERMA. The McCullough Peaks WSA is contained within the McCullough Peaks area. See WSA section for management prescriptions.	Manage the McCullough Peaks area as an SRMA (160,868 acres) with a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 76) (Appendix O).	Do not manage the McCullough Peaks area as an RMA. Management of resources within the McCullough Peaks area will be under custodial recreation management addressing public health and safety, use and user conflicts, and resource protection.	Manage the McCullough Peaks area as an SRMA (160,838 acres) with a destination recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O).	Same as Alternative B.	Same as Alternative D.
6199	X		LR:7.1-7.7	Manage the McCullough Peaks SRMA for motorized and nonmotorized dispersed recreation.	Manage the McCullough Peaks SRMA for motorized and nonmotorized recreation opportunities such as wildlife and wild horse viewing, nature viewing, horseback riding,	Manage the McCullough Peaks area to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					hunting, and hiking so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.				
6200	X		LR:7.1-7.7	The McCullough Peaks area is open for oil and gas leasing.	Apply a NSO restriction on the McCullough Peaks SRMA.	The McCullough Peaks area is open to oil and gas leasing subject to standard protection measures.	Apply a NSO restriction on 41,653 acres within the McCullough Peaks SRMA.	Same as Alternative B.	Same as Alternative D.
6201	X		LR:7.1-7.7	The McCullough Peaks area is open to ROW authorizations.	Manage the McCullough Peaks SRMA as a ROW avoidance area.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
6202	X		LR:7.1-7.7	Allow surface-disturbing activities in the McCullough Peaks area such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the McCullough Peaks SRMA such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the McCullough Peaks area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife) on a case-by-case basis.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
6203	X		LR:7.1-7.7	The McCullough Peaks area is open to renewable energy development.	Manage the McCullough Peaks SRMA as a renewable energy avoidance area.	The McCullough Peaks area is open to renewable energy development.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
6204	X		LR:7.1-7.7	Manage the McCullough Peaks area as VRM Classes II, III, and IV.	Manage the McCullough Peaks SRMA as VRM Class II.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6205	X		LR:7.1-7.7	Motorized vehicle use is limited to designated roads and trails in a portion the McCullough Peaks area and is limited to existing roads and trails in the remainder of the area.	Motorized vehicle use is limited to designated roads and trails in the entire area McCullough Peaks SRMA.	Motorized vehicle use is limited to existing roads and trails in the McCullough Peaks area.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
Basin Gardens – Basin Gardens Play Area									
6206		X	LR:7.1-7.7	The Basin Gardens Play Area is contained within the Worland ERMA where off-road motorized vehicle use is tolerated.	Manage the Basin Gardens Play Area as a RMZ (1,821 acres) within the Basin Gardens SRMA.	Manage the Basin Gardens Play Area as an ERMA (4,421 acres).	Manage the Basin Gardens Play Area as a SRMA (4,421 acres) with a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 78) (Appendix O).	Same as Alternative B.	Same as Alternative D.
6207		X	LR:7.1-7.7	Manage the Basin Gardens Play area to address use and user conflicts, public health and safety, and resource protection.	Manage the Basin Gardens Play Area RMZ for motorized recreation opportunities such as all-terrain vehicle, motorbike, mountain bike, and other motorized and mechanized hill climbing activities so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Basin Gardens Play Area ERMA to maximize recreational opportunities, as well as to address use and user conflicts, public health and safety, and resource protection.	Manage the Basin Gardens Play Area SRMA for motorized recreation opportunities such as all-terrain vehicle, motorbike, mountain bike, and other motorized and mechanized hill climbing activities so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Same as Alternative B.	Same as Alternative D.
6208		X	LR:7.1-7.7	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning.	Apply a NSO restriction on the Basin Gardens Play Area RMZ.	Open the Basin Gardens Play Area ERMA to mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Basin Gardens Play Area SRMA.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6209		X	LR:7.1-7.7	Authorize mineral materials disposal in the Basin Gardens Play Area.	Prohibit mineral materials disposal in the Basin Gardens Play Area.	Same as Alternative A.	Authorize mineral materials disposal in the Basin Gardens Play Area SRMA if the effects can be avoided, minimized and/or compensated based on site-specific analysis.	Same as Alternative B.	Same as Alternative D.
6210		X	LR:7.1-7.7	Allow surface-disturbing activities in the Basin Gardens Play area such as geophysical exploration and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the Basin Gardens Play Area RMZ such as geophysical exploration (except casual use) and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Basin Gardens Play Area ERMA such as geophysical exploration (including casual use) and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the Basin Gardens Play Area SRMA such as geophysical exploration, and construction activities (including those related to development of recreation facilities or wildlife habitat) if the effects can be avoided, minimized and/or compensated based on site-specific analysis.	Same as Alternative B.	Same as Alternative D.
6211		X	LR:7.4-7.7	Manage the Basin Gardens Play area as a ROW avoidance area. Co-locate ROW whenever possible.	Manage the Basin Gardens Play Area RMZ as a ROW avoidance area.	The Basin Gardens Play Area ERMA is open to ROW authorizations.	Manage the Basin Gardens Play Area SRMA as a ROW avoidance area.	Same as Alternative B.	Same as Alternative D.
6212		X	LR:7.4-7.7	The Basin Gardens Play area is open to renewable energy development.	Manage the Basin Gardens Play Area RMZ as a renewable energy avoidance area.	The Basin Gardens Play Area ERMA is open to renewable energy development.	Manage the Basin Gardens Play Area SRMA as a renewable energy avoidance area.	Same as Alternative B.	Same as Alternative D.
6213		X	LR:7.4-7.7	Manage the Basin Gardens Play area as VRM Classes III and IV.	Manage the Basin Gardens Play Area RMZ as VRM Class III.	Same as Alternative A.	Manage VRM in the Basin Gardens Play Area SRMA consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6214		X	LR:7.4-7.7	Motorized vehicle use is limited to existing roads and trails in the Basin Gardens Play area.	Same as Alternative A, except 1,821 acres within the Basin Gardens Play Area RMZ are open to motorized vehicle use.	4,421 acres within the Basin Gardens Play Area ERMA are open to motorized vehicle use.	4,421 acres within the Basin Gardens Play Area SRMA are open to motorized vehicle use.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Basin Gardens – Basin Gardens Area									
6215		X	LR:7.1-7.7	The Basin Gardens area is contained within the Worland ERMA.	Manage the Basin Gardens area as a RMZ (17,949 acres) to be included within the Basin Gardens SRMA.	Manage the Basin Gardens as an ERMA (15,349 acres).	Do not manage the Basin Gardens area as an RMA.	Same as Alternative B.	Same as Alternative D.
6216		X	LR:7.1-7.7	Manage the Basin Gardens area to address use and user conflicts, public health and safety, and resource protection.	Manage the Basin Gardens RMZ for motorized and nonmotorized recreation opportunities such as hiking, nature viewing, and wildlife viewing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Basin Gardens ERMA to maximize recreational opportunities and to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6217		X	LR:7.1-7.7	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the Basin Gardens area.	Apply a NSO restriction on the Basin Gardens RMZ.	The Basin Gardens ERMA is open to mineral leasing subject to standard protection measures.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6218		X	LR:7.1-7.7	Authorize mineral materials disposal in the Basin Gardens area.	Prohibit mineral materials disposal in the Basin Gardens RMZ.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6219		X	LR:7.1-7.7	Allow surface-disturbing activities in the Basin Gardens area such as geophysical exploration and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the Basin Gardens RMZ such as geophysical exploration (except casual use) and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Basin Gardens ERMA such as geophysical exploration (including casual use) and construction activities (including those related to development of recreation facilities or wildlife).	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6220		X	LR:7.4-7.7	Manage the Basin Gardens area as a ROW avoidance area. Co-locate ROW authorizations whenever possible.	Manage the Basin Gardens RMZ as a ROW avoidance area.	The Basin Gardens ERMA is open to ROW authorizations.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6221		X	LR:7.4-7.7	The Basin Gardens area is open to renewable energy development.	Manage the Basin Gardens RMZ as a renewable energy avoidance area.	The Basin Gardens ERMA is open to renewable energy development.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6222		X	LR:7.4-7.7	Manage the Basin Gardens area as VRM Classes III and IV.	Manage the Basin Gardens RMZ as VRM Class III.	Same as Alternative A.	Manage VRM in the Basin Gardens area consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6223		X	LR:7.4-7.7	Motorized vehicle use is limited to existing roads and trails in the Basin Gardens area.	Motorized vehicle use is limited to designated roads and trails in the Basin Gardens RMZ.	Motorized vehicle use is limited to existing roads and trails in the Basin Gardens ERMA.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
Horse Pasture Area									
6224		X	LR:7.1-7.9	The Horse Pasture area is contained within the Worland ERMA.	Manage the Horse Pasture area as an SRMA (144 acres) with a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 76) (Appendix O).	Do not manage the Horse Pasture area as an RMA.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6225		X	LR:7.1-7.9	Manage the Horse Pasture area for motorized and nonmotorized dispersed recreation.	Manage the Horse Pasture SRMA for nonmotorized recreation opportunities such as hiking, photography, hunting, and sightseeing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Horse Pasture area to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B, plus manage for habitat and wildlife resources under the Bighorn River HMP/RAMP.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6226		X	LR:7.1-7.9 LR:8.1	Consider facilities to enhance recreation and visitor services in the Horse Pasture area on a case-by-case basis.	Develop facilities to enhance recreation and visitor services in the Horse Pasture SRMA. Such facilities could include hiking trails, comfort stations, fencing, parking areas, road improvements and vehicle barriers, and trail and bridge repair.	Facility development to maximize recreational opportunities in the Horse Pasture area will be a low priority. Facility development will only be to address use and user conflicts, public health and safety, or resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6227		X	LR:7.1-7.9	Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the Horse Pasture area.	Apply a NSO restriction on the Horse Pasture SRMA.	The Horse Pasture area will be open to mineral entry and other mineral leasing subject to standard protection measures.	Apply a CSU stipulation on the Horse Pasture SRMA.	Same as Alternative B.	Same as Alternative D.
6228		X	LR:7.1-7.7	Allow surface-disturbing activities in the Horse Pasture area such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.	Prohibit surface-disturbing activities in the Horse Pasture SRMA such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Horse Pasture area such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).	Allow surface-disturbing activities in the Horse Pasture SRMA such as geophysical exploration, salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat) if the effects can be avoided, minimized and/or compensated based on site-specific analysis.	Same as Alternative B.	Same as Alternative D.
6229		X	LR:7.1-7.7	Co-locate ROW whenever possible in the Horse Pasture area.	Manage the Horse Pasture SRMA as a ROW avoidance area.	The Horse Pasture area is open to ROW authorizations.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6230		X	LR:7.1-7.7	The Horse Pasture area is open to renewable energy development.	Manage the Horse Pasture SRMA as a renewable energy avoidance area.	The Horse Pasture area is open to renewable energy development.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6231		X	LR:7.1-7.7	Manage the Horse Pasture area as VRM Class III.	Manage the Horse Pasture SRMA as VRM Class II.	Same as Alternative A.	Manage VRM in the Horse Pasture SRMA consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6232		X	LR:7.1-7.7	Motorized vehicle use is limited to existing roads and trails in the Horse Pasture area.	The Horse Pasture SRMA is closed to motorized vehicle use.	Same as Alternative A.	Motorized vehicle use in the Horse Pasture SRMA is limited to designated roads and trails.	Same as Alternative B.	Same as Alternative D.
				Rattlesnake Ridge Area					
6233		X	LR:7.1-7.7	Manage the Rattlesnake Ridge area under the Worland ERMA.	Do not manage the Rattlesnake Ridge area as an RMA.	Manage the Rattlesnake Ridge SRMA (7,982 acres) with a community recreation strategy for motorized recreation opportunities such as all-terrain vehicle, motorbike, and other motorized and mechanized hill climbing activities so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Rattlesnake Ridge area as an ERMA (7,996 acres) to maximize recreational opportunities, and to address use and user conflicts, public health and safety, and resource protection.	Same as Alternative B.	Same as Alternative D.
6234		X	LR:7.1-7.7	Motorized vehicle use is limited to existing roads and trails in the Rattlesnake Ridge area.	Same as Alternative A.	The Rattlesnake Ridge SRMA is open to motorized vehicle use.	Motorized vehicle use is limited to existing roads and trails in the Rattlesnake Ridge ERMA.	Same as Alternative A.	Same as Alternative D.
				Beck Lake Area					
6235	X		LR:7.1-7.7	Manage the Beck Lake area under the Cody ERMA.	Manage the Beck Lake area as an SRMA (6,483 acres) with a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map	Do not manage the Beck Lake area as an RMA. Management of resources within the Beck Lake area will be under custodial recreation management addressing public health	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					76) (Appendix O).	and safety, use and user conflicts, and resource protection, except for lands provided to the city of Cody under the R&PP.			
6236	X		LR:7.1-7.7	Manage the Beck Lake area for motorized and nonmotorized dispersed recreation.	Manage the Beck Lake SRMA for nonmotorized recreation opportunities to engage in mountain biking, hiking, wildlife viewing, and other activities so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Beck Lake area to address use and user conflicts, public health and safety, and resource protection.	Manage the Beck Lake SRMA for nonmotorized and motorized recreation opportunities such as mountain biking, hiking, wildlife viewing, and other activities so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Same as Alternative B.	Same as Alternative D.
6237	X		LR:7.1-7.7	The Beck Lake area is open to oil and gas leasing.	Apply a NSO restriction on the Beck Lake SRMA.	Same as Alternative A.	Apply a CSU stipulation on the Beck Lake SRMA.	Same as Alternative B.	Same as Alternative D.
6238	X		LR:7.1-7.7	The Beck Lake area is open to ROW authorizations.	Manage the Beck Lake SRMA as a ROW avoidance area.	Same as Alternative A.	The Beck Lake SRMA is open to ROW authorizations.	Same as Alternative B.	Same as Alternative D.
6239	X		LR:7.1-7.7	The Beck Lake area is open to renewable energy development.	Manage the Beck Lake SRMA as a renewable energy avoidance area.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6240	X		LR:7.1-7.7	Allow surface-disturbing activities in the Beck Lake area such as geophysical exploration, salable minerals exploration and development, and construction activities on a case-by-case basis.	Prohibit surface-disturbing activities in the Beck Lake area such as geophysical exploration salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Beck Lake area such as geophysical exploration salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Beck Lake SRMA such as geophysical exploration, salable minerals exploration and development, and construction activities on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6241	X		LR:7.1-7.7	Manage the Beck Lake area as VRM Class III.	Manage the Beck Lake SRMA as VRM Class II.	Same as Alternative A.	Manage VRM in the Beck Lake SRMA consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
6242	X		LR:7.1-7.7	Motorized vehicle use is limited to existing roads and trails in the Beck Lake area.	The Beck Lake SRMA is closed to motorized vehicle use.	Same as Alternative A.	Motorized vehicle use in the Beck Lake SRMA is limited to designated roads and trails.	Same as Alternative B.	Same as Alternative D.
Newton Lake Ridge Area									
6243	X		LR:7.1-7.7	Manage the Newton Lake Ridge area under the Cody ERMA.	Manage the Newton Lake Ridge area as an SRMA (1,997 acres) with a community recreation strategy for the protection of the recreation outcomes and setting prescriptions (Map 76) (Appendix O).	Do not manage the Newton Lake Ridge area as an RMA. Management of resources within the Newton Lake Ridge area will be under custodial recreation management addressing public health and safety, use and user conflicts, and resource protection.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6244	X		LR:7.1-7.7	Manage the Newton Lake Ridge area for motorized and nonmotorized dispersed recreation.	Manage the Newton Lake Ridge SRMA for nonmotorized recreationists to engage in mountain biking, hiking, wildlife viewing, and other activities so that affected users report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Manage the Newton Lake Ridge area to address use and user conflicts, public health and safety, and resource protection.	Manage the Newton Lake Ridge SRMA for nonmotorized and motorized recreation opportunities such as mountain biking, hiking, wildlife viewing, and other activities so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes listed in Appendix O.	Same as Alternative B.	Same as Alternative D.
6245	X		LR:7.1-7.7	The Newton Lake Ridge area is open to oil and gas leasing.	Apply a NSO restriction on the Newton Lake Ridge SRMA.	The Newton Lake Ridge area is open to oil and gas leasing subject to standard protection measures.	The Newton Lake Ridge SRMA is open to oil and gas leasing with a CSU restriction.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Recreation									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6246	X		LR:7.1-7.7	The Newton Lake Ridge area is open to ROW authorizations.	Manage the Newton Lake Ridge SRMA as a ROW avoidance area.	Same as Alternative A.	The Newton Lake Ridge SRMA is open to ROW authorizations.	Same as Alternative B.	Same as Alternative D.
6247	X		LR:7.1-7.7	The Newton Lake Ridge area is open to renewable energy development.	Manage the Newton Lake Ridge SRMA as a renewable energy avoidance area.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative D.
6248	X		LR:7.1-7.7	Allow surface-disturbing activities in the Newton Lake Ridge area such as geophysical exploration, salable minerals exploration and development, and construction activities on a case-by-case basis.	Prohibit surface-disturbing activities in the Newton Lake Ridge SRMA such as geophysical exploration salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Newton Lake Ridge area such as geophysical exploration salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat).	Allow surface-disturbing activities in the Newton Lake Ridge SRMA such as geophysical exploration, salable minerals exploration and development, and construction activities on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
6249	X		LR:7.1-7.7	Manage the Newton Lake Ridge area as VRM Class III.	Manage the Newton Lake Ridge SRMA as VRM Class II.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
6250	X		LR:7.1-7.7	Motorized vehicle use area is limited to existing roads and trails in the Newton Lake Ridge area.	The Newton Lake Ridge SRMA is closed to motorized vehicle use.	Same as Alternative A.	Motorized vehicle use in the Newton Lake Ridge SRMA is limited to designated roads and trails.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
6000 LAND RESOURCES (LR) –Lands with Wilderness Characteristics									
				GOAL LR:9 Manage lands with wilderness characteristics as appropriate, considering manageability and the context of competing resource demands. **Objective:** **LR:9.1** In areas managed to maintain their wilderness characteristics, wilderness characteristics will be protected.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
6251	X	X	LR:9.1	Response to wildland fires may vary from full suppression in areas where fire is undesirable, to monitoring fire behavior in areas where fire can be used as a management tool.					
6252	X	X	LR:9.1	Allow permitted livestock grazing use consistent with other resource objectives and in agreement with the *Wyoming Standards for Healthy Rangelands*.					
6253	X	X	LR:9.1	Manage invasive species using Invasive Pest Management strategy.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
6254	X	X	LR:9.1	No lands with wilderness characteristics are managed to maintain their wilderness characteristics.	Manage all inventoried lands with wilderness characteristics shown on Map 79 (476,349 acres) for naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation.	No lands with wilderness characteristics are managed to maintain their wilderness characteristics. Manage lands with wilderness characteristics consistent with other resource objectives. Do not manage the lands with wilderness characteristics for naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation.	Same as Alternative C.	Same as Alternative B.	Manage certain lands with wilderness characteristics shown on Map 79 (49,397 acres) to protect their naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation.
6255	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Manage lands with wilderness characteristics as VRM Class II, unless areas are managed as VRM Class I under another resource.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B, except manage 47 acres in Painted Hills as VRM Class III.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) –Lands with Wilderness Characteristics									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6256	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Evaluate existing roads and trails in lands with wilderness characteristics and close on a case-by-case basis as necessary to protect wilderness characteristics. Motorized vehicle use is limited to designated roads and trails in lands with wilderness characteristics. Within lands with wilderness characteristics, allow vehicle access up to 30 feet from the centerline of the road or trail for parking and necessary tasks.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Evaluate existing roads and trails in lands with wilderness characteristics and close on a case-by-case basis as necessary to protect wilderness characteristics. Motorized vehicle use is limited to existing roads and trails in lands with wilderness characteristics, unless further constrained by other resources.
6257	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Lands with wilderness characteristics are closed to oil and gas leasing.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B, except manage Painted Hills (7,892 acres) as available for leasing with a NSO restriction.
6258	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Lands with wilderness characteristics are closed to solid mineral leasing.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6259	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Lands with wilderness characteristics are closed to mineral materials disposal.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6260	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Manage lands with wilderness characteristics as ROW avoidance areas.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B, except manage Painted Hills (7,892 acres) as a ROW Exclusion Area.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) –Lands with Wilderness Characteristics									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6261	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Lands with wilderness characteristics are closed to permitted commercial and personal-use wood cutting and seed collection. Small amounts of fuelwood or seeds for personal use may be gathered, unless specifically prohibited for any defined area.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.
6262	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Lands with wilderness characteristics are closed to road construction unless specified on a case-by-case basis.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.
6263	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Prohibit mechanical vegetative treatments in lands with wilderness characteristics, except for the minimum necessary to restore natural resource systems, and to provide for public and firefighter safety in areas with hazardous fuels. Permit the use of prescribed fire for vegetation treatments when compatible with resource management objectives of the areas. Rehabilitate fire lines and other surface disturbances associated with prescribed fire operations.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.
6264	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Allow maintenance of existing facilities in lands with wilderness characteristics.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) –Lands with Wilderness Characteristics									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6265	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Allow construction of rangeland improvements, wildlife water development, and recreation facilities in lands with wilderness characteristics when short-term effects can be mitigated.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.
6266	X	X	LR:9.1	No special management prescriptions for lands with wilderness characteristics.[5]	Allow excavation of cultural resource sites and of paleontological sites in lands with wilderness characteristics where scientific information would be collected under permit, with minimum site disturbance. Mitigate short-term effects to wilderness characteristics by collection of long-term important scientific information, controls to modes and routes of site access, and site restoration when the project is completed.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
6000 LAND RESOURCES (LR) – Livestock Grazing Management									
				GOAL LR:10 Continue ecosystem benefits of herbivory by providing opportunities for livestock grazing to support and sustain local communities consistent with goals and objectives of other resources and overall land health. **Objectives:** **LR:10.1** Manage livestock grazing consistent with multiple-use needs, sustained yield, and the *Wyoming Standards for Healthy Rangelands*. Adjust management based on assessments and evaluations. **LR:10.2** Provide for the establishment of voluntary reserve common allotments as opportunities arise within the Planning Area to facilitate rangeland restoration, recovery, and management objectives (in accordance with existing policy, WO IM 2013-184). **LR:10.3** Manage levels of livestock use in a manner that strives to maintain or restore permitted use based on forage availability consistent with multiple use.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
6267	X	X	LR:10.1 LR:10.3	In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the *Wyoming Guidelines for Livestock Grazing Management*, other appropriate BMPs (see Appendices L and W), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations.					
6268	X	X	LR:10.1 LR:10.3	AMPs remain in effect or are revised as necessary.					
6269	X	X	LR:10.1	Retain designated stock driveway withdrawals (92,932 acres) and easements, except where no longer needed or provide comparable alternate access and routes. Other land uses within stock driveways will be considered on a case-by-case basis, so long as the proposed use will not interfere with the purpose for the withdrawal. Permit other livestock trailing on a case-by-case basis.					
6270	X	X	LR:10.1	Maintain current allotment categories shown on Map 80 (M, I, and C; see Glossary). Throughout the life of the plan, re-categorized allotments based on assessments and evaluations.					
6271	X	X	LR:10.1	Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse Habitat Objectives Table and Land Health Standards (43 CFR 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.					
6272	X	X	LR:10.1 LR:10.3	Forage supplements will be certified weed free and safe/compatible for domestic sheep, wildlife and wild horses based on allotment specific situations.					
6273	X	X	LR:10.1	Approximately 4,074 acres along the Bighorn River remain closed to livestock grazing, unless grazing is used for specific vegetation management objectives such as habitat improvement or the eradication of invasive weeds (tracts listed in Big Horn River HMP/RAMP and the Eggert Tract).					

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Livestock Grazing Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
6274	X	X	LR:10.1	Monitor all "I" category allotments and AMPs. Treat monitoring of "M" and "C" category allotments as a low priority. Continue monitoring following any adjustments in grazing use to assure allotment management objectives are being met.	Monitor livestock grazing only on those allotments not meeting land health standards due to currently permitted livestock grazing.	Vary the intensity of livestock grazing monitoring, with higher priority given to "I" category allotments and those allotments not meeting land health standards due to current livestock grazing.	Vary the intensity of livestock grazing monitoring, with higher priority given to "I" category allotments and those allotments not meeting land health standards due to livestock grazing.	Same as Alternative B.	Same as Alternative D.
6275	X	X	LR:10.1 -10.3	The Planning Area is open to livestock grazing except in areas specifically closed to grazing, such as: • Bighorn River tracts (4,074 acres) • Campgrounds (645 acres) • Exclosures (452 acres) Manage livestock grazing to provide for protection or enhancement of other resource values.	The Planning Area is open to livestock grazing on areas where livestock grazing is not in conflict with other resource uses. In addition to areas closed to livestock grazing under Alternative A, close the following: • Crucial winter range for elk and bighorn sheep (270,834 acres) • Greater sage-grouse Key Habitat Areas (1,232,583 acres)	Same as Alternative A, except do not manage livestock grazing to provide for the enhancement of other resource values.	The Planning Area is open to livestock grazing except in areas specifically closed to grazing, such as: • Bighorn River tracts (4,074 acres) • Campgrounds (645 acres) • Exclosures (452 acres) Manage livestock grazing to support other resource objectives and allow livestock grazing in areas closed to grazing as a tool to maintain or improve resource conditions. Mitigate new resource uses to minimize or avoid conflicts with livestock grazing where appropriate.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Livestock Grazing Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6276	X	X	LR:10.1 LR:10.3	Apportion additional sustained yield forage to meet multiple-use objectives and to satisfy suspended permitted use of permittees/lessees in the allotment where the forage is available (43 CFR 4110.1-3b).	Apportion additional sustained yield forage primarily to wild horses and wildlife.	Apportion additional sustained yield forage primarily to satisfy suspended permitted use of permittees/lessees in the allotment where the forage is available.	Apportion additional sustained yield forage, based on monitoring, to satisfy suspended permitted use of permittees/lessees in the allotment and to meet multiple-use objectives where the forage is available.	Same as Alternative B.	Same as Alternative D.
6277	X	X	LR:10.1 -10.3	On a case-by-case basis, allow issuance of permits/leases for livestock grazing for parcels that are not included in a grazing allotment.	Do not allow issuance of permits/leases on parcels that are not included in a grazing allotment. Allocate forage on such parcels to watershed protection, habitat, or other resource uses.	Same as Alternative A.	Same as Alternative A, and where such permits/leases are not issued, allocate forage on such parcels to meet other multiple-use objectives.	Same as Alternative B.	Same as Alternative D.
6278	X	X	LR:10.5	Management of reserve common allotments is not considered.	Establish and manage future reserve common allotments as opportunities arise within the Planning Area on a voluntary basis.	Do not establish reserve common allotments within the Planning Area.	Same as Alternative B, plus establish and manage reserve common allotments on abandoned allotments on a case-by-case basis and attempt to utilize each allotment at least every five years. At the time a permittee or lessee voluntarily relinquishes or abandons a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Livestock Grazing Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6279	X	X	LR:10.1 LR:10.3	Prohibit the placement of salt, mineral, or forage supplements within ¼ mile of water, wetlands, riparian areas, reclaimed or reforested areas, or as determined by the authorized officer.	Same as Alternative A, but prohibit within a ½ mile buffer.	Allow placement of salt, mineral, or forage supplements to maximize livestock use.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6280	X	X	LR:10.1 -10.3	In cooperation with permittees and the interested public, develop and implement AMPs or grazing management agreements as necessary to meet multiple use objectives.	In cooperation with permittees and the interested public, develop or revise AMPs or grazing management agreements for all category "I" allotments and allotments not meeting *Wyoming Standards for Healthy Rangelands*, emphasizing meeting multiple use objectives over livestock forage availability.	In cooperation with permittees and the interested public, develop or revise AMPs and grazing management agreements emphasizing livestock forage availability while meeting multiple-use objectives.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6281	X	X	LR:10.1 -10.3	Design range improvement projects, including vegetation treatments, to meet multiple-use objectives, mitigate impacts to other resource values, and meet allotment management objectives.	In cooperation with interested public, design range improvement projects, including vegetation treatments, to maximize multiple use benefits. Strive to maximize funding by utilizing, leveraging, and partnering with outside funding sources.	In cooperation with permittees and interested public, design range improvement projects, including vegetation treatments, to maximize livestock forage use while meeting multiple-use objectives. Strive to maximize funding by utilizing, leveraging, and partnering with outside funding sources.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
6282	X	X	LR:10.1 LR:10.3	Allow livestock use of produced water, meeting applicable standards on a case-by-case basis.	Do not develop livestock watering facilities with new surface discharge of produced water.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

6000 LAND RESOURCES (LR) – Livestock Grazing Management									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
6283	X	X	LR:10.1	No similar action.	Same as Alternative A.	Same as Alternative A.	Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Areas of Critical Environmental Concern (ACECs)									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL SD:1 Protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or process, or to protect life and safety from natural hazards. **Objectives:** **SD:1.1** Utilize special designations to meet resource protection needs within appropriate geographical areas. **SD:1.2** Provide for appropriate interpretation of sites of high public interest.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
7001	X	X	SD:1.1 SD:1.2	A plan of operations for all locatable mineral exploration (except casual use) and development on mining claims is required in ACECs.					
7002	X	X	SD:1.1 SD:1.2	Allow permitted livestock grazing use, unless otherwise prohibited, in agreement with the *Wyoming Standards for Healthy Rangelands*.					

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS – ACECs – Big Cedar Ridge ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7003		X	SD:1.1 SD:1.2	Manage the Big Cedar Ridge ACEC as the existing ACEC boundary (Map 84 and Appendix F; 264 acres).	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7004		X	SD:1.1 SD:1.2	Allow the use of hand tools in the Big Cedar Ridge ACEC to collect plant fossils for research and casual use in the fossil concentration areas. Mechanized collection may be approved on a case-by-case basis.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7005		X	SD:1.1 SD:1.2	Do not require site-specific surveys for cultural and historic resources for casual use collection of plant fossils in the fossil concentration areas of the Big Cedar Ridge ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7006		X	SD:1.1 SD:1.2	The Big Cedar Ridge ACEC is open to mineral leasing.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7007		X	SD:1.1 SD:1.2	Apply a NSO restriction on the 264-acre fossil concentration area in the Big Cedar Ridge ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7008		X	SD:1.1 SD:1.2	The 264-acre fossil concentration area is closed to geophysical exploration.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7009		X	SD:1.1 SD:1.2	Manage the 264-acre fossil concentration area of the Big Cedar Ridge ACEC as a ROW exclusion area. The fossil	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS – ACECs – Big Cedar Ridge ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				concentration area is closed to ROW authorizations and the use of heavy equipment; the use and maintenance of existing ROW and existing range improvement projects is allowed.					
7010		X	SD:1.1 SD:1.2	Motorized vehicle use is limited to existing roads and trails in the Big Cedar Ridge ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7011		X	SD:1.1 SD:1.2	The Big Cedar Ridge ACEC is open to consideration for leasing of geothermal resources; prohibit surface-disturbing activities associated with geothermal exploration and development in the 264-acre fossil concentration area.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7012		X	SD:1.1 SD:1.2	Pursue a withdrawal from appropriation under the mining laws for the Big Cedar Ridge ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7013		X	SD:1.1 SD:1.2	The 264-acre fossil concentration area is closed to mineral materials disposal and related exploration and development activities.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS – ACECs – Big Cedar Ridge ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7014		X	SD:1.1 SD:1.2	Encourage and expand public education opportunities in the Big Cedar Ridge area. Work with museums in highlighting paleontological resources from the area.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Red Gulch Dinosaur Tracksite ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7015		X	SD:1.1 SD:1.2	Manage the Red Gulch Dinosaur Tracksite ACEC as the existing ACEC boundary (Map 84 and Appendix F; 1,798 acres).	Same as Alternative A.	No ACEC would be designated.[3]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7016		X	SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Red Gulch Dinosaur Tracksite ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7017		X	SD:1.1 SD:1.2	Prohibit surface-disturbing activities within the Red Gulch Dinosaur Tracksite ACEC, except the construction of roads, trails, interpretive signs, and other facilities to enhance public education and recreation, and activities allowed under a paleontological resources use permit.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7018		X	SD:1.1 SD:1.2	Require all scientific and educational researchers studying the dinosaur tracks or working in that geologic horizon in the Red Gulch Dinosaur Tracksite ACEC to obtain a paleontological resources use permit.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7019		X	SD:1.1 SD:1.2	Prohibit the use of heavy equipment to construct fire lines and the use of chemical and dye retardants in the Red Gulch Dinosaur Tracksite ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Red Gulch Dinosaur Tracksite ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7020		X	SD:1.1 SD:1.2	Close the interpretive area of the Red Gulch Dinosaur Tracksite ACEC to livestock grazing.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7021		X	SD:1.1 SD:1.2	Apply a NSO restriction for mineral leasing, exploration, and development on BLM-administered lands in the Sundance Formation of the Red Gulch Dinosaur Tracksite ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7022		X	SD:1.1 SD:1.2	Pursue a withdrawal from appropriation under the mining laws for the Red Gulch Dinosaur Tracksite ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Sheep Mountain Anticline ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7023	X		SD:1.1 SD:1.2	Manage the Sheep Mountain Anticline ACEC as the existing ACEC boundary (Map 84 and Appendix F; 11,520 acres).	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A, plus manage the Sheep Mountain Anticline ACEC as VRM Class II.	Same as Alternative A.	Same as Alternative D.
7024	X		SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Sheep Mountain Anticline ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7025	X		SD:1.1 SD:1.2	Prohibit surface-disturbing activities such as geophysical exploration (except casual use), mineral materials disposal, and construction activities (except those related to development of recreation or wildlife habitat) above caves and cave passages on BLM-administered lands in the Sheep Mountain Anticline ACEC. Allow surface-disturbing activities elsewhere in the ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Prohibit surface-disturbing activities such as geophysical exploration (except casual use), mineral materials disposal, and construction activities (except those related to development of recreation or wildlife habitat) above caves and cave passages on BLM-administered lands in the Sheep Mountain Anticline ACEC. Consider approving surface-disturbing activities elsewhere in the ACEC if the action can be mitigated.	Same as Alternative B.	Same as Alternative D.
7026	X		SD:1.1 SD:1.2	Pursue a withdrawal from appropriation under the mining laws for the Sheep Mountain Anticline ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7027	X		SD:1.1 SD:1.2	Maintain existing semi-primitive motorized and primitive recreational settings. Protect the Sheep Mountain Anticline ACEC's outstanding scenic	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Sheep Mountain Anticline ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				values while continuing to provide limited developed recreational facilities and motorized access.					
7028	X		SD:1.1 SD:1.2	Manage the Sheep Mountain Anticline ACEC for recreational and interpretive use.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7029	X		SD:1.1 SD:1.2	The Sheep Mountain Anticline ACEC is open to oil and gas leasing.	The Sheep Mountain Anticline ACEC is closed to oil and gas leasing.	Same as Alternative A.	Apply a NSO restriction on the center of the Sheep Mountain Anticline and a CSU on the northern portion and the southern portion.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Spanish Point Karst ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
7030		X	SD:1.1 SD:1.2	Manage the Spanish Point Karst ACEC as the existing ACEC boundary (Map 84 and Appendix F; 6,298 acres).					
7031		X	SD:1.1 SD:1.2	Manage basal vegetative cover in the Spanish Point Karst ACEC to maximize (or maintain) ground cover in good or better ecological condition, commensurate with the potential of the ecological site.					
7032		X	SD:1.1 SD:1.2	Pursue a withdrawal from appropriation under the mining laws for the Spanish Point Karst ACEC. The withdrawal will involve the federal mineral estate under private surface and under federal surface administered by the USFS and the BLM.					
7033		X	SD:1.1 SD:1.2	Pursue ACEC Agreements for the cooperative management of surface activities in watersheds on USFS-administered and private lands within and adjacent to the Spanish Point Karst ACEC. To the extent possible, maintain compatible management prescriptions for these lands and those administered by the BLM.					
7034		X	SD:1.1 SD:1.2	The Spanish Point Karst ACEC is closed to oil and gas leasing.					
7035		X	SD:1.1 SD:1.2	The Spanish Point Karst ACEC is closed to geophysical exploration.					
7036		X	SD:1.1 SD:1.2	Manage the Spanish Point Karst ACEC as a ROW avoidance area.					

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Brown/Howe Dinosaur Area ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
7037	X		SD:1.1 SD:1.2	Fence and sign quarry sites on BLM-administered lands in the Brown/Howe Dinosaur Area ACEC.					
7038	X		SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Brown/Howe Dinosaur Area ACEC.					
7039	X		SD:1.1 SD:1.2	Mitigate surface-disturbing activities in the Brown/Howe Dinosaur Area ACEC.					
7040	X		SD:1.1 SD:1.2	Allow collection, excavation, or removal in the Brown/Howe Dinosaur Area ACEC of scientifically significant paleontological resources only under a Paleontological Resource Use Permit. Only issue permits to individuals engaged in research, museum, or educational projects that are approved by the BLM and that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and museums.					
7041	X		SD:1.1 SD:1.2	Do not sell or exchange public lands within the Brown/Howe Dinosaur Area ACEC unless such disposal would be consistent with the management objectives and would improve management capability and resource protection in the area.					
7042	X		SD:1.1	Coordinate with local stakeholders in landscape management in the Brown/Howe Dinosaur Area ACEC.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
7043	X		SD:1.1 SD:1.2	Manage the Brown/Howe Dinosaur Area ACEC as the existing ACEC boundary (Map 84 and Appendix F; 5,501 acres).	Expand the Brown/Howe Dinosaur Area ACEC to 20,734 acres (Map 85 and Appendix F). Apply management prescriptions for the existing ACEC to the expansion areas.	Same as Alternative A (Map 86).	Same as Alternative A (Map 87), plus manage the Brown/Howe Dinosaur Area ACEC as VRM Class III.	Same as Alternative B.	Same as Alternative D.
7044	X		SD:1.1 SD:1.2	The Brown/Howe Dinosaur Area ACEC is open to leasable and mineral materials disposal. Operations on oil and gas leases and mineral materials disposal are subject to the applicable provisions of the regulations (43 CFR 3100), including those set forth in 3162.5-1, and such other terms, stipulations, and conditions as the authorized officer deems	The Brown/Howe Dinosaur Area ACEC is closed to mineral leasing and mineral materials disposal.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Brown/Howe Dinosaur Area ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				necessary to avoid significant disturbance of the land surface or impairment of the area's natural, educational, and scientific research values, including paleontological study, excavation, and interpretation.					
7045	X		SD:1.1 SD:1.2	Allow minor ROW authorizations and other minor surface-disturbing activities in the Brown/Howe Dinosaur Area ACEC if they are preceded by a paleontological sensitivity survey and, if necessary, are monitored during construction. Management of surface-disturbing activities emphasizes avoiding impairment of the management objectives and existing values, while protecting the integrity of fossil-bearing material in the area.	Manage the Brown/Howe Dinosaur Area ACEC as a ROW avoidance area.	Same as Alternative A.	Allow minor ROW authorizations and other minor surface-disturbing activities in the Brown/Howe Dinosaur Area ACEC. Require an on-the-ground survey prior to approval of surface-disturbing activities or land-disposal actions and monitor surface-disturbing activities for PFYC 3 through 5 formations in accordance with policy. Management of surface-disturbing activities emphasizes avoiding impairment of the management objectives and existing values, while protecting the integrity of fossil-bearing material in the area.	Same as Alternative B.	Same as Alternative D.
7046	X		SD:1.1 SD:1.2	On a case-by-case basis, pursue a withdrawal from appropriation under the mining laws for ACECs and special status species habitat.	Pursue a withdrawal from appropriation under the mining laws for the Brown/Howe Dinosaur Area ACEC.	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Carter Mountain ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7047	X		SD:1.1 SD:1.2	Manage the Carter Mountain ACEC as the existing ACEC boundary (Map 84 and Appendix F; 10,867 acres).	Expand the Carter Mountain ACEC to 16,573 acres (Map 85 and Appendix F).	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
7048	X		SD:1.1 SD:1.2	Restrict the use of heavy equipment in the Carter Mountain ACEC during fire suppression operations to protect fragile soils and alpine tundra. Prescribed fire may be used as appropriate to accomplish identified multiple use management objectives.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7049	X		SD:1.1 SD:1.2	Maintain existing public access opportunities in the Carter Mountain ACEC. Pursue additional access on a case-by-case basis.	Same as Alternative A.	No ACEC would be designated.[5]	Maintain public access in the Carter Mountain ACEC consistent with the travel management plan.	Same as Alternative A.	Same as Alternative D.
7050	X		SD:1.1 SD:1.2	Approximately 840 acres in the Carter Mountain ACEC are identified for possible acquisition to improve management through consolidation of land ownership.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A, plus consider other parcels inside the ACEC for acquisition from willing sellers.	Same as Alternative A.	Same as Alternative D.
7051	X		SD:1.1 SD:1.2	Manage the Carter Mountain ACEC as a ROW avoidance area. If additional ROW authorizations are required, the effects will be intensively mitigated.	Same as Alternative A.	No ACEC would be designated.[5]	Manage the Carter Mountain ACEC as a ROW avoidance area.	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Carter Mountain ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7052	X		SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Carter Mountain ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7053	X		SD:1.1 SD:1.2	Manage visual resources in the Carter Mountain ACEC as VRM Class II (Map 84 and Appendix F).	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7054	X		SD:1.1 SD:1.2	Prohibit surface-disturbing activities such as exploration and development of leasable minerals, geophysical exploration, and ROW construction on slopes of more than 7 percent in the Carter Mountain ACEC for the protection of fragile soils and alpine tundra.	Same as Alternative A.	No ACEC would be designated.[5]	Allow surface-disturbing activities other than mineral leasing or ROWs if the effects can be avoided, minimized and/or compensated based on site-specific analysis for the protection of alpine tundra.	Same as Alternative A.	Same as Alternative D.
7055	X		SD:1.1 SD:1.2	Require approval before snow can be removed from BLM-administered roads in big game crucial winter range in the Carter Mountain ACEC. The purpose is to minimize disturbance of the animals during periods when wildlife are under high stress.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Carter Mountain ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7056	X		SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Carter Mountain ACEC with a seasonal closure from November 15 – June 15 or later if unfavorable weather or road conditions exist that could create resource damage.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A, except seasonal closures are subject to the travel management plan.	Same as Alternative A.	Same as Alternative D.
7057	X		SD:1.1 SD:1.2	Coordinate with local stakeholders in landscape management in the Carter Mountain ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7058	X		SD:1.1 SD:1.2	The Carter Mountain ACEC is open to mineral leasing and mineral materials disposal, subject to standard mitigation guidelines (Appendix F).	The Carter Mountain ACEC is closed to mineral leasing and mineral materials disposal.	No ACEC would be designated.[5]	The Carter Mountain ACEC is closed to mineral leasing and open to mineral materials disposal.	Same as Alternative B.	Same as Alternative D.
7059	X		SD:1.1 SD:1.2	The Carter Mountain ACEC is available for locatable mineral entry. Require a plan of operations for all locatable mineral exploration (except casual use) and development.	Pursue a withdrawal from appropriation under the mining laws for the Carter Mountain ACEC.	No ACEC would be designated.[5]	Pursue a withdrawal from appropriation under the mining laws for 4,998 acres of the Carter Mountain ACEC.	Same as Alternative B.	Same as Alternative D.
7060	X		SD:1.1 SD:1.2	Prohibit the construction of recreational sites in the Carter Mountain ACEC.	Consider construction of recreational facilities in the Carter Mountains ACEC to address visitor health and safety, use and user conflicts, and resource protection.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Five Springs Falls ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7061	X		SD:1.1 SD:1.2	Manage the Five Springs Falls ACEC as the existing ACEC boundary (Map 84 and Appendix F; 163 acres).	Expand the Five Springs Falls ACEC to 1,809 acres (Map 85 and Appendix F). Any management prescriptions for the existing ACEC apply to the expansion area unless otherwise noted.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
7062	X		SD:1.1 SD:1.2	During fire suppression operations, restrict the use of heavy equipment within the Five Springs Falls ACEC. Use prescribed fire as appropriate to accomplish identified multiple use management objectives.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7063	X		SD:1.1 SD:1.2	Manage the Five Springs Falls ACEC as a ROW avoidance area. If additional ROW are required, mitigate the effects.	Same as Alternative A.	No ACEC would be designated.[5]	Manage the Five Springs Falls ACEC as a ROW avoidance area.	Same as Alternative A.	Same as Alternative D.
7064	X		SD:1.1 SD:1.2	Pursue a withdrawal from appropriation under the mining laws for the Five Springs Falls ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7065	X		SD:1.1 SD:1.2	Do not allow climbing, except for the purposes of approved monitoring and research, on the cliff that forms Five Springs Falls.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7066	X		SD:1.1 SD:1.2	Prohibit surface-disturbing activities in the Five Springs Falls ACEC such as geophysical exploration (except casual	Same as Alternative A.	No ACEC would be designated.[3]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Five Springs Falls ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				use) and construction activities (except those related to development of recreation or interpretation of rare plants).					
7067	X		SD:1.1 SD:1.2	The Five Springs Falls ACEC is open to exploration and development of saleable and leasable minerals with a NSO restriction.	The Five Springs Falls ACEC is closed to mineral materials disposal and mineral leasing.	No ACEC would be designated.[5]	The Five Springs Falls ACEC is closed to mineral materials disposal and mineral leasing.	Same as Alternative B.	Same as Alternative D.
7068	X		SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Five Springs Falls ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs –Little Mountain ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7069	X		SD:1.1 SD:1.2	Manage the Little Mountain ACEC within the existing ACEC boundary (Map 84 and Appendix F; 21,476 acres). Additionally, a portion of the Little Mountain area is within the Craig Thomas Little Mountain SMA, which is managed in accordance with multiple use principles consistent with other resource objectives.	Expand the Little Mountain ACEC to 72,051 acres (Map 85 and Appendix F). Management prescriptions for the existing ACEC apply to the expansion area. The Little Mountain ACEC boundary is same as that of the Craig Thomas Little Mountain SMA.	No ACEC would be designated.[5] Same as Alternative A for the Craig Thomas Little Mountain SMA.	Same as Alternative A, plus apply specific management to 21,476 additional acres in the Craig Thomas Little Mountain SMA.	Same as Alternative B.	Same as Alternative D.
7070	X		SD:1.1 SD:1.2	During fire suppression operations, restrict the use of heavy equipment over important caves and cave passages within the Little Mountain ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A for the Little Mountain ACEC and the Craig Thomas Little Mountain SMA.	Same as Alternative A.	Same as Alternative D.
7071	X		SD:1.1 SD:1.2	Provide warnings as appropriate and establish precautions regarding safety hazards in the Little Mountain ACEC. For example, erect safety fencing and signs at abandoned mines in the ACEC warning the public of health and safety hazards posed by radioactivity at uncovered mine entrances and adits.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A for the Little Mountain ACEC and the Craig Thomas Little Mountain SMA.	Same as Alternative A.	Same as Alternative D.
7072	X		SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Little Mountain ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A for the Little Mountain ACEC and the Craig Thomas Little Mountain SMA.	Same as Alternative A.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs –Little Mountain ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7073	X		SD:1.1 SD:1.2	Manage the Little Mountain ACEC as a ROW avoidance area. If additional ROW are required, mitigate the effects.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A for the Little Mountain ACEC and the Craig Thomas Little Mountain SMA. Manage the Craig Thomas Little Mountain SMA as a renewable energy exclusion area.	Same as Alternative A.	Same as Alternative D.
7074	X		SD:1.1 SD:1.2	The Little Mountain ACEC is open to oil and gas leasing (21,477 acres).	The Little Mountain ACEC is closed to oil and gas leasing (89,146 acres of federal mineral estate).	No ACEC would be designated.[5]	Same as Alternative B for the Little Mountain ACEC (21,477 acres of federal mineral estate). Apply a CSU stipulation to portions of the Craig Thomas Little Mountain SMA (19,327 acres of federal mineral estate) and manage the remainder as closed to oil and gas leasing (58,970 acres of federal mineral estate). Allow geophysical exploration in the SMA.	Same as Alternative B.	Same as Alternative D.
7075	X		SD:1.1 SD:1.2	On a case-by-case basis, pursue a withdrawal from appropriation under the mining laws for ACECs and special status species habitat.	Pursue a withdrawal from appropriation under the mining laws for a portion (24,083 acres) of the Little Mountain ACEC.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs –Upper Owl Creek ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7076		X	SD:1.1 SD:1.2	Manage the Upper Owl Creek ACEC as the existing ACEC boundary (Map 84 and Appendix F; 13,758 acres).	Expand the Upper Owl Creek ACEC to 32,733 acres (Map 85 and Appendix F). Apply any management prescriptions for the existing ACEC to the expansion area.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
7077		X	SD:1.1 SD:1.2	Motorized vehicle use is limited to designated roads and trails in the Upper Owl Creek ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7078		X	SD:1.1 SD:1.2	Limit or prohibit surface-disturbing activities in the Upper Owl Creek ACEC to protect fragile soils, alpine tundra, important wildlife habitat, and scenic values (also see Appendix F).	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7079		X	SD:1.1 SD:1.2	Pursue a withdrawal from appropriation under the mining laws for the Upper Owl Creek ACEC.	Pursue a withdrawal from appropriation under the mining laws for the existing Upper Owl Creek ACEC and a portion of the proposed expansion area (13,016 acres).	No ACEC would be designated.[5]	Pursue withdrawals from appropriation under the mining laws for portions of the ACEC on a case-by-case basis.	Same as Alternative B.	Same as Alternative D.
7080		X	SD:1.1 SD:1.2	Require a detailed activity plan before approval of any proposal for major surface-disturbing activity in the Upper Owl Creek ACEC.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7081		X	SD:1.1 SD:1.2	The Upper Owl Creek ACEC is open for future ROW authorizations.	Manage the Upper Owl Creek ACEC as a ROW avoidance area.	No ACEC would be designated.[5]	Manage the Upper Owl Creek ACEC as a ROW avoidance area.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs –Upper Owl Creek ACEC and Proposed Expansion									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7082		X	SD:1.1 SD:1.2	Coordinate with local stakeholders in landscape management.	Same as Alternative A.	No ACEC would be designated.[5]	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
7083		X	SD:1.1 SD:1.2	The Upper Owl Creek ACEC is open to oil and gas leasing with a NSO restriction.	The Upper Owl Creek ACEC is closed to oil and gas leasing.	No ACEC would be designated.[5]	The Upper Owl Creek ACEC is closed to oil and gas leasing.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Chapman Bench ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7084	X		SD:1.1	No ACEC currently exists.[5]	Designate Chapman Bench as an ACEC (Map 85; 23,326 acres).	No ACEC would be designated.[5]	Same as Alternative C, except manage a portion of the Chapman Bench area as the Chapman Bench Management Area (3,425 acres of BLM-administered surface ownership).	Same as Alternative B.	Same as Alternative D.
7085	X		SD:1.1	No ACEC currently exists.[5]	Manage the Chapman Bench ACEC for the retention, enhancement, and success of the greater sage-grouse, mountain plover, and long-billed curlew**.**	No ACEC would be designated.[5]	Manage the Chapman Bench Management Area for the retention and success of the mountain plover, long-billed curlew, and other sensitive species habitat.	Same as Alternative B.	Same as Alternative D.
7086	X		SD:1.1	No ACEC currently exists.[5]	Motorized and mechanized vehicle use is limited to existing roads and trails in the Chapman Bench ACEC.	No ACEC would be designated.[5]	Manage motorized vehicle use in the Chapman Bench Management Area consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.
7087	X		SD:1.1	No ACEC currently exists.[5]	The Chapman Bench ACEC is closed to mineral materials disposal and mineral leasing.	No ACEC would be designated.[5]	The Chapman Bench Management Area is closed to mineral materials disposal and open to mineral leasing with a NSO restriction.	Same as Alternative B.	Same as Alternative D.
7088	X		SD:1.1	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the Chapman Bench ACEC.	No ACEC would be designated.[5]	Pursue a withdrawal from appropriation under the mining laws for the Chapman Bench Management Area.	Same as Alternative B.	Same as Alternative D.
7089	X		SD:1.1	No ACEC currently exists.[5]	Prohibit surface-disturbing activities in the Chapman Bench ACEC.	No ACEC would be designated.[5]	Allow surface-disturbing activities in the Chapman Bench Management Area consistent with other resource objectives.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Chapman Bench ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7090	X		SD:1.1	No ACEC currently exists.[5]	Manage the Chapman Bench ACEC as a renewable energy avoidance area.	No ACEC would be designated.[5]	Manage the Chapman Bench Management Area as a renewable energy avoidance area.	Same as Alternative B.	Same as Alternative D.
7091	X		SD:1.1	No ACEC currently exists.[5]	Close the Chapman Bench ACEC to geophysical exploration.	No ACEC would be designated.[5]	Open the Chapman Bench Management Area to geophysical exploration.	Same as Alternative B.	Same as Alternative D.
7092	X		SD:1.1	No ACEC currently exists.[5]	Manage the Chapman Bench ACEC as a ROW avoidance area.	No ACEC would be designated.[5]	Manage the Chapman Bench Management Area as a ROW avoidance area.	Same as Alternative B.	Same as Alternative D.
7093	X		SD:1.1	No ACEC currently exists.[5]	Seasonally stipulate, where feasible, vegetative treatments, invasive, nonnative pest species control, fuels management, and maintenance of existing facilities in the Chapman Bench ACEC.	No ACEC would be designated.[5]	Stipulate, where feasible, vegetative treatments, invasive species control, fuels management, and maintenance of existing facilities in the Chapman Bench Management Area.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Clarks Fork Basin/Polecat Bench West Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7094	X		SD:1.1 SD:1.2	Do not designate the Clarks Fork Basin/Polecat Bench area as an ACEC.	Designate the Clarks Fork Basin/Polecat Bench area as an ACEC (Map 85 and Appendix F; 23,895 acres).	Same as Alternative A.	Same as Alternative A. Part of the Clarks Fork Basin/Polecat Bench area (4,973 acres) is within the proposed PETM ACEC. See the PETM ACEC section for management prescriptions in this area.	Same as Alternative B.	Same as Alternative D.
7095	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Fence excavation sites on BLM-administered lands within the ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7096	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Clarks Fork Basin/Polecat Bench ACEC as a renewable energy exclusion area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7097	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Motorized vehicle use is limited to designated roads and trails in the Clarks Fork Basin/Polecat Bench ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7098	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Avoid or prohibit surface-disturbing activities in the Clarks Fork Basin/Polecat Bench ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7099	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Prohibit the use, occupation, construction, or maintenance of facilities within the Clarks Fork Basin/Polecat Bench ACEC that are inconsistent with the management direction and objectives for the area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Clarks Fork Basin/Polecat Bench West Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7100	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Clarks Fork Basin/Polecat Bench ACEC is closed to mineral materials disposal and mineral leasing.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7101	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the Clarks Fork Basin/Polecat Bench ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7102	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Clarks Fork Basin/Polecat Bench ACEC is closed to geophysical exploration.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7103	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow collection, excavation, or removal of scientifically important paleontological resources in the Clarks Fork Basin/Polecat Bench ACEC only under a Paleontological Resource Use Permit. Only issue permits to individuals engaged in research, museum, or educational projects that are approved by the BLM and that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and museums.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7104	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow minor ROW authorizations and other minor surface-disturbing activities in the Clarks Fork Basin/Polecat Bench ACEC if they are preceded by a	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Clarks Fork Basin/Polecat Bench West Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					paleontological sensitivity survey and, if necessary, are monitored during construction. Management of surface-disturbing activities emphasizes avoiding impairment of the management objectives and existing values, while protecting the integrity of fossil-bearing material in the area.				

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Clarks Fork Canyon ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7105	X		SD:1.1 SD:1.2	Do not designate the Clarks Fork Canyon area as an ACEC.	Designate the Clarks Fork Canyon area as an ACEC (Map 85 and Appendix F; 12,249 acres).	Same as Alternative A.	Designate the Clarks Fork Canyon area as an ACEC (Map 87 and Appendix F; 4,746 acres).	Same as Alternative B.	Same as Alternative D.
7106	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	A portion (1,211 acres) of the Clarks Fork Canyon ACEC is closed to motorized and mechanized vehicle use and the remainder is limited to designated roads and trails. Continue to implement the seasonal closure within the Bald Ridge Area.	No ACEC would be designated.[5]	Motorized vehicle use is limited to designated roads and trails in the Clarks Fork Canyon ACEC. Continue to implement the seasonal closure within the Bald Ridge Area.	Same as Alternative B.	Same as Alternative D.
7107	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Prohibit surface-disturbing activities in the Clarks Fork Canyon ACEC.	No ACEC would be designated.[5]	Allow surface-disturbing activities consistent with the goals of the ACEC.	Same as Alternative B.	Same as Alternative D.
7108	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Clarks Fork Canyon ACEC is closed to mineral materials disposal and mineral leasing.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
7109	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the Clarks Fork Canyon ACEC.	No ACEC would be designated.[5]	On a case-by-case basis, pursue a withdrawal from appropriation under the mining laws for ACECs and special status species habitat.	Same as Alternative B.	Same as Alternative D.
7110	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Clarks Fork Canyon ACEC as a renewable energy exclusion area.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
7111	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Clarks Fork Canyon ACEC is closed to geophysical exploration.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Clarks Fork Canyon ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7112	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Clarks Fork Canyon ACEC as a ROW avoidance area.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
7113	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow and seasonally stipulate, where feasible, vegetative/silviculture treatments, invasive, nonnative pest species control, fuels management, and maintenance of existing facilities.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Foster Gulch Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7114	X		SD:1.1 SD:1.2	Do not designate the Foster Gulch Paleontological Area as an ACEC.	Designate the Foster Gulch Paleontological Area as an ACEC (Map 85 and Appendix F; 27,302 acres).	Same as Alternative A.	Same as Alternative A. Part of the Foster Gulch Paleontological area (4,975 acres) is within the proposed PETM ACEC. See the PETM ACEC section for management prescriptions in this area.	Same as Alternative B.	Same as Alternative D.
7115	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Fence excavation sites on BLM-administered lands within the Foster Gulch Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7116	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Foster Gulch Paleontological Area ACEC as a renewable energy avoidance area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7117	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Motorized vehicle use is limited to designated roads and trails in the Foster Gulch Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7118	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Avoid or prohibit surface-disturbing activities in the Foster Gulch Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7119	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Prohibit the use, occupation, construction, or maintenance of facilities within the Foster Gulch Paleontological Area ACEC that are inconsistent with the management direction and objectives for the area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Foster Gulch Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7120	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Foster Gulch Paleontological Area ACEC is closed to mineral materials disposal mineral leasing.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7121	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the Foster Gulch Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7122	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Foster Gulch Paleontological Area ACEC is closed to geophysical exploration.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7123	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow collection, excavation, or removal of scientifically important paleontological resources in the Foster Gulch Paleontological Area ACEC only under a Paleontological Resource Use Permit. Only issue permits to individuals engaged in research, museum, or educational projects that are approved by the BLM and that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and museums.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7124	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow minor surface-disturbing activities in the Foster Gulch Paleontological Area ACEC if they are preceded by a paleontological sensitivity	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Foster Gulch Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					survey and, if necessary, are monitored during construction. Management of surface-disturbing activities emphasizes avoiding impairment of the management objectives and existing values, while protecting the integrity of fossil-bearing material in the area.				

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed McCullough Peaks South Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7125	X		SD:1.1 SD:1.2	Do not designate the McCullough Peaks South Paleontological Area as an ACEC.	Designate the McCullough Peaks South Paleontological Area as an ACEC (Map 85 and Appendix F; 6,994 acres).	Same as Alternative A.	Same as Alternative A. Part of the McCullough Peaks South Paleontological Area (4,959 acres) is within the proposed PETM ACEC. See the PETM ACEC section for management prescriptions in this area.	Same as Alternative B.	Same as Alternative D.
7126	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The McCullough Peaks South Paleontological Area ACEC is closed to mineral leasing.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7127	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the McCullough Peaks South Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7128	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The McCullough Peaks South Paleontological Area ACEC is closed to mineral materials disposal.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7129	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Fence excavation sites on BLM-administered lands in the McCullough Peaks South Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7130	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the McCullough Peaks South Paleontological Area ACEC as a renewable energy avoidance area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7131	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Motorized vehicle use is limited to designated roads and trails in the McCullough Peaks South Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed McCullough Peaks South Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7132	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Avoid or prohibit surface-disturbing activities in the McCullough Peaks South Paleontological Area ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7133	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Prohibit the use, occupation, construction, or maintenance of facilities within the McCullough Peaks South Paleontological Area ACEC that are inconsistent with the management direction and objectives for the area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7134	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The McCullough Peaks South Paleontological Area ACEC is closed to geophysical exploration.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7135	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow collection, excavation, or removal of scientifically important paleontological resources in the McCullough Peaks South Paleontological Area ACEC only under a Paleontological Resource Use Permit. Only issue permits to individuals engaged in research, museum, or educational projects that are approved by the BLM and that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and museums.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed McCullough Peaks South Paleontological Area ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7136	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the McCullough Peaks South Paleontological Area ACEC as a ROW avoidance area. Allow minor ROW authorizations and other minor surface-disturbing activities if they are preceded by a paleontological sensitivity survey and, if necessary, are monitored during construction. Management of surface-disturbing activities emphasizes avoiding impairment of the management objectives and existing values, while protecting the integrity of fossil-bearing material in the area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 Special Designations (SD) – ACECs – Proposed Rainbow Canyon ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7137	X		SD:1.1 SD:1.2	Do not designate the Rainbow Canyon area as an ACEC.	Designate the Rainbow Canyon area as an ACEC (Map 85 and Appendix F; 1,433 acres).	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
7138	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Fence excavation sites on BLM-administered lands within the Rainbow Canyon ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7139	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Rainbow Canyon ACEC as a renewable energy avoidance area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7140	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Motorized vehicle use is limited to designated roads and trails in the Rainbow Canyon ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7141	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Avoid or prohibit surface-disturbing activities in the Rainbow Canyon ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7142	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Prohibit the use, occupation, construction, or maintenance of facilities within the Rainbow Canyon ACEC that are inconsistent with the management direction and objectives for the area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7143	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Rainbow Canyon ACEC is closed to mineral materials disposal and mineral leasing.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7144	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the Rainbow Canyon ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 Special Designations (SD) – ACECs – Proposed Rainbow Canyon ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7145	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Rainbow Canyon ACEC is closed to geophysical exploration.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7146	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow fossil collection, excavation, or removal in the Rainbow Canyon ACEC only under a permit issued by the Wyoming BLM State Director. Only issue permits to individuals engaged in research, museum, or educational projects that are approved by the BLM and that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and museums.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7147	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Rainbow Canyon ACEC as a ROW avoidance area. Allow other minor surface-disturbing activities if they are preceded by a paleontological sensitivity survey and, if necessary, are monitored during construction. Management of surface-disturbing activities emphasizes avoiding impairment of the management objectives and existing values, while protecting the integrity of fossil-bearing material in the area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 Special Designations (SD) – ACECs – Proposed Rainbow Canyon ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7148	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Continue to allow livestock grazing under existing regulations provided it does not disturb the natural, educational, and scientific research values of the Rainbow Canyon ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Paleocene, Eocene Thermal Maximum (PETM) ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7149	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated. Portions of ACEC proposed under Alternative D are managed as the Clarks Fork Basin/Polecat Bench, McCullough Peaks South Paleontological Area, and Foster Gulch ACECs under Alternative B. See these ACECs for management prescriptions in this area.	No ACEC would be designated.[5]	Designate portions of the Clarks Fork Basin/Polecat Bench, Foster Gulch, and McCullough Peaks South areas as the PETM ACEC (Map 87 and Appendix F; 14,906 acres).	Same as Alternative B.	Same as Alternative D.
7150	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Allow renewable energy development consistent with the protection of paleontological resources and other resource goals.	Same as Alternative B.	Same as Alternative D.
7151	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Motorized vehicle use is limited to existing roads and trails in the PETM ACEC. In the McCullough Peaks Travel Management area, travel is limited to designated roads and trails.	Same as Alternative B.	Same as Alternative D.
7152	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Allow surface-disturbing activities consistent with the goals of the ACEC.	Same as Alternative B.	Same as Alternative D.
7153	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Allow the use, occupation, construction, or maintenance of facilities within the ACEC that are consistent with management direction and objectives for the area.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Paleocene, Eocene Thermal Maximum (PETM) ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7154	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Apply a NSO restriction on the PETM ACEC. Grant exceptions on a case-by-case basis. The PETM ACEC is closed to mineral materials disposal.	Same as Alternative B.	Same as Alternative D.
7155	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Allow geophysical exploration consistent with paleontological and other resource goals.	Same as Alternative B.	Same as Alternative D.
7156	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Except for casual use collection of common paleontological resources, allow fossil collection, excavation, or removal in the PETM ACEC only under a Paleontological Resource Use Permit. Only issue permits to individuals engaged in research, museum, or educational projects that are approved by the BLM and that provide for detailed recordation, reporting, care and availability of specimens to other scientists and museums.	Same as Alternative B.	Same as Alternative D.
7157	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Allow new ROW authorizations consistent with the protection of paleontological resources and other resource goals. Existing ROW or corridors are not subject to this management.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Rattlesnake Mountain ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7158	X		SD:1.1 SD:1.2	Do not designate the Rattlesnake Mountain area as an ACEC.	Designate the Rattlesnake Mountain area as an ACEC (Map 85 and Appendix F, 19,137 acres).	Same as Alternative A.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
7159	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Rattlesnake Mountain ACEC is limited to designated roads and trails and portions are seasonally closed to motorized and mechanized vehicle use.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7160	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Rattlesnake Mountain ACEC is closed to mineral materials disposal and mineral leasing.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7161	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the Rattlesnake Mountain ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7162	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Prohibit surface-disturbing activities in the Rattlesnake Mountain ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7163	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Rattlesnake Mountain ACEC as a renewable energy exclusion area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7164	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Rattlesnake Mountain ACEC is closed to geophysical exploration.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7165	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Rattlesnake Mountain ACEC as a ROW exclusion area.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Rattlesnake Mountain ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7166	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow and seasonally stipulate, where feasible, vegetative/silviculture treatments, invasive, nonnative pest species control, fuels management, and maintenance of existing facilities in the Rattlesnake Mountain ACEC.	No ACEC would be designated.[5]	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Sheep Mountain ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
7167	X		SD:1.1 SD:1.2	Coordinate with local stakeholders in landscape management.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
7168	X		SD:1.1 SD:1.2	Do not designate the Sheep Mountain area as an ACEC.	Designate the Sheep Mountain area as an ACEC (Map 85 and Appendix F; 73,298 acres including 25,151 acres of BLM-administered surface).	Same as Alternative A.	Designate the Sheep Mountain area as an ACEC (Map 87 and Appendix F; 25,960 acres including 14,200 acres of BLM-administered surface).	Same as Alternative B.	Same as Alternative D.
7169	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage Sheep Mountain ACEC as VRM Class II.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
7170	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Motorized and mechanized vehicle use is limited to designated roads and trails.	No ACEC would be designated.[5]	Motorized vehicle use is limited to designated roads and trails in the Sheep Mountain ACEC.	Same as Alternative B.	Same as Alternative D.
7171	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Sheep Mountain ACEC is closed to mineral materials disposal and mineral leasing.	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
7172	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Pursue a withdrawal from appropriation under the mining laws for the Sheep Mountain ACEC.	No ACEC would be designated.[5]	On a case-by-case basis, pursue a withdrawal from appropriation under the mining laws for ACECs and special status species habitat.	Same as Alternative B.	Same as Alternative D.
7173	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Prohibit surface-disturbing activities in the Sheep Mountain ACEC.	No ACEC would be designated.[5]	Allow surface-disturbing activities consistent with the goals of the ACEC. Limit surface-disturbing activities to slopes of 15 percent or less, except where needed to improve watershed function, wildlife habitat, or land health (e.g., including forestland management).	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Sheep Mountain ACEC									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7174	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Sheep Mountain ACEC as a renewable energy avoidance area.	No ACEC would be designated.[5]	Manage the Sheep Mountain ACEC as a renewable energy avoidance area.	Same as Alternative B.	Same as Alternative D.
7175	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	The Sheep Mountain ACEC is closed to geophysical exploration.	No ACEC would be designated.[5]	Areas available for leasing are open to geophysical exploration with specific resource protection.	Same as Alternative B.	Same as Alternative D.
7176	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Manage the Sheep Mountain ACEC as a ROW avoidance area.	No ACEC would be designated.[5]	Manage the Sheep Mountain ACEC as a ROW avoidance area.	Same as Alternative B.	Same as Alternative D.
7177	X		SD:1.1 SD:1.2	No ACEC currently exists.[5]	Allow and seasonally stipulate, where feasible, vegetative/silviculture treatments, invasive, nonnative pest species control, fuels management, and maintenance of existing facilities in the Sheep Mountain ACEC.	No ACEC would be designated.[5]	Allow and stipulate, where feasible, vegetative/silviculture treatments, invasive species control, fuels management, and maintenance of existing facilities.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
7178	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Designate greater sage-grouse priority habitat within Key Habitat Areas as the Greater Sage-Grouse Key Habitat Areas ACEC (Map 88 and Appendix F; 1,232,583 acres).	Designate greater sage-grouse priority habitat within PHMAs as the Greater Sage-Grouse PHMAs ACEC (Map 89 and Appendix F; 1,116,698 acres).
7179	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B, except implement mitigation and minimization guidelines and required design features, including specific measures for greater sage-grouse (refer to Appendix L). Incorporate greater sage-grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership.	Implement mitigation and minimization guidelines and required design features, including specific measures for greater sage-grouse (refer to Appendix L). Incorporate greater sage-grouse specific measures into project proposals as required design features.	Same as Alternative E.
7180	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B, except incorporate greater sage-grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership. Require the development of a wildlife resource monitoring and mitigation plan to address potential impacts	Incorporate BLM required design features or mitigation for any authorized mineral activity for federal mineral estate, regardless of surface ownership. Require the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							from mineral development on wildlife populations and/or habitat on a case-by-case basis.[7]	populations and/or habitat on a case-by-case basis.	
7181	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Examine the applicability of categorical exclusions in priority habitat[6]. Conduct extraordinary circumstances review if applicable.	Same as Alternative E.
7182	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Where suitable conservation actions cannot be achieved in priority habitat, seek to acquire state and private lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore sage-grouse habitat.	Same as Alternative E.
7183	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Identify areas where acquisitions (including subsurface mineral rights) or conservation easements would benefit sage-grouse habitat.	Same as Alternative E.
				Density and Disturbance					
7184	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Manage the Greater Sage-Grouse Key Habitat Areas ACEC so that anthropogenic disturbances do not exceed one disturbance per 640 acres and cover less than 3 percent of total sage-grouse habitat	In the Greater Sage-Grouse PHMAs ACEC, the density goal includes either: • Maintain or reduce the existing level of density of energy production and/or transmission

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								regardless of ownership. Anthropogenic features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, homes, and mines. Prohibit further disturbance in the Greater Sage-Grouse Key Habitat Areas ACEC where the 3 percent disturbance threshold is already exceeded until enough habitat has been restored to maintain the area under this threshold (subject to valid existing rights). Require any development to be placed at the most distal part of the lease from the lek, or, depending on topography and other habitat aspects, in an area that is less demonstrably harmful to sage-grouse.	structures on the landscape in sagebrush communities, or • Manage the existing level of density of disturbance on the landscape so that anthropogenic disturbances do not exceed one disturbance per 640 acres within the Density and Disturbance Calculation Tool (DDCT) analysis (or best available tool) and cover less than 3 percent of sagebrush habitat. Consolidate anthropogenic features from development and transmission on the landscape, regardless of land ownership patterns or whether proposed actions occur in the Greater Sage-Grouse PHMAs ACEC. Allow high profile structures (higher than 12 feet) within greater sage-grouse nesting habitat on a case-by-case basis.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Lands & Realty									
7185	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Evaluate and remove, bury, or modify existing powerlines within priority sage-grouse habitat areas on a case-by-case basis.	Same as Alternative E.
7186	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Allow only below ground ROWs within designated ROW corridors. Co-locate new ROWs only if the entire footprint of the proposed project (including construction and staging) can be completed within the existing disturbance associated with the authorized ROWs.	Allow only below ground ROWs within designated ROW corridors. Construct new transmission lines between July 1 and March 14 (or between July 1 and November 30 in mapped winter concentration areas) and within 0.5 miles on either side of existing 115 kV or larger transmission lines.
7187	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Manage the ACEC as a ROW exclusion area. Co-locate new ROWs within existing ROWs or where it best minimizes sage-grouse impacts where new ROWs associated with valid existing rights are required. Use existing roads or realignments, as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, build any new road to the absolute	Manage the ACEC as a ROW avoidance/ mitigation area. Allow ROWs where it best minimizes sage-grouse impacts, build new roads to the minimum standard necessary, and add the surface disturbance to the total disturbance in the Greater Sage-Grouse PHMAs ACEC if valid existing rights cannot be accessed via existing roads. If disturbance exceeds 3 percent for that area, implement additional effective mitigation on a case-by-case basis to offset the

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								minimum standard necessary, and add the surface disturbance to the total disturbance in the Greater Sage-Grouse Key Habitat Areas ACEC. If that disturbance exceeds 3 percent for that area, implement additional effective mitigation on a case-by-case basis to offset the resulting loss of sage-grouse habitat.	resulting loss of sage-grouse habitat. Use existing roads to access valid existing rights that are not yet developed to the extent practicable. Allow new ROWs to access valid, existing rights and private and state inholdings where needed.
7188	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features and restoring the habitat.	Same as Alternative E.
7189	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Relocate existing designated ROW corridors crossing priority sage-grouse habitat void of any authorized ROWs, outside of the priority habitat area. If relocation is not possible, undesignate that entire corridor during the planning process.	Same as Alternative E.
7190	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Retain lands in the ACEC. Consider exceptions where there is mixed ownership, and land exchanges would allow for additional or more contiguous federal	No similar action.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								ownership patterns within the ACEC. Under portions of the Greater Sage-Grouse Key Habitat Areas ACEC with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure consideration should be given to pursuing a permanent conservation easement.	
7191	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Pursue a withdrawal from appropriation under the mining laws for the Greater Sage-Grouse Key Habitat Areas ACEC.	No similar action.
7192	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Do not recommend withdrawals not associated with mineral activity in the Greater Sage-Grouse Key Habitat Areas ACEC unless the land management is consistent with sage-grouse conservation measures.	No similar action.
7193	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	ROWs will be amended to require features that enhance sage-grouse habitat security. Allow access to existing designated corridors for maintenance.	Maintenance of existing structures would be allowed, and upgrades would be considered where need is demonstrated through the appropriate regulatory process, and would include

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									anti-perching devices and retrofitting existing towers to discourage use by raptors.
7194	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Any existing towers must undergo review for adverse effects. Review will include minimizing wires and other collision hazards for sage-grouse and migratory birds, as well as adverse impacts of night lights.	Same as Alternative E.
Renewable Energy—Wind-Energy Development									
7195	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Manage the Greater Sage-Grouse Key Habitat Areas ACEC as a renewable energy exclusion area.	Manage the Greater Sage-Grouse PHMAs ACEC as a renewable energy avoidance area. Do not authorize new applications and proposals for wind power development inside greater sage-grouse PHMAs unless it can be sufficiently demonstrated that the development activity would not result in declines of sage-grouse populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and U.S. Fish and Wildlife Service.
7196	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Prohibit the location of new meteorological towers.	No similar action.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Habitat Restoration/Vegetation Management									
7197	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit sage-grouse. Prioritize restoration in seasonal habitats that are thought to be limiting sage-grouse distribution and/or abundance.	Same as Alternative E.
7198	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Include sage-grouse habitat parameters as defined by Connelly et al. (2000), Hagen et al. (2007), or if available, State Sage-Grouse Conservation Plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within priority sage-grouse habitat areas the highest restoration priority.	Same as Alternative E.
7199	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Composition, function, and structure of native desired plant communities will be consistent with the reference state of the appropriate ESD, and maximize these properties to provide for healthy, resilient, and recovering sage-grouse	Manage areas for a higher plant community state or phase (based on state and transition models in ESDs) on a case-by-case basis where site-specific management objectives determine that a higher plant community state or phase is desirable. In

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								habitat components.	these areas the desired plant community states or phases will be determined on a site-specific basis at the implementation level.
7200	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, nonnative seeds may be used as long as they support sage-grouse habitat objectives.	Same as Alternative E.
7201	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Design post-restoration management to ensure long-term persistence. This could include changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the restoration effort that benefits sage-grouse.	Same as Alternative E.
7202	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Consider potential changes in climate when proposing restoration seedings using native plants. Consider collection from the warmer component of	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								the species' current range when selecting native species.	
7203	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Restore native (or desirable) plants and create landscape patterns which most benefit sage-grouse.	Same as Alternative E.
7204	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) the highest priority for restoration efforts.	Same as Alternative E.
7205	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	In fire prone areas where sagebrush seed is required for sage-grouse habitat restoration, consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances.	Same as Alternative E.
7206	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Avoid sagebrush reduction/treatments to increase livestock or big game forage in occupied habitat and include plans to restore high-quality habitat in areas with invasive species.	Same as Alternative E.
7207	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	For vegetation treatments, fuels management, and habitat restoration, base sage-grouse habitat	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								objectives on, in priority order, potential natural community within the applicable ESD, (Connelly et al. [2000]: 977, Table 3), or other objectives that have been demonstrated to be associated with increasing sage-grouse populations.	
7208	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	If there ever is any legitimate need to reduce "thatch" in meadows, grass mowers will be used. Thus, livestock manure, trampling damage to soils, weed spread will be minimized.	No similar action.
Integrated Invasive Species Management									
7209	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Restrict activities in sage-grouse habitat that facilitate the spread of invasive plants.	No similar action.
7210	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	In sage-grouse habitat, ensure that soil cover and native herbaceous plants are at their ESD potential to help protect against invasive plants. In areas without ESDs, reference sites would be utilized to identify appropriate desired plant communities and soil cover.	Manage areas for a higher plant community state or phase (based on state and transition models in ESDs) on a case-by-case basis where site-specific management objectives determine that a higher plant community state or phase is desirable. In these areas the desired plant community states or phases will be determined on a site-

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									specific basis at the implementation level.
7211	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants.	Same as Alternative E.
7212	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Use of herbicides will be minimized, and used only as a last resort to achieve clearly defined goals and objectives. Flash burners, mowing of weeds and selected hand cutting will be prioritized. Only if no other alternative exists will selected ground-based application of a limited range of herbicides be used.	Same as Alternative E.
7213	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Any project vehicles will be washed, and will not drive through infestations during access to site.	Same as Alternative E.
Fire and Fuels Management									
7214	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Design and implement fuels treatments in the Greater Sage-Grouse Key Habitat Areas ACEC with an emphasis on protecting existing sagebrush ecosystems. Do not reduce sagebrush canopy cover to less than 15 percent unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic	Design and implement fuels treatments in the Greater Sage-Grouse PHMAs ACEC with an emphasis on protecting existing sagebrush ecosystems. Sagebrush Treatment: Sagebrush eradication is considered disturbance and will contribute to the 3 percent disturbance factor. In stands with less than

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								protection of sage-grouse habitat and conserve habitat quality for the species. Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in future NEPA documents. Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present. Allow no fuels treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality. Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species. However, if as a last resort and after all other treatment opportunities have been explored and site specific variables allow, the use of prescribed fire for fuel breaks that would disrupt the fuel continuity across the landscape could be	15percent cover, treatment should be designed to maintain or improve sagebrush habitat percent. Sagebrush treatments that maintain sagebrush canopy cover at or above 15 percent total canopy cover within the treated acres will not be considered disturbance. Treatments that reduce sagebrush canopy cover below 15 percent will be allowed if all such treated areas make up less than 20 percent of the suitable sagebrush habitat within the DDCT analysis, and any point within the treated area is within 60 meters of sagebrush habitat with 10 percent or greater canopy cover. Treatments to enhance sagebrush/grassland will be evaluated based upon the existing habitat quality and the functional level post-treatment. Although seasonal restrictions on activities may apply, vegetation treatments that do not make the habitat unsuitable for greater sage-grouse (e.g., fence lines, two-tracks, water pipelines, or stock tanks)

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								considered in stands where cheatgrass is a very minor component in the understory. Monitor and control invasive vegetation post-treatment. Require use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet sage-grouse habitat objectives. Design post-fuels management projects to ensure long-term persistence of seeded or pre-treatment native plants. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project to ensure long-term persistence of seeded or pre-treatment native plants.	are not considered in the density calculation. In the Greater Sage-Grouse PHMAs ACEC, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. Do not reduce sagebrush canopy cover to less than 15 percent unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of priority sage-grouse habitat and conserve habitat quality for the species. Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in future NEPA documents. Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in the Greater Sage-Grouse PHMAs ACEC. Allow no fuels treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									habitat quality. Limit the use of fire to treat sagebrush in areas receiving less than 12 inches of annual precipitation. Prescribed fire to reduce hazardous fuels or enhance land health in areas receiving less than 12 inches of annual precipitation could be considered after exploring other potential treatment methods and where cheatgrass is a very minor component of the understory. Monitor and control invasive vegetation post-treatment. Rest treated areas from grazing for three full growing seasons unless vegetation recovery dictates otherwise. Require use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet sage-grouse habitat objectives. Design post-fuels management projects to

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									ensure long-term persistence of seeded or pre-treatment native plants. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management projects to ensure long-term persistence of seeded or pre-treatment native plants.
7215	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Lands will be managed for the potential natural community ecological condition to help minimize adverse impacts of fire.	Same as Alternative E.
7216	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Any fuels treatments will focus on interfaces with human habitation or significant existing disturbances.	No similar action.
7217	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Design fuels management projects in priority sage-grouse habitat to strategically and effectively reduce wildfire threats in the greatest area. This may require fuels treatments implemented in a more linear versus block design.	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7218	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels, and implement grazing management that will accomplish this objective. Consult with ecologists to minimize impacts to native perennial grasses.	Same as Alternative E.
7219	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Prioritize native seed allocation for use in sage-grouse habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from emergency stabilization and rehabilitation projects outside the Greater Sage-Grouse Key Habitat Areas ACEC to those inside it. Use of native plant seeds for emergency stabilization and rehabilitation seedings is required based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet sage-grouse habitat conservation objectives. Re-establishment of	In disturbed areas, reestablish healthy native or desired plant communities based on pre-disturbance/desired plant species composition.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								appropriate sagebrush species/subspecies and important understory plants, relative to site potential, will be the highest priority for rehabilitation efforts.	
7220	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Design post emergency stabilization and rehabilitation management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse and burro management, travel management or other activities to achieve and maintain the desired condition of emergency stabilization and rehabilitation projects to benefit sage-grouse.	No similar action.
7221	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Consider potential changes in climate when proposing post-fire seedings using native plants. Consider seed collections from the warmer component of a species' current range for selection of native seed.	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7222	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Establish and strengthen networks with seed growers to ensure availability of native seed for emergency stabilization and rehabilitation projects.	Same as Alternative E.
7223	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Close the Greater Sage-Grouse Key Habitat Areas ACEC to livestock grazing.	Post fire recovery must include establishing adequately sized exclosures (free of livestock grazing) that can be used to assess recovery.
7224	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Close the Greater Sage-Grouse Key Habitat Areas ACEC to livestock grazing.	Livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve sage-grouse habitat objectives.
7225	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Close the Greater Sage-Grouse Key Habitat Areas ACEC this to livestock grazing.	Where burned sage-grouse habitat cannot be fenced from other unburned habitat, the entire area (e.g., allotment/pasture) should be closed to grazing until recovered.
7226	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Mowing of grass will be used in any fuelbreak fuels reduction project (roadsides or other areas).	No similar action.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Comprehensive Travel and Transportation Management									
7227	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5] Limit motorized vehicle use to designated roads and trails, with a seasonal closure from March 15 to June 30.[7] In greater sage-grouse Key Habitat Areas travel management should evaluate the need for permanent or seasonal road or area closures.	No ACEC would be designated.[5]	Same as Alternative C.	Limit motorized vehicle use to designated roads and trails, with a seasonal closure from March 15 to June 30. In greater sage-grouse Key Habitat Areas travel management should evaluate the need for permanent or seasonal road or area closures.	Limit motorized vehicle use to designated roads and trails.
7228	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Limit motorized travel to existing roads, primitive roads, and trails for the interim until travel management planning is complete and routes are either designated or closed.	Same as Alternative E.
7229	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Prohibit new road construction within 4 miles of active sage-grouse leks, and avoid new road construction in occupied sage-grouse habitat.	Locate new primary and secondary roads greater than 1.9 miles from the perimeter of occupied sage-grouse leks inside core areas. Additionally, for new proposals, consider and evaluate an alternative that would locate new tertiary roads greater than 0.6 mile from the perimeter of occupied leks.
7230	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B, except using the following travel management criteria:	Complete activity level travel plans within 5 years of the record of decision. During activity	Same as Alternative E, except applies to the Greater Sage-Grouse PHMAs ACEC.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							• During subsequent travel management planning, all routes within PHMAs would undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route would be considered for closure or considered for relocation outside of sensitive greater sage-grouse habitat. • During implementation-level travel planning, threats to greater sage-grouse and their habitat would be considered when evaluating route designations and/or closures. • During subsequent travel management planning, routes within PHMAs that do not have a purpose or need would be considered for closure. • During subsequent	level planning, where appropriate, designate routes in the Greater Sage-Grouse Key Habitat Areas ACEC with current administrative/agency purpose or need to administrative access only. Route by route analysis (referred also as minimization or designation criteria as stated in 43 CFR 8342.1) in sage-grouse Key Habitat Areas will recognize sage-grouse habitat as a predominant management objective, as well as the priority resource to manage. The route by route analysis will determine future travel management plans within sage-grouse Key Habitat Areas, which would be designed to minimize impacts to sage-grouse habitat. Travel management planning will evaluate the need for closures of routes not desired for public purposes, including seasonal closures, and designate routes with current administrative/agency purpose or need to administrative access only as well as seasonal closures.	

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							travel management planning, routes within PHMAs that are duplicative parallel, or redundant would be considered for closure. • During subsequent travel management planning, OHV timing limitations would be considered in important seasonal habitats where OHV use is a threat. • During subsequent travel management planning, consider limiting snow machine travel to designated routes or consider seasonal closures in greater sage-grouse wintering areas from November 1 through March 31. • During subsequent travel management planning, routes in PHMAs not required for public access or recreation with a current administrative/agency purpose or need would be evaluated for administrative access only. • During subsequent travel management planning, prioritize	Routes designated as closed will be restored when necessary using appropriate seed mixtures for sage-grouse ecological conditions.	

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							restoration of routes not designated in a Travel Management Plan within PHMAs. • During subsequent travel management planning, consider using seed mixes or transplant techniques that will maintain or enhance greater sage-grouse habitat when rehabilitating linear disturbances. • During subsequent travel management planning, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Use time of day limits (after 10:00 AM to 7:00 PM) to reduce impacts on greater sage-grouse during breeding and nesting periods.[7]		
7231	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Limit route construction to realignments of existing designated routes in priority habitat if that realignment has a minimal impact on sage-grouse habitat, eliminates the need to construct a new road, or is necessary for motorist safety.	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7232	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Use existing roads or realignments in greater sage-grouse priority habitat to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3 percent for that area, then evaluate and implement additional, effective mitigation necessary to offset the resulting loss of sage-grouse habitat.	Same as Alternative E.
7233	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless upgrading would have minimal impact on sage-grouse habitat, is necessary for motorist safety, or eliminates the need to construct a new road.	Construct new roads to a minimum design standard needed for proposed activity.
7234	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Conduct restoration of roads, primitive roads, and trails not designated in travel management	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								plans in priority habitat. This also includes primitive routes/roads that were not designated in Wilderness Study Areas and within lands with wilderness characteristics that have been selected for protection in previous RMPs.	
7235	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	When reseeding roads, primitive roads and trails in priority habitat, use appropriate seed mixes and consider the use of transplanted sagebrush.	Same as Alternative E.
7236	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Consider closing designated roads in sage-grouse priority habitat.	Same as Alternative E.
Recreation and Visitor Services									
7237	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Only allow BLM SRPs in priority habitat that have neutral or beneficial effects to priority habitat areas (e.g., big game outfitting, which occurs during a non-critical time for sage-grouse).	Same as Alternative E.
Non-Energy Leasables									
7238	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	The Greater Sage-Grouse Key Habitat Areas ACEC is closed to non-energy mineral leasing. This includes not permitting any new leases to expand an existing mine.	No similar action.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7239	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	For existing non-energy leasable mineral leases in priority habitat, in addition to the solid minerals required design features, follow the same required design features applied to Fluid Minerals, when wells are used for solution mining.	No similar action.
Locatable Minerals									
7240	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Pursue a withdrawal from appropriation under the mining laws for the Greater Sage-Grouse Key Habitat Areas ACEC.	No similar action.
7241	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Make any existing claims within the withdrawal area subject to validity exams or buy out. Include claims that have been subsequently determined to be null and void in the proposed withdrawal. In plans of operations required prior to any proposed surface-disturbing activities, include the following: Additional, effective mitigation in perpetuity for conservation (In accordance with existing policy, WO IM 2013-142 [BLM 2013b]). Example: purchase private land and mineral rights or severed subsurface	Consider seasonal restrictions if deemed necessary to prevent unnecessary or undue degradation as defined in 43 CFR 3809.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								mineral rights within the ACEC area and deed to US Government. Consider seasonal restrictions if deemed effective.	
Salable Minerals									
7242	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	In the Greater Sage-Grouse Key Habitat Areas ACEC, restore salable mineral pits no longer in use to meet sage-grouse habitat conservation objectives.	Same as Alternative E.
7243	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Close the Greater Sage-Grouse Key Habitat Areas ACEC to mineral materials disposals.	No similar action.
Unleased Federal Fluid Mineral Estate									
7244	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	The Greater Sage-Grouse Key Habitat Areas ACEC is closed to mineral leasing.	Apply a NSO stipulation within 0.6 mile of occupied sage-grouse leks (Map 89). Apply a minimum lease size of 640 contiguous acres of federal mineral estate within sage-grouse PHMAs. Lease smaller parcels only when 640 contiguous acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations, and policy; for example, to protect the federal mineral

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									estate from drainage or to commit the federal mineral estate to unit or communitization agreements. Preliminary parcels reviewed for possible offering in a lease sale should comply with this minimum lease size. Expressions of interest that are less than this minimum lease size would be evaluated and modified by the BLM to meet the minimum lease size, where possible, prior to review for possible offering in a lease sale. Apply a TLS to restrict disruptive activity within 0.6 mile of occupied sage-grouse leks from March 1 to June 30.
Leased Federal Fluid Mineral Estate									
7245	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Require unitization when deemed necessary for proper development and operation of an area or to facilitate more orderly (e.g., phased and/or clustered) development as a means of minimizing adverse impacts to resources, including greater sage-grouse, so long as the unitization plan adequately protects the rights of all parties	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								including the United States, according to the Federal Lease Form, 3100-11, Sections 4 and 6.	
7246	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Require a full reclamation bond specific to the site in accordance with 43 CFR 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM or USFS will perform the work.	Same as Alternative E.
7247	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Upon expiration or termination of existing leases, do not accept nominations or expressions of interest for parcels within the Greater Sage-Grouse Key Habitat Areas ACEC.	No similar action.
7248	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Implement management actions regarding unitization and requirements for full reclamation bonds through implementation decisions (e.g., approval of an APD, Sundry Notice, etc.) and upon completion of the	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								environmental record of review (43 CFR 3162.5), including appropriate documentation of compliance with NEPA. Evaluate, among other things: • Whether the conservation measure is "reasonable" (43 CFR 3101.1-2) with the valid existing rights; and • Whether the action is in conformance with the approved RMP.	
7249	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Apply a NSO condition of approval in the Greater Sage-Grouse Key Habitat Areas ACEC. In the ACEC, provide the following conservation measure as terms and conditions of the approved RMP: Do not allow new surface occupancy on federal leases within the Greater Sage-Grouse Key Habitat Areas ACEC during any time of the year. Consider an exception: • If the lease is entirely within the ACEC; apply a 4 mile NSO around the lek, and limit permitted disturbances to one per section with no more than 3 percent	Apply a NSO condition of approval within 0.6 mile of occupied sage-grouse leks. Apply TLS condition of approval to restrict disruptive activity within 0.6 mile of occupied sage-grouse leks from March 1 to June 30.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								surface disturbance in that section. • If the entire lease is within the 4 mile lek perimeter, limit permitted disturbances to one per section with no more than 3 percent surface disturbance in that section. Require any development to be placed at the most distal part of the lease from the lek, or, depending on topography and other habitat aspects, in an area that is less demonstrably harmful to sage-grouse.	
7250	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Apply a TLS condition of approval to prohibit surface-disturbing exploratory drilling activities during the nesting and early brood-rearing season in priority sage-grouse habitat.	Same as Alternative E.
7251	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Complete Master Development Plans in lieu of APD-by-APD processing for all but wildcat wells.	Same as Alternative E.
7252	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Limit proposed surface disturbance to 3 percent for an area when permitting APDs on existing leases that are not yet developed.	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
								Consider an exception if additional mitigation is demonstrated to offset the resulting loss of sage-grouse habitat. Implement additional mitigation when necessary in priority sage-grouse habitat. Implement additional mitigation first within the same population area where the impact is realized, and if not possible, then conduct mitigation within the same Management Zone as the impact, per 2006 WAFWA Strategy (page 2-17).	
7253	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Explore options to amend, cancel, or buy out leases.	Consider offers to amend, cancel, or buy out leases.
7254	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Include conditions that require relinquishment of leases/authorizations if doing so will mitigate the impact of a proposed development or mitigate the unanticipated impacts of an approved development.	Same as Alternative E.
7255	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Consider exceptions, modifications, and waivers as outlined in Appendix G.	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7256	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Any oil, gas, geothermal activity will be conducted to maximize avoidance of impacts, based on evolving scientific knowledge of impacts.	Any oil, gas, geothermal activity will be reviewed based on evolving scientific knowledge of impacts.
Mineral Split Estate									
7257	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Where the federal government owns the mineral estate and the surface is in non-federal ownership, apply the conservation measures applied on public lands.	Same as Alternative E.
7258	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Where the federal government owns the surface, and the mineral estate is in non-federal ownership in priority habitat, apply appropriate Fluid Mineral BMPs to surface development.	Same as Alternative E.
Geophysical Exploration									
7259	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Close the Greater Sage-Grouse Key Habitat Areas ACEC to geophysical exploration.	Allow geophysical exploration in the Greater Sage-Grouse PHMAs ACEC to obtain exploratory information for areas outside of and adjacent to priority sage-grouse habitat areas. Allow geophysical operations only by helicopter-portable drilling methods and in accordance with seasonal timing

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									restrictions and/or other restrictions that may apply.
Livestock Grazing									
7260	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Close the Greater Sage-Grouse Key Habitat Areas ACEC to livestock grazing.	Allow livestock grazing in the Greater Sage-Grouse PHMAs ACEC.
7261	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Incorporate sage-grouse habitat objectives and management considerations into all BLM grazing allotments through AMPs or permit renewals.
7262	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Work cooperatively on integrated ranch planning so operations with deeded/State/BLM and/or USFS allotments can be planned as single units.
7263	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Prioritize completion of rangeland health assessments and processing grazing permits in the Greater Sage-Grouse PHMAs ACEC. Focus this process on allotments that have the best opportunities for conserving, enhancing, or restoring habitat for sage-grouse. Utilize ESDs to conduct rangeland health assessments to determine if standards of range-land health are being met.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7264	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Conduct rangeland health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving sage-grouse habitat objectives. If local/state seasonal habitat objectives are not available, use sage-grouse habitat recommendations from Connelly et al. (2000) and Hagen et al. (2007).
7265	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Develop specific objectives to conserve, enhance, or restore greater sage-grouse PHMAs based on BLM ESDs and assessments (including within wetlands and riparian areas). If an effective grazing system that meets sage-grouse habitat requirements is not already in place, analyze at least one alternative that conserves, restores, or enhances sage-grouse habitat in the NEPA document prepared for the permit renewal.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7266	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Manage the Greater Sage-Grouse PHMAs ACEC for vegetation composition and structure consistent with ecological site potential and within the reference state to achieve sage-grouse seasonal habitat objectives.
7267	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	During drought periods, prioritize evaluating effects of the drought in greater sage-grouse PHMAs relative to their needs for food and cover. Since there is a lag in vegetation recovery following drought, ensure that post-drought management allows for vegetation recovery that meets sage-grouse needs.
7268	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Manage riparian areas and wet meadows for proper functioning condition.
7269	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									edge to minimize elevated mortality during the late brood rearing period.
7270	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Where riparian areas and wet meadows meet proper functioning condition strive to attain reference state vegetation relative to the ecological site description.
7271	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by sage-grouse in the summer.
7272	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Avoid grazing and trailing within lekking, nesting, brood-rearing, and winter habitats during periods of the year when these habitats are used by sage-grouse.
7273	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Analyze springs, seeps, and associated water pipelines to determine if modifications are necessary to maintain the continuity of the

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									predevelopment riparian area. Make modifications where necessary, considering impacts to other water uses when such considerations are neutral or beneficial to sage-grouse.
7274	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Only allow treatments that conserve, enhance, or restore sage-grouse habitat in the Greater Sage-Grouse Key Habitat Areas ACEC (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve sage-grouse habitat).	Sagebrush Treatment: Sagebrush eradication is considered disturbance and will contribute to the 3 percent disturbance factor. In stands with less than 15 percent cover, treatment should be designed to maintain or improve sagebrush habitat percent. Sagebrush treatments that maintain sagebrush canopy cover at or above 15 percent total canopy cover within the treated acres will not be considered disturbance. Treatments that reduce sagebrush canopy cover below 15 percent will be allowed if all such treated areas make up less than 20 percent of the suitable sagebrush habitat within the DDCT analysis, and any point within the treated area is within 60 meters of sagebrush habitat with 10 percent or greater

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									canopy cover. Treatments to enhance sagebrush/grassland will be evaluated based upon the existing habitat quality and the functional level post-treatment. Although seasonal restrictions on activities may apply, vegetation treatments that do not make the habitat unsuitable for greater sage-grouse (e.g., fence lines, two-tracks, water pipelines, or stock tanks) are not considered in the density calculation. Only allow treatments that conserve, enhance, or restore sage-grouse habitat in the Greater Sage-Grouse PHMAs ACEC (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve sage-grouse habitat).
7275	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Evaluate the role of existing seedings to determine if the area should be restored to sagebrush or habitat of higher quality for sage-grouse. If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving or enhancing the rest of the greater

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									sage-grouse PHMAs, then no restoration would be necessary. Assess the compatibility of these seedings for sage-grouse habitat or as a component of a grazing system during the rangeland health assessments (or other analyses [USFS only]).
7276	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Design any new structural range improvements and supplements (salt or protein blocks) locations to conserve, enhance, or restore sage-grouse habitat through an improved grazing management system relative to sage-grouse objectives. Structural range improvements, in this context, include but are not limited to cattle guards, fences, exclosures, corrals, or other livestock handling structures; pipelines, troughs, and storage tanks (including moveable tanks used in livestock water hauling); windmills; ponds/reservoirs; solar panels; and spring developments. Potential for invasive species establishment or increase following

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									construction must be considered in the project planning process and monitored and treated post-construction.
7277	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	When developing or modifying water developments, use applicable required design features (see Appendix L) to mitigate potential impacts from West Nile virus.
7278	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Evaluate existing structural range improvements and supplements (salt or protein blocks) locations to make sure they conserve, enhance, or restore priority sage-grouse habitat.	Same as Alternative E.
7279	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Remove, modify, or mark fences to reduce outright sage-grouse strikes and mortality in high risk areas within priority sage-grouse habitat based on proximity to lek, lek size, and topography.	Same as Alternative E.
7280	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Monitor for and treat invasive species associated with existing range improvements in the Greater Sage-Grouse Key Habitat Areas ACEC.	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7281	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Maintain retirement of grazing privileges as an option in priority sage-grouse areas when the current permittee is willing to retire grazing on all or part of an allotment. Analyze the adverse impacts of no livestock use on wildfire and invasive species threats in evaluating retirement proposals.	Same as Alternative E.
7282	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Identify the specific allotment(s) where retirement of grazing privileges is potentially beneficial. (See Appendix P for a list of all grazing allotments in PHMAs; this list indicates the universe of allotments where retirement could be considered, not those currently identified for retirement.)
7283	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Encourage partners to monitor effects of retiring grazing permits in sage-grouse habitat.
7284	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	No similar action.	Any vegetation treatment plan must include pre-treatment data on wildlife and habitat condition, establish non-grazing exclosures, and include long-term monitoring where treated areas are

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
									monitored for at least 3 years before grazing returns. Continue monitoring for 5 years after livestock are returned to the area, and compare to treated, ungrazed exclosures, as well as untreated areas.
				Wild Horses and Burros					
7285	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	For all HMAs within priority sage-grouse habitat, prioritize the evaluation of all AMLs based on indicators that address structure, condition, and composition of vegetation and measurements specific to achieving sage-grouse habitat objectives.	Same as Alternative E.
7286	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B.	Conduct rangeland health assessments to determine existing structure, condition, and composition of vegetation within all HMAs.	Same as Alternative E.
				Adaptive Management					
7287	X	X	SD:1.1 SD:1.2	No ACEC currently exists.[5]	No ACEC would be designated.[5]	Same as Alternative B.	Same as Alternative B. The greater sage-grouse adaptive management plan provides regulatory assurance that unintended negative impacts to greater sage-grouse habitat will be addressed before	This RMP includes the requirements for the development of EIS/project level adaptive management strategies in support of the population management objectives for greater sage-grouse set by the	Same as Alternative E.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							consequences become severe or irreversible. Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting greater sage-grouse conservation objectives. With respect to sage-grouse, all regulatory entities in Wyoming, including the BLM and USFS, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See Appendix Y for more information on soft and hard triggers. **Soft Triggers Response:** Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal	State of Wyoming (State of Wyoming Office of the Governor, EO 2011-5 [Wyoming Office of the Governor 2011]). These adaptive management strategies will be developed in partnership with the WGFD, project proponents, partners, and stakeholders, incorporating the best available science. The purpose of these strategies will be to ensure amelioration of greater sage-grouse population declines by providing the framework in which management will be changed if negative impacts are detected through a rigorous monitoring program. Wyoming BLM typically manages the public lands to meet objectives of the State of Wyoming. At this time the population objective is to maintain at least 67 percent of the 2005-2008 Greater Sage-Grouse Core Area Population within the State of Wyoming. Wyoming BLM and USFS will coordinate with the State of Wyoming in implementation planning to develop a statewide	

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – ACECs – Proposed Greater Sage-Grouse Priority Habitat Area ACECs									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
							factor. The management agency (BLM and/or USFS) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. **Hard Trigger Response:** Upon determination that a hard trigger has been tripped, the BLM and/or USFS will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Work Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment).[7]	adaptive management plan, including mitigation where appropriate, and a framework to evaluate causal factors. The adaptive management plan will identify adaptive management triggers; indicators to be measured; and appropriate mitigation, restoration, and reclamation actions, including targets and benchmarks for responses. The plan will include both short-term and long-term monitoring. The adaptive management plan will guide the development of project level adaptive management strategies.	

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – National Back Country Byways									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL SD:2 Manage National Back Country Byways to enhance opportunities for the public to see and enjoy public lands. **Objectives:** **SD:2.1** Promote the increased awareness of the historical and cultural values and facilitate a sense of stewardship within the Red Gulch/Alkali Road National Back Country Byway. **SD:2.2** Where appropriate, identify scenic or back country byways and where necessary develop management prescriptions to maintain resource values. **SD:2.3** Through cooperative relationships with volunteer groups, landowners, other agencies, and other interested stakeholders, showcase landscapes, their scenic qualities, multiple uses, and unique character through interpretation.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
7288		X	SD:2	Continue the existing Red Gulch/Alkali Road National Back Country Byway designation (Map 90). Manage cultural and environmental interpretation and education along the Byway under the *Red Gulch/Alkali National Back Country Byway Interpretive Master Plan* (BLM 1994a).					
7289		X	SD:2.1 SD:2.3	Develop educational materials and facilities to enhance the knowledge of resources and the unique character of National Back Country Byways.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
7290		X	SD:2.2	No similar action.	Designate the Hyattville Logging Road as a primitive Back Country Byway (Map 90). The designated area includes the roadway up to the National Bighorn Forest Service connecting with FS Rd 408, which leads back to U.S. Highway 16, consisting of 25 miles of Type II and III gravel road (10 miles BLM, 8 miles USFS, 3 miles private, 4 miles State of Wyoming). Manage the area in cooperation with Big Horn County, the Bighorn National Forest Service, the State of Wyoming, and affected private landowners with the objective of encouraging responsible motorized	Do not designate the Hyattville Logging Road as a Back Country Byway.	Consider the designation of new Back Country Byways on a case-by-case basis in cooperation with stakeholders.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – National Back Country Byways									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					recreational use of the proposed Byway, while protecting and displaying the scenic, cultural, geologic, multiple uses, and crucial wildlife habitat values that occur in the area.				
7291		X	SD:2.2 SD:2.3	No similar action.	Develop interpretive facilities (including interpretive pull-outs, parking areas, trailheads, etc.) and publish interpretive and educational brochures displaying the multiple uses on BLM-administered public lands; the geologic, scenic, and cultural values; and the unique character of the Hyattville Logging Road Back Country Byway.	Do not develop interpretive facilities.	Consider the development of interpretive facilities (including interpretive pull-outs, parking areas, trailheads, etc.) and public interpretive and educational brochures displaying the multiple users on BLM-administered public lands; the geologic, scenic, and cultural values, and the unique character of newly designated Back Country Byways.	Same as Alternative B.	Same as Alternative D.
7292		X	SD:2.2	No similar action.	Designate the Hazelton (33 Mile) road as a Back Country Byway (Map 90). The designated area includes the roadway from the Washakie Country boundary south to the Natrona County Boundary connecting with the South Bighorn/Red Wall Back Country Byway, consisting of 21.7 miles of Type II gravel road (13 miles BLM, 0.7 miles State of Wyoming, and 8 miles traversing through private land).	Do not designate the Hazelton Road as a Back Country Byway.	Consider the designation of new Back Country Byways on a case-by-case basis in cooperation with stakeholders.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – National Back Country Byways									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
					Manage the area through the BLM WFO in cooperation with Washakie County, the State of Wyoming Land Board, the BLM Casper and Buffalo Field Offices, and affected private landowners with the objective of encouraging responsible motorized recreational use of the proposed byway, while protecting and displaying the scenic, cultural, geologic, multiple use, and crucial wildlife habitat values that occur in the area.				
7293		X	SD:2.2	No similar action.	Develop interpretive facilities (including interpretive pull-outs, parking areas, trailheads, etc.) and publish interpretive and educational brochures displaying the multiple uses on BLM-administered public lands; the geologic, scenic, and cultural values; and the unique character of the Hazelton Road Back Country Byway.	Do not develop interpretive facilities.	Consider the development of interpretive facilities (including interpretive pull-outs, parking areas, trailheads, etc.) and publish interpretive and educational brochures displaying the multiple uses on BLM-administered public lands; the geologic, scenic, and cultural values; and the unique character of newly designated Back Country Byways.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Heart Mountain Relocation Center National Historic Landmark									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL SD:1 Maintain and protect the integrity of unique resource values, preserve historic significance, and provide opportunity for other compatible uses where appropriate. **Objectives:** **SD:1.1** Utilize special designations to meet resource protection needs within appropriate geographical areas. **SD:1.2** Provide for appropriate interpretation of sites of high public interest.					
				MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES					
7294	X		SD:1.1 SD:2.1	Pursue a withdrawal from appropriation under the mining laws for 72 acres of federal minerals underlying federal surface within the Heart Mountain Relocation Camp National Historic Landmark.					
				MANAGEMENT ACTIONS BY ALTERNATIVE					
7295	X		SD:1.1 SD:2.1	No similar action.	Avoid surface-disturbing activities in view within 5 miles of Heart Mountain National Historic Landmark, except within existing utility corridors (Map 64 and Map 93).	Same as Alternative A.	Do not authorize undertakings of Moderate or Strong Contrast, except ROWs within the utility corridors (Map 66 and Map 93), within the viewshed from the Heart Mountain Relocation Camp National Historic Landmark toward Heart Mountain. Require all undertakings in the viewshed to have a Visual Contrast Rating and, as appropriate, require visual simulation. Avoid, minimize and/or compensate adverse effects from all undertakings by using BMPs (Appendix L).	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Heart Mountain Relocation Center National Historic Landmark									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7296	X		SD:1.1 SD:2.1	No similar action.	Manage areas within 3 miles (12,506 acres of federal mineral estate) as closed to leasing and apply a CSU stipulation in view within 5 miles (7,367 acres of federal mineral estate) of the Heart Mountain National Historic Landmark (Map 93).	Manage areas within the footprint of the original Heart Mountain Urban Area (833 acres of federal mineral estate) as closed to leasing.	Same as Alternative C, plus apply a CSU stipulation and BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects within the viewshed from the Heart Mountain Relocation Camp National Historic Landmark toward Heart Mountain.	Same as Alternative B.	Same as Alternative D.
7297	X		SD:1.1 SD:2.1	No similar action.	Close the area within 3 miles (12,506 acres of federal mineral estate) and in view within 5 miles (7,367 acres of federal mineral estate) of Heart Mountain National Historic Landmark to mineral materials disposal (Map 93).	The area within ¼ mile (387 acres of federal mineral estate), and in view within 1 mile (978 acres of federal mineral estate) of Heart Mountain National Historic Landmark is closed to mineral materials disposal (Map 93).	Prohibit mineral materials disposal within the National Historic Landmark Urban Center.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – National Historic Trails and Other Historic Trails									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL SD:3 Manage National Historic Trails and Other Historic Trails for long-term heritage and educational values and to enhance the public experience. **Objectives:** **SD:3.1** Maintain compatible recreational use with historic trail values. **SD:3.2** Maintain setting for those contributing trail segments where setting is an aspect of integrity by utilizing viewshed management tools. **SD:3.3** Safeguard the nature and purposes; and conserve, protect, and restore the National Historic Trail resources, qualities, values, and associated settings and the primary use or uses. **SD:3.4** Provide premier trail visitor experiences for public benefit. **SD:3.5** Maximize opportunities for shared National Historic Trail stewardship. **SD:3.6** Reduce the potential for uses that substantially interfere with the nature and purposes of the National Historic Trail. **SD:3.7** Avoidance of activities that are incompatible with the purposes for which the National Historic Trail was established. **SD:3.8** Identify and manage the historic route and historic remnants and artifacts for public use, enjoyment, and vicarious trail experiences. **SD:3.9** Identify and manage high potential historic sites or high potential route segments, including the recommendation of additional Federal Protection Components. **GOAL SD:4** Enhance public experience through interpretive facilities and support of heritage tourism. **Objectives:** **SD:4.1** Sites associated with historic trails will be interpreted and developed as needed. **SD:4.2** Maximize partnership and cooperative management opportunities (e.g., cooperate with private landowners to install trail markers, provide public access, etc.).					
				MANAGEMENT ACTIONS BY ALTERNATIVE					
				Nez Perce National Historic Trail					
7298	X		SD:3.1 SD:3.2 SD:4.1 SD:4.2	Avoid surface-disturbing activities in view within ¼ mile of the Nez Perce (Neeme-poo) NHT (Map 91).	Avoid surface-disturbing activities in view within 5 miles of the Nez Perce (Neeme-poo) NHT, except within existing utility corridors (Map 91).	Same as Alternative A.	Avoid surface-disturbing activities and protect the foreground of National Historic Trails (defined in Glossary) up to 3 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity of the trail. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – National Historic Trails and Other Historic Trails									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7299	X		SD:3.1 SD:3.2 SD:4.1 SD:4.2	Apply a NSO restriction within ¼ mile of the Nez Perce (Neeme-poo) NHT.	Apply a NSO restriction within 3 miles and a CSU stipulation in view within 5 miles of the Nez Perce (Neeme-poo) NHT.	Apply a NSO restriction within ¼ mile and a CSU stipulation within 1 mile of the Nez Perce (Neeme-poo) NHT.	Protect the foreground of National Historic Trails (defined in Glossary) up to 3 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.	Same as Alternative B.	Same as Alternative D.
7300	X		SD:3.1 SD:3.2 SD:4.1 SD:4.2	Avoid surface-disturbing activities in view within ¼ mile of the Nez Perce (Neeme-poo) NHT.	Areas within 3 miles, or in view within 5 miles of the Nez Perce (Neeme-poo) NHT are closed to mineral materials disposal.	Areas within ¼ mile, or in view within 1 mile of the Nez Perce (Neeme-poo) NHT are closed to mineral materials disposal.	Avoid surface-disturbing activities and protect the foreground of National Historic Trails (defined in Glossary) up to 3 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.	Same as Alternative B.	Same as Alternative D.
7301	X		SD:3.1 SD:3.2 SD:4.1 SD:4.2	Avoid surface-disturbing activities in view within ¼ mile of the Nez Perce (Neeme-poo) NHT.	Motorized vehicle use is limited to designated roads and trails in view within 5 miles of the Nez Perce (Neeme-poo) NHT.	Motorized vehicle use is limited to designated roads and trails in view within ¼ miles of the Nez Perce (Neeme-poo) NHT.	Motorized vehicle use is limited to existing roads and trails in view within 5 miles of the Nez Perce (Neeme-poo) NHT, except where other resources considerations impose more restrictive management.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – National Historic Trails and Other Historic Trails									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
Regionally Important Prehistoric and Historic Trails (Other Trails)									
7302	X	X	SD:3.1 SD:3.2 SD:4.1 SD:4.2	Avoid surface-disturbing activities in the immediate vicinity of important cultural resources and canals and in view within ¼ mile of significant segments of the Bridger Trail and Fort Washakie to Meeteetse to Red Lodge Trail (Other Trails) (Map 91).	Avoid surface-disturbing activities and ROW authorizations in view within 5 miles of Other Trails (, except within existing utility corridors (Map 91).	Avoid surface-disturbing activities and ROW authorizations in view within ¼ mile of Other Trails, except within existing utility corridors where the trail lacks physical integrity or where the trail setting has been previously compromised (Map 91).	Avoid surface-disturbing activities and protect the foreground of Historic Trails (defined in Glossary) up to 2 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects, except within designated utility corridors.	Same as Alternative B.	Same as Alternative D.
7303	X	X	SD:3.1 SD:3.2 SD:4.1 SD:4.2	Apply a NSO restriction within ¼ mile of Other Trails.	Apply a NSO restriction within 3 miles and a CSU stipulation in view within 5 miles of Other Trails.	Apply a NSO restriction within ¼ mile and a CSU stipulation within 1 mile of Other Trails, except where the trail is known to lack physical integrity or the trail setting has been previously compromised.	Protect the foreground of Historic Trails (defined in Glossary) up to 2 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail, and use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – National Historic Trails and Other Historic Trails									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7304	X	X	SD:3.1 SD:3.2 SD:4.1 SD:4.2	Avoid surface-disturbing activities in the immediate vicinity of important cultural resources and in view within ¼ mile of significant segments of Other Trails.	Areas within 3 miles, or in view within 5 miles of Other Trails are closed to mineral materials disposal.	Areas within ¼ mile, or in view within 1 mile of Other Trails are closed to mineral materials disposal, except where the trail is known to lack physical integrity or the trail setting has been previously compromised.	Avoid surface-disturbing activities and protect the foreground of Historic Trails (defined in Glossary) up to 2 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail. Use BMPs (Appendix L) to avoid, minimize and/or compensate adverse effects.	Same as Alternative B.	Same as Alternative D.
7305	X	X	SD:3.1 SD:3.2 SD:4.1 SD:4.2	No similar action.	Motorized vehicle use is limited to designated roads and trails in view within 5 miles of Other Trails.	Motorized vehicle use is limited to designated roads and trails in view within ¼ mile of Other Trails, except where the trail is known to lack physical integrity or the trail setting has been previously compromised.	Motorized vehicle use is managed consistent with other resource objectives (Map 72).	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				GOAL SD:5 Protect the free-flowing condition, water quality, tentative classification, and any outstanding remarkable values of suitable river segments until Congress designates the river or releases it for other uses. **Objective:** **SD:5.1** Protect outstanding remarkable values of eligible and suitable WSR segments.					
				MANAGEMENT ACTIONS BY ALTERNATIVE					
7306	X	X	SD:5.1	Continue interim management into perpetuity on the following WSR eligible waterways (Map 94): • Deep Creek: 5.29 miles (Wild) • Dry Medicine Lodge Creek: 10.61 miles (Scenic) • Medicine Lodge Creek: 5.72 miles (Wild) • Middle Fork of the Powder River: 1.12 miles (Recreational) • Paint Rock Creek Unit (Includes Paint Rock: 6.61 miles, South Fork of Paint Rock: 3.27 miles, and a portion of Laddie Creek: 0.69 miles): 11.18 miles (Recreational) • Trapper Creek: 10.91 miles (Wild) • White Creek (downstream portion): 6.98 miles (Wild) • Porcupine Creek: 10.8 miles (Wild and Scenic) • Deer Creek: 1.45 miles (Scenic)	Manage all waterways listed under Alternative A as suitable for inclusion in the NWSRS. Apply protective management based on a case-by-case review.	Manage all waterways listed under Alternative A as unsuitable for inclusion in the NWSRS, and release these areas to other uses. No special management actions are applied to these areas.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				• Oasis Spring Creek: 2.07 miles (Wild) • Trout Creek: 0.96 miles (Wild) • Cow Creek: Segments 1 and 2- 1.92 miles (Wild) • Cottonwood Creek (Segment 2): 4.05 miles (Scenic) • Clarks Fork of the Yellowstone River (Segment 3): 4.74 miles (Scenic) Unless otherwise noted, interim management on the following waterways is based on case-by-case evaluations of discretionary actions: Clarks Fork of the Yellowstone (Segment 2) (3.77 miles); Meeteetse Creek (2.78 miles); North fork Shoshone River (0.85 miles); Pat O'Hara Creek (2.17 miles); South Fork Shoshone River (1.98 miles); Canyon Creek (1.3 miles); Kirby Creek (0.15 miles); Paint Rock Creek Unit (upstream portion of Laddie Creek) (0.7 miles); and White Creek (upstream portion) (1.26 miles). See the WSR Report for a complete description of the above waterway segments.					

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7307	X	X	SD:5.1	Close BLM-administered lands within the waterway corridors of WSR eligible and suitable segments to land disposal actions.	Same as Alternative A.	Manage BLM-administered lands within these areas consistent with other resource objectives.	Same as Alternative C.	Same as Alternative A.	Same as Alternative D.
7308	X	X	SD:5.1	Prohibit water impoundments, major diversions, or hydroelectric power facilities on all waterways identified above.	Same as Alternative A.	Manage the area in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative A.	Same as Alternative C.
7309	X	X	SD:5.1	Continue to pursue a withdrawal from appropriation under the mining laws for BLM-administered land within the following waterways and manage as closed to mineral leasing: • Deep Creek • Dry Medicine Lodge Creek (within the Spanish Point Karst ACEC) • Medicine Lodge Creek • Trapper Creek • White Creek (downstream portion) • Porcupine Creek ("wild" portion only) • Oasis Spring Creek • Trout Creek • Cow Creek Allow existing mineral leases to expire.	Pursue a withdrawal from appropriation under the mining laws for BLM-administered land within all waterway segments. Land within these segments is closed to mineral leasing.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7310	X	X	SD:5.1	BLM-administered land within the following scenic and recreational waterway segments is open to mineral leasing with a NSO and a seasonal NSO (WFO only): • Dry Medicine Lodge Creek (outside the Spanish Point Karst ACEC) • Middle Fork of the Powder River • Paint Rock Creek Unit (A portion of Laddie Creek, Paint Rock, and South Fork Paint Rock) • Porcupine Creek ("scenic" portion only) • Deer Creek • Cottonwood Creek • Clarks Fork of the Yellowstone River (Segment 3) Permit reasonable mining claim and mineral lease access.	Pursue a withdrawal from appropriation under the mining laws for BLM-administered land within all waterway segments. Land within these segments is closed to mineral leasing.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7311	X	X	SD:5.1	Close the following waterway segments to recreational dredging for minerals, such as gold, and to mineral materials disposal: • Deep Creek • Dry Medicine Lodge Creek • Medicine Lodge Creek • Trapper Creek	Same as Alternative A.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative A.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				• White Creek (downstream portion) • Porcupine Creek • Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Cottonwood Creek • Clarks Fork of the Yellowstone River (Segment 3)					
7312	X	X	SD:5.1	Limit geophysical exploration on BLM-administered land within the following waterway segments to foot access: • Deep Creek • Medicine Lodge Creek • Trapper Creek • White Creek (downstream portion) • Porcupine Creek • Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Cottonwood Creek • Clarks Fork of the Yellowstone (Segment 3)	BLM-administered land within all waterway segments is closed to geophysical exploration.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7313		X	SD:5.1	BLM-administered land within the following scenic and recreational waterway segments is open to geophysical exploration: • Middle Fork of the	Close BLM-administered land within all waterway segments to geophysical exploration.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				Powder River • Dry Medicine Lodge Creek • Paint Rock Creek Unit (a portion of Laddie Creek, Paint Rock, and South Fork Paint Rock) Motorized vehicle use is limited to existing roads and trails.					
7314	X	X	SD:5.1	Allow surface-disturbing activities on BLM-administered land within the following scenic and recreational waterway segments on a case by case basis: • Middle Fork of the Powder River • Paint Rock Creek Unit (a portion of Laddie Creek, Paint Rock, and South Fork Paint Rock) • Dry Medicine Lodge Creek Allow for activities such as recreation, range, and wildlife habitat improvements.	Prohibit surface-disturbing activities on BLM-administered land within all waterway segments.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7315	X	X	SD:5.1	Prohibit surface-disturbing activities such as construction of major recreation developments, wildlife habitat improvements, and range improvements on BLM-administered land within the following waterway segments:	Same as Alternative A.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				• Deep Creek • Medicine Lodge Creek • Trapper Creek • White Creek (downstream portion) • Porcupine Creek • Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Cottonwood Creek • Clarks Fork of the Yellowstone River (Segment 3)					
7316		X	SD:5.1	Manage BLM-administered land within the following wild waterway segments as ROW exclusion areas: • Deep Creek • Medicine Lodge Creek • Trapper Creek • White Creek (downstream portion)	Manage BLM-administered land within all waterway segments as ROW exclusion areas, except where private land access must be provided according to policy.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7317	X	X	SD:5.1	Manage BLM-administered land within the following wild, scenic, and recreational waterway segments as ROW avoidance areas: • Dry Medicine Lodge Creek • Paint Rock Creek Unit (a portion of Laddie Creek, Paint Rock, and South Fork Paint Rock) • Porcupine Creek	Manage BLM-administered land within all waterway segments as ROW exclusion areas, except where private land access must be provided according to policy.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				• Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Cottonwood Creek • Clarks Fork of the Yellowstone River (Segment 3)					
7318		X	SD:5.1	BLM-administered land within the following recreational waterway segment is open to ROW authorizations: • Middle Fork of the Powder River	Manage BLM-administered land within all waterway segments as ROW exclusion areas, except where private land access must be provided according to policy.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7319		X	SD:5.1	BLM-administered land within the following wild waterway segments is closed to motorized vehicle use and the use of motorized or mechanized vehicle ground equipment to suppress fires is prohibited, except were life is at risk: • Deep Creek • Medicine Lodge Creek • Trapper Creek • White Creek (downstream portion) • Canyon Creek Motorized vehicle use is limited to existing roads and trails, and the use of motorized and mechanized vehicle ground equipment off existing roads and trails to suppress fires is	BLM-administered land within the following wild, scenic, and recreational waterway segments is closed to motorized vehicle use and the use of motorized or mechanized vehicle ground equipment to suppress fires is prohibited: • Dry Medicine Lodge Creek • Paint Rock Creek Unit (Laddie Creek, Paint Rock, and South Fork Paint Rock) • Deep Creek • Medicine Lodge Creek • Trapper Creek • White Creek Motorized vehicle use is limited to designated roads and trails, and the	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				prohibited on BLM-administered land within the following scenic and recreational waterway segments, except where life is at risk: • Dry Medicine Lodge Creek • Middle Fork of the Powder River • Paint Rock Creek Unit (a portion of Laddie Creek, Paint Rock, and South Fork Paint Rock) • Kirby Creek	use of motorized or mechanized vehicle ground equipment to suppress fires is prohibited on BLM-administered land within the following recreational waterway segment: • Middle Fork of the Powder River • Canyon Creek • Kirby Creek				
7320	X		SD:5.1	Motorized vehicle use is limited to designated roads and trails within the following areas to maintain the outstanding remarkable values associated with wild and scenic waterway segments: • Porcupine Creek • Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Clarks Fork of the Yellowstone River (Segment 3) • Meeteetse Creek • North Fork of the Shoshone River • South Fork of the Shoshone River Cottonwood Creek is	Motorized vehicle use is limited to designated roads and trails within the following areas to maintain the outstanding remarkable values associated with wild, scenic, recreational waterway segments: • North Fork of the Shoshone River • South Fork Shoshone River • Clarks Fork of the Yellowstone River (Segment 2) • Meeteetse Creek BLM-administered land within all other waterway segments is closed to motorized and mechanized vehicle use and the use of motorized or mechanized vehicle ground equipment	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				closed to motorized vehicle use. Allow motorized and mechanized vehicles to suppress fires.	to suppress fires is prohibited.				
7321	X	X	SD:5.1	Prohibit fire retardant along BLM-administered land within the following wild and scenic waterway segments: • Deep Creek • Medicine Lodge Creek • Middle Fork of the Powder River • Paint Rock Creek Unit (Laddie Creek, Paint Rock, and South Fork Paint Rock) • Trapper Creek • White Creek • Porcupine Creek • Oasis Spring • Trout Creek • Deer Creek	Prohibit fire retardant along BLM-administered land within all waterway segments.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7322	X	X	SD:5.1	Close BLM-administered land within the following wild and scenic waterway segments to timber sale or harvesting: • Deep Creek • Dry Medicine Lodge Creek • Medicine Lodge Creek • Middle Fork of the Powder River • Trapper Creek • White Creek	Close BLM-administered land within all waterway segments to timber sale or harvesting.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				(downstream portion) • Porcupine Creek • Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Cottonwood Creek • Clarks Fork of the Yellowstone River (Segment 3)					
7323	X	X	SD:5.1	Manage to prevent an increase in actual grazing use on BLM-administered land within all waterway segments.	Prohibit grazing use, including trailing, on BLM-administered land within all waterway segments.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.
7324	X	X	SD:5.1	Close BLM-administered land within all waterway segments to vegetation treatment or manipulation by means other than hand or aerial seeding methods.	Same as Alternative A.	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative A.	Same as Alternative C.
7325	X	X	SD:5.1	Manage BLM-administered land within the following wild and recreational waterway segments as VRM Class IV: • Deep Creek • Middle Fork of the Powder River Manage BLM-administered land within the following wild, scenic, and recreational waterway segments as VRM Class II, except portions within WSAs, which are managed as Class I:	Manage BLM-administered land within the following wild, scenic, and recreational waterway segments as VRM Class II: • Middle Fork of the Powder River • Paint Rock Creek Unit (Laddie Creek, Paint Rock, and South Fork Paint Rock) • Clarks Fork of the Yellowstone River • Meeteetse Creek • North Fork of the	Manage these areas in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wild and Scenic Rivers									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				• Dry Medicine Lodge Creek (except within Medicine Lodge WSA) • Medicine Lodge Creek (except within Medicine Lodge WSA) • Paint Rock Creek Unit (a portion of Laddie Creek, Paint Rock, and South Fork Paint Rock) • Trapper Creek (except within Trapper Creek WSA) • White Creek (downstream portion) • Porcupine Creek • Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Cottonwood Creek • Clarks Fork of the Yellowstone River(Segment 3)	Shoshone River • Canyon Creek • Pat O'Hara Creek • South Fork Shoshone River Manage BLM-administered land within the following wild and scenic waterway segments as VRM Class I: • Deep Creek • Dry Medicine Lodge Creek • Medicine Lodge Creek • Trapper Creek • White Creek • Porcupine Creek • Deer Creek • Oasis Spring Creek • Trout Creek • Cow Creek • Cottonwood Creek Manage BLM-administered land within Kirby Creek as VRM IV.				

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
7000 SPECIAL DESIGNATIONS (SD) – Wilderness Study Areas									
				GOAL SD:6 Manage WSAs to maintain their suitability as wilderness. **Objective:** **SD:6.1** Areas managed as WSAs will maintain a high degree of naturalness, outstanding opportunities for solitude, outstanding opportunities for primitive and unconfined recreation.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
7326	X	X	SD:6	Manage all WSAs under the guidance of BLM Manual 6330, *Management of BLM Wilderness Study Areas* (BLM 2012a), to maintain the non-impairment standard.					
7327	X	X	SD:6	The following WSAs (Map 93) are managed under BLM Manual 6330: • McCullough Peaks (24,531 acres) • Alkali Creek (9,475 acres) • Cedar Mountain (20,425 acres) • Honeycombs (20,156 acres) • Medicine Lodge (7,181 acres) • Trapper Creek (7,475 acres) • Owl Creek (668 acres) • Sheep Mountain (23,256 acres) • Red Butte (10,805 acres) • Bobcat Draw Badlands (16,969 acres)					
7328	X	X	SD:6	Manage all WSAs as VRM Class I.					
7329	X	X	SD:6	Manage WSAs as ROW avoidance areas, as detailed in BLM Manual 6330, Management of Wilderness Study Area.					
7330	X	X	SD:6	WSAs are closed to renewable energy development.					
7331	X	X	SD:6	Manage all mineral activities in WSAs as in accordance with BLM Manual 6330.					
7332	X	X	SD:6	WSAs are closed to mineral and geothermal leasing.					
7333	X	X	SD:6	WSAs are closed to mineral materials disposal.					
7334	X	X	SD:6	WSAs that are released by Congress from wilderness study will no longer be subject to BLM Manual 6330 and will be managed under general BLM management authorities found in FLPMA (43 U.S.C. 1701 et seq.) and associated regulations and policies, in accordance with the adjacent BLM-administered lands, consistent with other resource objectives.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
7335		X	SD:6	Motorized vehicle use is limited to existing roads and trails within the Cedar Mountain and Honeycombs WSAs.	The Cedar Mountain and Honeycombs WSAs are closed to motorized and mechanized vehicle use.	Motorized vehicle use is limited to designated roads and trails within the Cedar Mountain and Honeycombs WSAs.	Same as Alternative C, which may include the routes inventoried during the initial assessment.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

7000 SPECIAL DESIGNATIONS (SD) – Wilderness Study Areas									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
7336		X	SD:6	Motorized vehicle use is limited to designated roads and trails within the Trapper Creek, Medicine Lodge, and Alkali Creek WSAs. Portions of the Trapper Creek and Medicine Lodge WSAs within the Spanish Point ACEC are closed motorized vehicle use.	The Trapper Creek, Medicine Lodge, and Alkali Creek WSAs are closed to motorized and mechanized vehicle use.	Motorized vehicle use is limited to designated roads and trails identified at the time of the WSA inventory in the Trapper Creek, Medicine Lodge, and Alkali Creek WSAs.	Motorized vehicle use is limited to designated roads and trails in the Trapper Creek, Medicine Lodge, and Alkali Creek WSAs, which may include the routes inventoried during the initial assessment.	Same as Alternative B.	Same as Alternative D.
7337	X		SD:6	Carry forward the McCullough Peaks Travel Management Plan, in which motorized vehicle use is limited to designated roads and trails within the McCullough Peaks WSA.	The McCullough Peaks WSA is closed to motorized and mechanized vehicle use.	Motorized vehicle use is limited to designated roads and trails identified at the time of the WSA inventory in the McCullough Peaks WSA.	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.
7338		X	SD:6	Carry forward the Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands travel management plans, in which Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands WSAs are closed to motorized vehicle use.	Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands WSAs are closed to motorized and mechanized vehicle use.	Motorized vehicle use is limited to designated roads and trails from the time of the WSA inventory in the Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands WSAs.	Same as Alternative A.	Same as Alternative B.	Same as Alternative D.
7339	X	X	SD:6	Acquire 639 acres of state land in Bobcat Draw.	Acquire inholdings and/or lands or interest in lands within WSA boundaries in cooperation with willing landowners. Manage acquired inholdings under WSA Interim Management Policy.	Do not pursue acquisition of inholdings, lands, or interests in lands within WSA boundaries.	Acquire inholdings and/or lands or interest in lands within WSA boundaries in cooperation with willing landowners. Manage acquired inholdings to preserve their wilderness characteristics.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
8000 SOCIOECONOMIC RESOURCES (SR) – Social and Economic									
				GOAL SR:1 Provide opportunities for economic and social sustainability at the national, regional, and local level. Ensure local and regional economic development and local land use plans are considered. **Objectives:** **SR:1.1** Consider and address the economic impact of BLM decisions on the sectors affected by public land management decisions. Also, coordinate and address the impacts to the social structure of the study region to the extent these same management decisions are expected to produce major changes to the study area's social structure. **SR:1.2** Recognize infrastructure needs, including implementation and maintenance, directly and indirectly associated with BLM actions. **GOAL SR:2** Provide sustainable consumptive economic development opportunities for a diversity of resources and resource uses that are balanced against nonconsumptive uses that affect market and nonmarket values. **Objective:** **SR:2.1** Consider the options to access and utilize resources consistent with a multiple resource management philosophy that provides a sustainable and viable economic, cultural, and social environment at the national, regional, and local levels while also providing a balance between consumptive and nonconsumptive uses. **GOAL SR:3** Manage use conflicts through public education and outreach efforts. **Objective:** **SR:3.1** Work cooperatively with local agencies to foster public awareness, where suitable, through appropriate measures.				
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
8001	X	X	SR:1	Ensure BLM actions consider local and regional economic development and land use plans.					
8002	X	X	SR:2	Incorporate BLM actions that are sensitive to the economic and social health of the affected area.					
8003	X	X	SR:1	Management refers to available socioeconomic monitoring plans that provide indicators for the economic and social health of an affected area.					
MANAGEMENT ACTIONS BY ALTERNATIVE									
8004	X	X	SR:1	Manage in a way that recognizes BLM actions are integrally connected with both socioeconomics and the cultural health of the Planning Area. BLM's management recognizes and considers local and regional economic development and land use plans. To the extent possible, quantify socioeconomic impacts associated with site-specific and	Manage in a way that not only recognizes that BLM actions are integrally connected with socioeconomics and cultural health of the study area, but also with the explicit goal of developing mitigation strategies designed to resolve conflicts that have a detrimental effects on multiple resource use. Moreover, manage in a way that recognizes and	Manage in a way that not only recognizes the fact that BLM actions are integrally connected with socioeconomics and cultural health of the study area, but also with the goal of developing management strategies designed to recognize and point out conflicts that are expected to have an impact on multiple resource use. However, the focus of this strategy is	Same as Alternative A.	Same as Alternative B.	Same as Alternative A.

Table 2-9. Detailed Alternatives (Continued)

8000 SOCIOECONOMIC RESOURCES (SR) – Social and Economic									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
				programmatic BLM actions. Share the results with state and local governmental officials for the purpose of promoting collaborative management, where possible, to ensure the affected parties and overlapping jurisdictions are provided that information as required by law.	incorporates, to the extent possible, local and regional economic development and land use plans so long as they are consistent and sensitive to the multiple resource use philosophy. Quantify socioeconomic impacts associated with site-specific and programmatic BLM actions to the extent possible. Share the results with state and local governmental officials for the purpose of working together cooperatively and providing that information to the affected parties and overlapping jurisdictions as required by law.	to promote extractive industries that rely on public resources. Manage to recognize and consider local and regional economic development and land use plans. Quantify the socioeconomic impacts associated with site-specific and programmatic BLM actions to the extent possible. Share the results with state and local governmental officials for the purpose of promoting collaborative management, where possible, and to ensure the affected parties and overlapping jurisdictions are provided that information as required by law.			
8005	X	X	SR:1	No similar action.	Manage with minimal consideration of economic benefits on local communities.	Manage to maximize the economic benefits to the local communities.	Manage to provide a predictable supply of goods and services within the sustainable limits of the ecosystem, which help meet public demand. Encourage public and private partnerships to achieve the shared economic objectives of providing employment and income to local communities while benefiting ecosystem health.	Same as Alternative B.	Same as Alternative D.

Table 2-9. Detailed Alternatives (Continued)

Record #	C[1]	W[2]	Goal/ Obj.	Alternative A (Current Management)	Alternative B (Least Resource Use)	Alternative C (More Resource Use)	Alternative D (Proposed RMP)	Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)	Alternative F (Greater Sage-Grouse PHMAs ACEC)
8000 SOCIOECONOMIC RESOURCES (SR) – Health and Safety									
				GOAL SR:4 Manage risks to public health and safety and the environment posed by human-caused hazards and/or natural geologic hazards on the National System of Public Lands. **Objectives:** **SR:4.1** Protect public health and safety and the environment through complying with federal and state laws and regulations governing hazardous substances and the generation of hazardous wastes; maintaining the health of ecosystems though assessment, cleanup, and restoration of contaminated sites; and integrating environmental protection and compliance into all BLM activities. **SR:4.2** Collaborate with Wyoming DEQ through existing or new MOUs to identify and plan for remediation of Abandoned Mine Land sites, including the appropriate level of environmental review prior to on-the-ground work. **SR:4.3** Protect public health and safety through review of geologic hazards and application of appropriate management. **SR:4.4** Manage public exposure to H_2S on public lands. **SR:4.5** Reduce or eliminate hazards to human health and safety and the environment from hazardous substances or hazardous wastes.					
MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES									
8006	X	X	SR:4.1 SR:4.5	Manage hazardous substances to reduce human and environmental risk, restore contaminated lands, and carry out emergency response activities.					
8007	X	X	SR:4.1 SR:4.5	Prepare Environmental Site Assessments on lands acquired or conveyed. Notify the public of conveyance of public lands affected by hazardous substances (CERCLA 120[h]).					
8008	X	X	SR:4.1	Warn the public of the release of hazardous substances. Work to prevent public exposure to contaminated areas.					
8009	X	X	SR:4.1 SR:4.5	Manage hazardous materials, including but not limited to hazardous substances, hazardous wastes, and hazardous materials, to reduce the risk to visitors, employees, and the environment, to restore contaminated lands, and to carry out emergency response activities, as per appropriate laws, policies, and regulations.					
8010	X	X	SR:4.1 SR:4.5	Require public notification by the BLM of the type and quantity of the hazardous substances, as required under CERCLA 120(h), and BLM policy to prepare Environmental Site Assessments for the acquisition and disposal of real property before the sale, exchange, or other transfer of public lands on which storage or disposal of hazardous substances is or has been known to have occurred.					
8011	X	X	SR:4.3	Develop a geologic hazards database that ranks threats to public health and safety. Inform applicants and project proponents of geologic hazards, and develop mitigation where appropriate.					
8012	X	X	SR:4.1 SR:4.4	Comply with the requirements of Occupational Safety and Health Administration and Onshore Order #6 relative to H_2S plans for new oil and gas wells.					
8013	X	X	SR:4.4	Mitigate potential safety concerns of H_2S wells and pipelines through signs, warning sirens, and public education. Safety distances are determined through site-specific H_2S plans.					
8014	X	X	SR:4	Consistent with Wyoming DEQ and EPA requirements, require Hazardous Spill Response Plans for all projects involving hazardous materials. Report spills and releases of chemicals, petroleum products, and produced water to Wyoming DEQ in accordance with Wyoming law.					

Table 2-9. Detailed Alternatives (Continued)

8000 SOCIOECONOMIC RESOURCES (SR) – Health and Safety									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**
MANAGEMENT ACTIONS BY ALTERNATIVE									
8015	X	X	SR:4.2	Inventory AML sites for hazards, and prioritize AML sites for reclamation in coordination with Wyoming DEQ.	Same as Alternative A, plus identify AML sites with warning signage and consider adding protective fencing around shafts and adits.	Same as Alternative A, except sites are not prioritized for reclamation.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
8016	X	X	SR:4.3 SR:4.5	Allow activities in AML areas (Map 95) on a case-by-case basis.	Prohibit activities within ¼ mile of AML areas (Map 95).	Allow activities in mitigated AML areas.	Allow activities in AML areas if the impacts can be avoided, minimized and/or compensated.	Same as Alternative B.	Same as Alternative D.
8017	X	X	SR:4.3	Provide warnings for geologic hazards.	Identify geologic hazard sites with warning signage, and inventory geologic hazards. Prohibit activities in geologic hazard areas.	Same as Alternative A. Identify geologic hazards on case-by-case. Allow activities in mitigated (remediated) geologic hazard areas.	Same as Alternative C.	Same as Alternative B.	Same as Alternative C.

[1]Cody Field Office
[2]Worland Field Office
[3]Land Use Classification – criteria are based on that found in existing plans.
[4]Subject to restrictions due to other management actions.
[5]This area is managed in accordance with multiple use principles consistent with other resource objectives.
[6]"Priority habitat" when used in management actions common to alternatives E and F refers to either Key Habitat Areas (for Alternative E) or PHMAs (for Alternative F).
[7]Management is included under this alternative at this location for comparison purposes; the ACEC does not occur under Alternative B or the Proposed Plan, but this management is what would be applied to the ACEC area.

Table 2-9. Detailed Alternatives (Continued)

8000 SOCIOECONOMIC RESOURCES (SR) – Health and Safety									
Record #	**C[1]**	**W[2]**	**Goal/ Obj.**	**Alternative A (Current Management)**	**Alternative B (Least Resource Use)**	**Alternative C (More Resource Use)**	**Alternative D (Proposed RMP)**	**Alternative E (Greater Sage-Grouse Key Habitat Areas ACEC)**	**Alternative F (Greater Sage-Grouse PHMAs ACEC)**

ACEC	Area of Critical Environmental Concern
AML	Abandoned Mine Land
AMP	Allotment Management Plan
APD	Application for Permit to Drill
APHIS	Animal and Plant Health Inspection Service
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMP	Best Management Practice
BOR	Bureau of Reclamation
C&MU	Classification and Multiple Use
CBNG	Coalbed Natural Gas
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COA	Conditions of Approval
COT	Conservation Objectives Team
CSU	Controlled Surface Use
CYFO	Bureau of Land Management Cody Field Office
dBA	Decibels with an A-weighted scale
DEQ	Department of Environmental Quality
DLE	Desert Land Entry
DOI	United States Department of the Interior
DPC	Desired Plant Community
EIS	Environmental Impact Statement
EO	Executive Order
EPA	United States Environmental Protection Agency
ERMA	Extensive Recreation Management Area
ESD	Ecological Site Description
FLPMA	Federal Land Policy and Management Act
FMP	Fire Management Plan
FRCC	Fire Regime Condition Class
GHMA	General Habitat Management Area
H_2S	Hydrogen Sulfide
HA	Herd Area
HMA	Herd Management Area
HMG	Habitat Management Guidelines
HMP	Habitat Management Plan
HUC	Hydrologic Unit Code
IM	Instruction Memorandum
LRP	Limited reclamation potential
MLP	Master Leasing Plan
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHT	National Historic Trail
NOS	Notice of Staking
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NWSRS	National Wild and Scenic River System
OHV	Off-Highway Vehicle
PARC	Partners in Amphibian and Reptile Conservation
PEIS	Programmatic Environmental Impact Statement
PETM	Paleocene-Eocene Thermal Maximum
PFC	Proper Functioning Condition
PFYC	Potential Fossil Yield Classification
PHMAs	Priority Habitat Management Areas
PSD	Prevention of Significant Deterioration
R&PP	Recreation and Public Purposes
RAMP	Recreation Area Management Plan
RMA	Recreation Management Area
RMG	Reservoir Management Group
RMP	Resource Management Plan
RMZ	Recreation Management Zone
ROD	Record of Decision
ROW	Rights-of-way
SCZ	Setting Consideration Zone
SHPO	State Historic Preservation Office
SMA	Special Management Area
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
TLS	Timing Limitations
TMDL	Total Maximum Daily Load
TMP	Travel Management Plan
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management
WFO	Bureau of Land Management Worland Field Office
WGFD	Wyoming Game and Fish Department
WHMA	Wildlife Habitat Management Area
WQD	Water Quality Division
WSA	Wilderness Study Area
WSR	Wild and Scenic River

2.8 Summary of Environmental Consequences by Alternative

Table 2-10 summarizes potential impacts under alternatives A through F. Where appropriate, the table quantifies potential impacts anticipated from BLM-authorized actions. Table 2-10 summarizes impacts under the six alternatives in acres and actions. For example, more acreage implies more impact (either beneficial or adverse). The Summary of Impacts by Alternative section for each resource in Chapter 4 provides a more detailed comparison of impacts between alternatives. Chapter 4 describes cumulative impacts from non-BLM actions; Table 2-10 does not include cumulative impacts.

The environmental consequences of alternatives are not anticipated to exceed known legal thresholds or standards over the life of this RMP, with the exception of air quality under Alternative C which has the potential to exceed thresholds, and water quality under all alternatives, which has the potential to exceed state water quality standards over the life of the RMP. No additional impacts to surface water quality are anticipated under any of the alternatives, other than the potential for those waters listed as impaired in Chapter 3, to continue to exceed state standards for fecal coliform and *E. coli* until the source of contamination can be identified and all landowners support the implementation of BLM approved BMPs (see Record #1039). Standard practices, BLM-approved BMPs, and guidelines for surface-disturbing activities are built into each alternative to avoid and minimize potential impacts. The BLM would consider mitigation of residual impacts during subsequent implementation-level projects and any associated environmental analyses performed at that time. All alternatives include reclamation of surface disturbance to reduce long-term impacts.

Table 2-10. Summary of Environmental Consequences by Alternative

Resources	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Air Quality						
NAAQS	Not anticipated to exceed	Not anticipated to exceed	Potential to exceed	Not anticipated to exceed	Not anticipated to exceed	Not anticipated to exceed
WAAQS	Not anticipated to exceed	Not anticipated to exceed	Potential to exceed	Not anticipated to exceed	Not anticipated to exceed	Not anticipated to exceed
Air Quality Related Value Impacts	Potential	Lowest Potential	Highest Potential	Potential	Lowest Potential	Potential
Visibility Impacts	Potential	Lowest Potential	Highest Potential	Potential	Lowest Potential	Potential
Atmospheric Deposition	Potential	Lowest Potential	Highest Potential	Potential	Lowest Potential	Potential

Table 2-10. Summary of Environmental Consequences by Alternative (Continued)

Resources	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Soil and Water						
Acres of Surface Disturbance Anticipated	136,253 short-term/ 15,646 long-term	73,940 short-term/ 10,893 long-term	245,642 short-term/ 41,485 long-term	140,175 short-term/ 18,306 long-term	71,829 short-term/ 10,802 long-term	137,064 short-term/ 17,663 long-term
Long-term Erosion Rate (Based on Disturbance from BLM Actions)	25,065 tons/year	17,450 tons/year	66,459 tons/year	29,326 tons/year	17,305 tons/year	28,297 tons/year
Groundwater Impacts	Potential	Lowest Potential	Potential	Potential	Lowest Potential	Potential
Produced Water Impacts	Potential	Lowest Potential	Potential	Potential	Lowest Potential	Potential
Surface Water Impacts	Potential	Lowest Potential	Greatest Potential	Potential	Lowest Potential	Potential
Minerals						
Acres Withdrawn or Recommended for Withdrawal from Appropriation under the Mining Laws for Locatable Mineral Entry	72,861	314,223	48,095	83,321	1,759,312	83,321
Total Projected New Oil and Gas Wells/Pads	1,695	968	1,815	1,652	965	1,652
Acres of BLM-administered Surface with Moderate Oil and Gas Potential Managed as Closed to Leasing or with Major Constraints	32,076	227,441	3,435	56,198	227,441	56,411
Acres of BLM-administered Surface with Moderate Oil and Gas Potential Affected by Raptor Nest TLS Buffer Areas	47,429	72,717	7,908	12,035	72,717	12,035
Acres of BLM-administered Surface with Moderate Oil and Gas Potential Affected by VRM Class I and II Areas	14,128	170,583	1,888	68,253	170,583	68,253
Fire and Fuels Management						
Acres of Disturbance from Prescribed Fire	40,000 short-term/ 0 long-term	20,000 short-term/ 0 long-term	80,000 short-term/ 0 long-term	40,000 short-term/ 0 long-term	18,000 short-term/ 0 long-term	40,000 short-term/ 0 long-term
Acres of Disturbance from Mechanical Fuels Treatment	30,000 short-term/ 0 long-term	5,000 short-term/ 0 long-term	60,000 short-term/ 0 long-term	30,000 short-term/ 0 long-term	5,000 short-term/ 0 long-term	30,000 short-term/ 0 long-term
Vegetation						
Acres of Surface-disturbing Activities in Grassland and Shrubland Communities	116,578 short-term/ 13,387 long-term	63,263 short-term/ 9,320 long-term	210,171 short-term/ 35,495 long-term	119,933 short-term/ 15,663 long-term	61,457 short-term/ 9,242 long-term	117,273 short-term/ 15,113 long-term

Table 2-10. Summary of Environmental Consequences by Alternative (Continued)

Resources	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Fragmentation of Native Plant Communities	Potential	Lowest Potential	Potential	Low Potential	Lowest Potential	Low Potential
Acres within and around Riparian/Wetland Areas where Surface-disturbing Activities are Restricted	70,715 (prohibited unless mitigated)	162,887 (prohibited)	CBC	70,715 (avoided) up to 140,464 if needed	162,887 (prohibited)	70,715 (avoided) up to 140,464 if needed
Wetland Impacts	Potential	Lowest Potential	Potential	Low Potential	Lowest Potential	Low Potential
Invasive Species and Pest Management						
Contribute to Spread of Invasive and/or Pest Species	Potential	Lowest Potential	Highest Potential	Potential	Lowest Potential	Potential
Fish and Wildlife						
Impacts to Water Quality and Fish Habitat	Potential	Lowest Potential	Highest Potential	Potential	Lowest Potential	Potential
Acres/Percent of Big Game Crucial Winter Range Closed to Mineral Leasing or with Major/Moderate Constraints	1,830,970/ 99%	1,830,970/ 99%	732,322/ 62%	1,830,970/ 99%	1,830,970/ 99%	1,830,970/ 99%
Acres of Big Game Crucial Winter Range Exempted from Seasonal Stipulations due to Oil and Gas Management Area	N/A	N/A	260,460	190,891	N/A	190,891
Special Status Species						
Adverse Effects to ESA Species within the Planning Area	Potential	Low Potential	Highest Potential	Low Potential	Lowest Potential	Low Potential
Acres of Priority Sage-grouse Habitat Closed to Oil and Gas Leasing[1]	41,120	1,490,758	23,535	75,325	1,490,758	67,476
Acres of Sage-grouse Winter Habitat/Key Habitat Area Exempted from Seasonal Stipulations within Oil and Gas Management Area	0	0	194,363	0	0	0
Wild Horses						
Acres of Federal Mineral Estate in McCullough Peaks and Fifteenmile HMAs Closed to Oil and Gas Leasing	33,837	165,921	27,767	37,599	165,921	37,599
Application of Seasonal Restrictions	No	Yes	No	Yes	Yes	Yes
Heritage						
Potential to Impact Eligible/Listed Cultural Sites and Paleontological Localities	Highest Potential	Lowest Potential	Potential	Low Potential	Lowest Potential	Low Potential

Table 2-10. Summary of Environmental Consequences by Alternative (Continued)

Resources	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Renewable Energy						
Acres with High Wind Energy Potential (Wind Power Class 4-7) within Renewable Energy Avoidance Areas	N/A	61,698	25,131	43,841	50,408	43,841
Acres with High Wind Energy Potential (Wind Power Class 4-7) within Renewable Energy Exclusion Areas	N/A	28,152	3,157	15,680	39,443	15,680
Rights-of-Way and Corridors						
Acres of Rights-of-Way and Corridors	787,618	133,184	131,184	131,852	133,184	131,852
Travel and Transportation Management						
Miles/Acres of New Roads and Trails due to User-pioneered and BLM-created Routes	847 miles/ 1,233 acres	1,908 miles/ 2,776 acres	8,873 miles/ 12,907 acres	4,001 miles/ 5,820 acres	839 miles/ 1,221 acres	4,001 miles/ 5,820 acres
Miles/Acres of New Roads and Trails due to ROW Authorizations	1,351 miles/1,966 acres (short-term) 675 miles/983 acres (long-term)	845 miles/1,229 acres (short-term) 422 miles/615 acres (long-term)	3,188 miles/4,638 acres (short-term) 1,594 miles/2,319 acres (long-term)	1,351 miles/1,966 acres (short-term) 675 miles/983 acres (long-term)	845 miles/1,229 acres (short-term) 422 miles/615 acres (long-term)	1,351 miles/1,966 acres (short-term) 675 miles/983 acres (long-term)
Acres Closed to Motorized Vehicle Use	68,115	170,253	9,274	61,010	170,253	61,010
Acres Open to Motorized Vehicle Use	1,311	3,132	14,830	5,885	3,132	5,885
Acres Limited to Existing Roads and Trails	2,315,896	592,563	2,137,574	1,955,943	592,563	1,295,072
Acres Limited to Designated Roads and Trails	797,077	2,416,378	1,020,748	1,159,557	2,416,378	1,820,427
Recreation						
Potential to Impact Recreation Desired Settings, Opportunities, Activities, Experiences, and Beneficial Outcomes	Potential	Lowest Potential	Highest Potential	Low Potential	Lowest Potential	Low Potential
Lands with Wilderness Characteristics						
Potential to Impact Lands with Wilderness Characteristics	Potential	Lowest Potential	Highest Potential	Potential	Lowest Potential	Low Potential
Livestock Grazing						
Total Active (Use) AUMs[2] Lost from Closures and from Surface-disturbing Activity	1,663	163,609	4,120	1,912	163,609	1,851

Table 2-10. Summary of Environmental Consequences by Alternative (Continued)

Resources	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Potential for Effects from Restrictions in Greater Sage-Grouse Key and PHMAs	Low Potential	Highest Potential	Low Potential	Potential	Highest Potential	Potential
Active (Use) AUMs Projected at the End of the Planning Cycle/Percent Reduction from Baseline (305,264)	303,601/ <1%	141,655/ 54%	301,144/ 1%	303,352/ <1%	141,663/ 54%	303,413/ <1%
Total Authorized AUMs[3] Lost from Closures and from Surface-disturbing Activity	1,068	105,053	2,645	1,228	105,048	1,189
Authorized AUMs[3] Projected at the End of the Planning Cycle/Percent Reduction from Baseline (196,010)	194,942/ <1%	90,957/ 54%	193,365/ 1%	194,782/ <1%	90,962/ 54%	194,821/ <1%
Special Designations						
Acres Designated as ACECs	71,646	302,490	11,799	105,498	1,535,851	1,222,146
Special Designations (ACECs, SMAs, WSR eligible and suitable waterways, WSAs) Focusing on Resource Conservation	237,586	466,243	178,433	269,417	1,550,320	1,348,797
Nez Perce NHT	Potential	Lowest Potential	Potential	Low Potential	Lowest Potential	Low Potential
National Trails System – Other Historic Trails	Potential	Lowest Potential	Potential	Low Potential	Lowest Potential	Low Potential
Socioeconomics						
Effect on Planning Area Population	Low Impact	Medium Impact (potential reductions focused in oil/gas service areas, which generally correspond to population centers)	Low Impact	Low Impact	Medium Impact (potential reductions focused in oil/gas service areas, which generally correspond to population centers)	Low Impact
Effect on Housing and Community Services	Low Impact	Medium Impact (due to potential population reductions)	Low Impact	Low Impact	Medium Impact (due to potential population reductions)	Low Impact

Table 2-10. Summary of Environmental Consequences by Alternative (Continued)

Resources	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Impacts on Quality of Life and Local Culture	Low Impact	Medium Impact (change from recent trends would constitute greater emphasis on resource conservation)	Medium Impact (change from recent trends would constitute greater emphasis on resource development)	Low Impact	Low to medium Impact (change from recent trends would constitute greater emphasis on resource conservation)	Low Impact
Forecasted annual earnings (millions of 2011 dollars) due to activities on BLM-administered surface[4]	$86.7	$38.5	$94.1	$83.9	$38.3	$83.8
Forecasted annual employment due to activities on BLM-administered surface[4]	1,520	763	1,631	1,478	761	1,477

[1]Priority and Key Habitat Areas exist within the Planning Area, but Key Habitat Areas are only managed under alternatives B and C, while PHMAs are only managed under alternatives D and F.
[2]Permitted AUMs are AUMs that are allowed on a permit/lease that can be used in any given year provided the forage is available.
[3]Authorized AUMs are the AUMs actually billed for and paid for each year by the permittee/lessee. The ratio of historical average billed use or actual use to permitted use in the Planning Area is 64 percent.
[4]Estimate of annual earnings and employment includes direct, indirect, and induced economic activity (the "multiplier effect").

<	less than
ACEC	Area of Critical Environmental Concern
AUM	animal unit month
BLM	Bureau of Land Management
CBC	case-by-case
ESA	Endangered Species Act
HMA	Herd Management Area
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NHT	National Historic Trail
PHMA	Priority Habitat Management Area
ROW	right-of-way
SMA	Special Management Area
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standards
WSA	Wilderness Study Area
WSR	Wild and Scenic River

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CHAPTER 3 – AFFECTED ENVIRONMENT

This chapter describes existing conditions for Bureau of Land Management (BLM) resource programs, resource uses, and special designations, and the socioeconomic environment in the Bighorn Basin Planning Area. As summarized in Chapter 1, various laws, regulations, policies, and other requirements direct management of resources and resource uses on BLM-administered public lands. The Cody Field Office (CYFO) and Worland Field Office (WFO), which comprise the Planning Area, operate under these requirements and guidance. The CYFO and WFO also consider Best Management Practices (BMP) in the management of resources and resource uses in the Planning Area.

In addition to describing existing conditions, where appropriate this chapter identifies management challenges for resource programs and resource uses on BLM-administered lands. The BLM identified these management challenges through its Analysis of the Management Situation (AMS), and by issues identified during the scoping process for the Bighorn Basin Resource Management Plan (RMP) Revision. Because it describes existing conditions in the Planning Area, this chapter serves as the baseline against which the BLM analyzes and compares impacts of alternatives A through F in Chapter 4.

Overview of the Planning Area

The Planning Area comprises 3,187,814 acres of BLM-administered federal surface lands (Map 1) and 4,203,213 acres of BLM-administered federal mineral estate (Map 2) in Big Horn, Hot Springs, Park, and Washakie counties in north-central Wyoming. The CYFO extends west beyond the Bighorn Basin, but generally, the United States Department of Agriculture (USDA) Forest Service (USFS) and the National Park Service manage those lands; therefore, this RMP and Environmental Impact Statement (EIS) does not consider them. In each of the four counties there are large contiguous areas of BLM-administered land and smaller tracts of BLM-administered land interspersed with private and state land. There is a checkerboard pattern of state, private, and BLM-administered lands in the northwestern portion of the Planning Area.

The Planning Area lies within two Major Land Resource Areas (MLRA) – the Northern Intermountain Desertic Basins and Central Rocky Mountains. The Planning Area is in the Bighorn Basin, an asymmetric heart-shaped intermontane basin of the Rocky Mountain foreland in north-central Wyoming and south-central Montana. The basin is surrounded by mountainous uplifts, including the Big Horn and Pryor Mountains to the east and northeast, respectively, the Owl Creek Mountains to the south, the Absaroka Range to the west, and the Beartooth Mountains to the northwest (Roberts and Rossi 1999). The central low-lying part of the basin is dominated by desert shrubland and grasslands. At high elevations the dominant vegetation transitions from sagebrush and grassland to mountain shrublands and ultimately to coniferous forests. The Planning Area generally has a dry, windswept, rain-shadow climate like much of the state of Wyoming, but variations in elevation have a substantial effect on vegetation types and suitability of areas for agriculture and grazing.

The topography of the Planning Area varies from rolling plains, flat mesas, and badlands to alluvial valleys, benches, foothills and mountains (BLM 1993). Elevations in the Planning Area range from approximately 3,552 feet above mean sea level (amsl) in the middle of the basin to 11,657 feet amsl in the higher mountain ranges.

The Bighorn River and its tributaries (including the Shoshone, Nowood, Greybull and Wood Rivers, and Owl, Gooseberry, Cottonwood, Shell, Nowater, Kirby and Fifteenmile Creeks) drain the Bighorn Basin. The Clarks Fork of the Yellowstone River also drains the basin.

Basin climate is arid to semi-arid. Precipitation in the central basin is less than 10 inches per year, but up to 40 or more inches per year in the mountainous regions surrounding the basin (BLM 1993). The average annual temperature in the basin is approximately 44 degrees Fahrenheit (°F), but substantially colder in the mountain regions.

Soils and vegetation in the Planning Area generally provide rangeland suitable for year-round livestock grazing in the lower elevations. Higher elevations are generally grazed during summer and/or fall. Livestock grazing includes the grazing of domestic animals such as cattle, sheep, horses, and bison.

Agricultural production in the Planning Area is limited by low precipitation and scarcity of surface water. Major crops in the Planning Area include spring wheat, barley, oats, dry beans, sugar beets, alfalfa hay, and corn (Headwaters Economics 2007a).

Big Horn County

Big Horn County was organized in 1897, created from parcels taken from Johnson, Fremont, and Sheridan counties. In the same year, Basin, Wyoming, was named as the county seat. A portion of the Big Horn County National Recreation Area, which straddles the Wyoming-Montana state line, is in Big Horn County. The United States (U.S.) Department of Defense also administers a small parcel of land in Big Horn County.

The Bighorn River watershed, which drains the entire basin, flows through the middle of the county. Bighorn National Forest is along the eastern portion of the county and is comprised primarily of the foothills and higher mountain regions of the Big Horn Mountains.

The principle industries in Big Horn County are bentonite mining, farming, sugar-beet and bean processing, and tourism.

U.S. Highways 20 and 310 are the main north-south arteries in Big Horn County. U.S. Highway 14 traverses east-west, intersecting Highway 20 in Greybull.

Big Horn County is comprised of approximately 1,664,796 surface acres in the Planning Area, of which the BLM administers approximately 1,157,920. In addition, the BLM administers approximately 1,288,238 acres of federal mineral estate in Big Horn County.

Hot Springs County

Hot Springs County was established in 1911, the same year Thermopolis, Wyoming, was named the county seat. The county's name is derived from geothermal features that attract tourists to the county.

Most of the Wind River Canyon, with the Owl Creek Mountains on the west and the Bridger Mountains on the east, is in Hot Springs County. The Big Horn Mountains ring the eastern portion of the county, with the Absaroka Range to the west.

State Highway 789 and U.S. Highway 20 are the main north-south corridors in Hot Springs County. The county is also served by Wyoming Highway 120, which runs northwest from Thermopolis, through Meeteetse, and on to Cody.

The smallest county by area in Wyoming, Hot Springs County also has the fewest BLM-administered surface and mineral estate acres in the Planning Area. Hot Springs County is comprised of approximately 984,429 surface acres in the Planning Area, of which the BLM administers approximately 500,631. In addition, the BLM administers approximately 741,151 acres of federal mineral estate in Hot Springs County.

Park County

The largest county by area in the Planning Area, Park County also is the most populous, with approximately 27,000 residents in 2005 (Headwaters Economics 2007b). A large portion of Park County is in Yellowstone National Park, which the National Park Service administers.

What is now Park County was first a part of Sweetwater County, then Fremont County, and then Big Horn County, until 1909 when the Wyoming State Legislature defined and set aside the boundaries of Park County. Cody, Wyoming, named for William "Buffalo Bill" Cody, was chosen as the county seat the following year.

Three rivers flow through Park County – the Greybull and Shoshone Rivers, which are tributaries to the Bighorn River, and the Clarks Fork of the Yellowstone River, which flows into the Yellowstone River. Three highways serve Park County (U.S. Highway 14-16-20 east and west, U.S. Highway 14 Alternate, and Wyoming 120 north and south).

The major industries in Park County are oil and gas production, agriculture, and tourism. Park County is comprised of approximately 1,618,644 surface acres in the Planning Area, of which the BLM administers approximately 624,870. In addition, the BLM administers approximately 1,049,904 acres of federal mineral estate in Park County.

Washakie County

Washakie County was organized in 1911 and named after the head chief of the Shoshone people, Chief Washakie. The county seat of Washakie County is Worland, Wyoming.

The western part of Washakie County is intensively irrigated farmlands that lie adjacent to the Bighorn River, which winds its way through Worland. Other farmlands are along the Gooseberry and Cottonwood Creeks. The agriculture of the eastern part of Washakie County is based primarily on the production of sheep and cattle (Washakie County Conservation District 2009).

U.S. Highway 16 is the main east-west corridor in the county, passing over the Big Horn Mountains and through Ten Sleep, before turning north in Worland. State Highway 789 and U.S. Highway 20 are the main north-south arteries in Washakie County.

Washakie County is comprised of approximately 1,375,849 surface acres in the Planning Area, of which the BLM administers approximately 903,846. In addition, the BLM administers approximately 1,123,281 acres of federal mineral estate in Washakie County.

3.1 Physical Resources

Physical resources in the Planning Area include air quality, geologic resources, soil, water, and cave and karst resources. The following five resource sections define and describe the resource, its existing condition, and any management challenges for the resource.

3.1.1 Air Quality

This section describes the climate and existing air quality in the region potentially affected by the six alternatives described in Chapter 2. Air pollutants addressed include criteria pollutants, hazardous air pollutants (HAPs), and sulfur and nitrogen compounds that could impair visibility or cause atmospheric deposition, including acid rain.

Air Quality Indicators

Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) identify maximum limits for concentrations of criteria air pollutants at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health that, by law, require public safeguards to be implemented. State standards must be at least as protective of human health as federal standards, and may be more restrictive than federal standards, as allowed by the Clean Air Act. The Wyoming Prevention of Significant Deterioration (PSD) program establishes allowable increases of a given pollutant for a particular area from specific sources.

In Wyoming, it is the responsibility of Wyoming Department of Environmental Quality (DEQ) Air Quality Division, subject to United States Environmental Protection Agency (EPA) oversight, to ensure compliance with federal and state air quality standards; setting maximum allowable limits (NAAQS and WAAQS) for six criteria pollutants—CO (carbon monoxide), SO_2 (sulfur dioxide), NO_2 (nitrogen dioxide), O_3 (ozone) and particulate matter (PM_{10} and $PM_{2.5}$); and setting maximum allowable increases (PSD Increments) above legal baseline concentrations for three of these pollutants (SO_2, NO_2, and PM_{10}) in Class I and Class II areas.

Criteria Air Pollutants

The EPA established air quality standards (NAAQS) for criteria pollutants. Criteria pollutants include CO, NO_2, O_3, PM_{10} and $PM_{2.5}$, SO_2, and lead (Pb). Air-pollutant concentrations greater than the NAAQS represent a risk to human health.

Hazardous Air Pollutants

There are a wide variety of HAPs, including benzene, toluene, ethylbenzene, xylene (also referred to as BTEX), N-hexane, and formaldehyde. There are no federal air quality standards for HAPs (there are exposure thresholds), but some states have established “significance thresholds” to evaluate human exposure for potential chronic inhalation illness and cancer risks.

Visibility

Visibility, also referred to as visual range, is a subjective measure of the distance that light or an object can clearly be seen by an observer. Light extinction is used as a measure of visibility and is calculated from the monitored components of fine particle mass (aerosols) and relative humidity. It is expressed in terms of deciviews, a measure for describing perceived changes in visibility. One deciview is defined as a change in visibility that is just perceptible to an average person, which is approximately a 10 percent

change in light extinction. To estimate potential visibility impairment, monitored aerosol concentrations are used to reconstruct visibility conditions for each day monitored. The aerosol species include ammonium sulfate, ammonium nitrate, organic mass, elemental carbon, soil elements, and coarse mass. The daily values are then ranked from clearest to haziest and divided into three categories to indicate the mean visibility for all days (average), the 20 percent of days with the clearest visibility (20 percent clearest), and the 20 percent of days with the worst visibility (20 percent haziest). Visibility can also be defined by standard visual range (SVR) measured in miles, which is the farthest distance at which an observer can see a black object viewed against the sky above the horizon; the larger the SVR, the cleaner the air.

Since 1980, the Interagency Monitoring of Protected Visual Environments (IMPROVE) network has measured visibility in national parks and wilderness areas. These are managed as high visual quality Class I and II areas under the federal visual resource management (VRM) program. There are six IMPROVE stations in Wyoming, including one in the Planning Area at the North Absaroka site and two adjacent to the Planning Area (in the BLM Buffalo Field Office planning area) at the Thunder Basin National Grasslands and Cloud Peak National Wilderness areas.

Atmospheric Deposition

Atmospheric deposition refers to processes in which air pollutants are removed from the atmosphere and deposited into terrestrial and aquatic ecosystems. Air pollutants can be deposited by precipitation (rain and snow) or the gravitational settling of gaseous pollutants on soil, water, and vegetation. Much of the concern about deposition is due to secondary formation of acids and other compounds from emitted nitrogen and sulfur species, such as oxides of nitrogen (NO_x) and SO_2, which can contribute to acidification of lakes, streams, and soils and affect other ecosystem characteristics, including nutrient cycling and biological diversity.

Substances deposited include:

- Acids, such as sulfuric (H_2SO_4) and nitric (HNO_3), sometimes referred to as acid rain.
- Air toxics, such as pesticides, herbicides, and volatile organic compounds (VOC).
- Heavy metals, such as mercury.
- Nutrients, such as nitrates (NO_3-) and ammonium (NH_4+).

The accurate measurement of atmospheric deposition is complicated by contributions to deposition by several components – rain, snow, cloud water, particle settling, and gaseous pollutants. Deposition varies with precipitation and other meteorological variables (e.g., temperature, humidity, winds, and atmospheric stability), which in turn, vary with elevation and time.

Federal land managers, including the USFS and National Park Service, have established guidelines or Levels of Concern (LOC) for total deposition of nitrogen and sulfur compounds in Class I Wilderness Areas. Total nitrogen deposition of 1.5 kilograms (kg) per hectare (ha) per year or less is considered to be unlikely to harm terrestrial or aquatic ecosystems. For total sulfur deposition, the LOC is 3 kg per ha per year.

Monitoring of Air Quality, Visibility, and Deposition in the Planning Area

Although various state and federal agencies monitor air pollutant concentrations, visibility, and atmospheric deposition throughout Wyoming, at present there are only a few air quality monitors in and near the Planning Area. Table 3-1 lists the available air quality monitoring sites in the Bighorn Basin and relevant sites nearby. The Wyoming DEQ Air Quality Division operates a PM_{10} and $PM_{2.5}$ monitor as part of the State and Local Air Monitoring Site (SLAMS) network in Cody, Wyoming (Park County). Additional SLAMS and Special Purpose Monitoring (SPM) sites operate in nearby counties. These include several IMPROVE monitors and BLM-administered sites that are part of the Wyoming Air Resource Monitoring System (WARMS). The "Basin" WARMS site, located northwest of Worland, has only been operating since 2010 and has a limited data record available. This site was recently upgraded to a full Clean Air Status and Trends Network (CASTNet) site in 2012, but although deposition and SO_2 data are collected at this monitor, only ozone data were available for the analysis presented below. Atmospheric deposition (wet) measurements of NH_4, sulfate (SO_4), and various metals are taken at the Sinks Canyon site, which the BLM operates as part of the National Atmospheric Deposition Program (NADP), as well as the South Pass and Yellowstone Park sites. Figure 3-1 presents a map of northwestern Wyoming and parts of Montana and Utah that includes an outline of the Planning Area, the locations of Class I and II areas, and the locations of the various air quality and meteorological monitors discussed in this analysis.

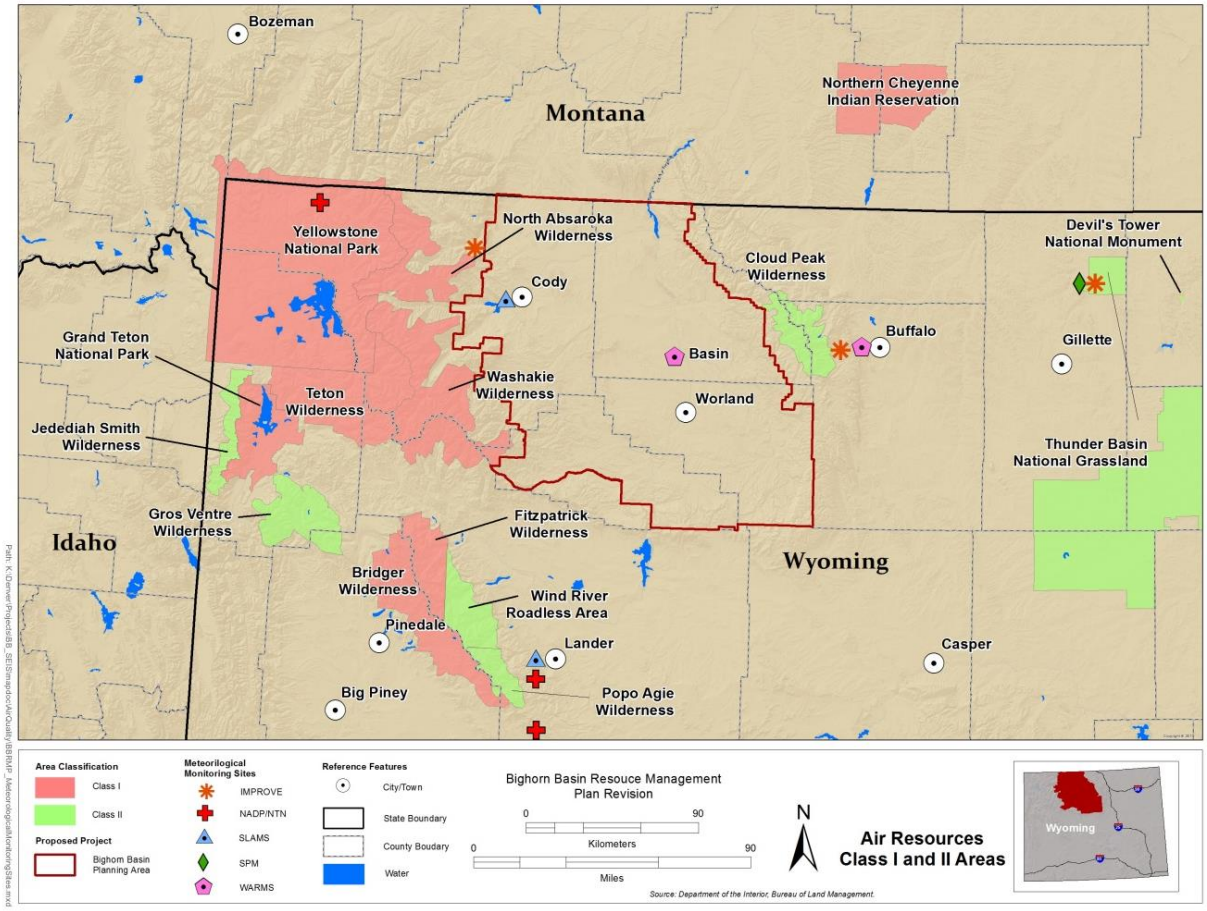
Table 3-1. Air Quality Monitoring Sites In or Near the Planning Area

County	Site Name	Type of Monitor	Parameter	Operating Schedule	Location	
					Longitude	Latitude
Park	Cody	SLAMS	$PM_{10,}$ $PM_{2.5}$	1/6	-109.073	44.532
	North Absaroka (managed by USFS)	IMPROVE	$PM_{2.5}$, NO_{3-}, Ammonium, Nitric Acid, Sulfate, Meteorology	1/3; Hourly Meteorology	-109.382	44.745
	Yellowstone National Park – Tower Falls	NADP/NTN	Wet Deposition Ions, Precipitation, pH	Weekly (Ions); Daily (Precip)	-110.420	44.917
Fremont	Lander	SLAMS	$PM_{2.5}$	1/3	-108.733	42.833
	Sinks Canyon	NADP/NTN	Wet Deposition Ions, Precipitation, pH	Weekly (Ions); Daily (Precip)	-108.850	42.734
	South Pass City	NADP/NTN	Wet Deposition Ions, Precipitation, pH	Weekly (Ions); Daily (Precip)	-108.832	42.494
Big Horn	Basin	WARMS CASTNet	Ozone, NO_{3-}, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/7 (Speciated); Hourly (O3, Met)	-108.041	44.280
Campbell	Thunder Basin	SPM	Ozone, Nitrogen Oxides & Met	Hourly	-105.300	44.672
	Thunder Basin	IMPROVE	$PM_{2.5}$, NO_{3-}, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3 (Speciated); Hourly Met.	-105.287	44.663
Johnson	Buffalo	WARMS	$PM_{2.5}$, NO_{3-}, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3 ($PM_{2.5}$); 1/7 (others); Hourly Met	-106.019	44.144
	Cloud Peak	IMPROVE	$PM_{2.5}$, NO_{3-}, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3 (Speciated); Hourly Met	-106.956	44.333

Sources: WARMS 2013; EPA 2013; IMPROVE 2013; Wyoming DEQ 2013b; Wyoming DEQ 2013c; NADP 2013.

IMPROVE Interagency Monitoring of Protected Visual Environments
NO_3 Nitrate
PM Particulate Matter
SLAMS State and Local Air Monitoring Site
SPM Special Purpose Monitoring
USFS United States Forest Service
WARMS Wyoming Air Resource Monitoring System

Figure 3-1. Location of Meteorological and Air Quality Monitoring Sites and Class I and II Areas in Northwest Wyoming



Current Conditions

Climate

The climate in the Planning Area is designated as a combination of Intermountain Semi-desert and Southern Rocky Mountain Steppe. The Bighorn Basin is bounded on the northeast by the Pryor Mountains, on the east by the Big Horn Mountains, on the south by Owl Creek and Bridger and Washakie Ranges, on the west by the Absaroka Mountains, and open to the north into Montana. Summers are generally hot and short, and winters long and cold. Precipitation is generally low, though greater at higher elevations, and is generally evenly distributed across the year, with the exception of the drier summer months. Wind speeds are variable and generally strong. Table 3-2 lists temperature, precipitation, and wind speed data for the Planning Area. This information is derived from daily ambient measurements for 1981 through 2010. The summer period covers June, July, and August; the winter period covers December, January, and February. Based on these limited data, meteorological conditions vary somewhat across the Planning Area, with the Worland area in the middle of the Planning Area showing higher mean maximum summer temperatures, lower mean winter temperatures, and overall drier conditions compared to Cody, which is in the western part of the Planning Area.

Table 3-2. Temperature, Precipitation, and Wind Speed Data for the Planning Area (1981-2010)

Climate Component	Cody, Wyoming	Worland, Wyoming
Mean maximum summer temperatures (June, July, and August) (degrees Fahrenheit)	75.2, 83.8, 82.3	80.7, 90.1, 88.8
Mean minimum winter temperatures (December, January, and February) (degrees Fahrenheit)	15.8, 16.4, 18.2	6.1, 4.3, 10.7
Mean annual temperature (degrees Fahrenheit)	46.8	45.6
Mean annual precipitation (inches)	10.56	7.82
Mean annual snowfall (inches)	42.86	5.1[1]
Mean annual wind speed (miles per hour)	7.7[1]	5.6[1]
Prevailing wind direction	Northerly/westerly[1]	Northerly/southerly[1]

Source: Western Regional Climate Center 2013

[1]Data only available for these parameters for the period 1971-2000

In the Planning Area, the potential effects of climate change on air quality are likely to be varied. For example, if global climate change results in a warmer and drier climate, this could result in increased concentrations of PM due to increased windblown dust from drier and less stable soils. Less snow and an earlier snowmelt could result in a longer wildland fire season, which could lead to higher concentrations of ozone and PM.

Some activities within the Planning Area generate greenhouse gas (GHG) emissions. Oil and gas development activities can generate carbon dioxide (CO_2) and methane (CH_4). CO_2 emissions result from the use of combustion engines, while CH_4 can be released during processing. Wildland fires also are a source of CO_2 and other GHG emissions, while livestock grazing is a source of CH_4. Other activities in the Planning Area with the potential to contribute to climate change include soil erosion from disturbed areas and fugitive dust from roads, which have the potential to darken snow-covered surfaces and cause faster snow melt.

Please see the last section of this chapter for a further discussion of climate change.

Air Quality

With only one long-term air quality monitor (Cody – measuring PM_{10} and $PM_{2.5}$), one relatively new monitor (Basin – measuring ozone, NO_{3-}, ammonium, nitric acid, sulfate, and SO_2) within the Planning Area, and one monitor (North Absaroka/IMPROVE) located just outside the Planning Area, it is difficult to accurately assess existing air quality conditions throughout the area. However, as noted above, air quality, visibility, and atmospheric deposition are monitored throughout Wyoming, including adjacent planning areas. Therefore, the BLM assessed recent air quality conditions in the Bighorn Basin by examining data collected at the Cody and Basin monitors, supplemented by various monitors in neighboring planning areas, as summarized in Table 3-1. While there are limited ambient air quality monitoring data available in the study area, air quality is generally considered to be good, with no regions in the Planning Area designated as non-attainment for NAAQS or WAAQS. Since the Planning Area is in attainment of NAAQS, a General Conformity Determination is not required. Based on measurements in the area, visibility in the Planning Area is considered excellent. It should be noted that the monitoring data presented in this analysis were selected from the available list of sites in nearby

areas that would most closely match conditions in the Planning Area. For example, no data are presented for air quality monitoring sites located in the Upper Green River Basin (Sublette County), because, although some of these sites are closer to the Planning Area than other sites presented in the analysis, this area is located on the other side of the Wind River Range and has meteorological and emissions characteristics far different from those experienced in the Planning Area.

Table 3-3 is an overview of the applicable primary WAAQS and NAAQS and recent representative maximum pollutant concentrations measured in and at sites near the Planning Area. These representative concentrations can be compared with the applicable WAAQS and NAAQS to indicate the status of recent air quality conditions within the Planning Area relative to the standards.

Trends

This section describes recent trends in air quality in the Planning Area by examining data collected at the Cody PM_{10} monitor and nearby North Absaroka IMPROVE site, and as best as can be inferred criteria-pollutant (ozone), visibility, and deposition data collected at monitoring sites further outside the Bighorn Basin in adjacent areas. Because measurements of carbon monoxide (CO) are typically representative of local air quality and the Yellowstone monitor is the only site that measures CO near the Planning Area, the CO data presented in Table 3-3 may not be representative of conditions in the Planning Area.

Air Pollutant Concentrations

This section presents air quality data collected at the various monitors in and near the Planning Area (see Table 3-1) for PM_{10}, $PM_{2.5}$, O_3, SO_2, SO_4, NO_3, and NH_4. There are currently no measurements of HAPs within the Planning Area. Figure 3-2 shows annual peak 24-hour average PM_{10} concentrations at the Cody site for 2000 through 2012. Over this period, peak 24-hour average measurements of PM_{10} were well below the NAAQS (150 micrograms per cubic meter [$\mu g/m^3$]) and vary considerably from year to year. There is no real discernible trend during this period.

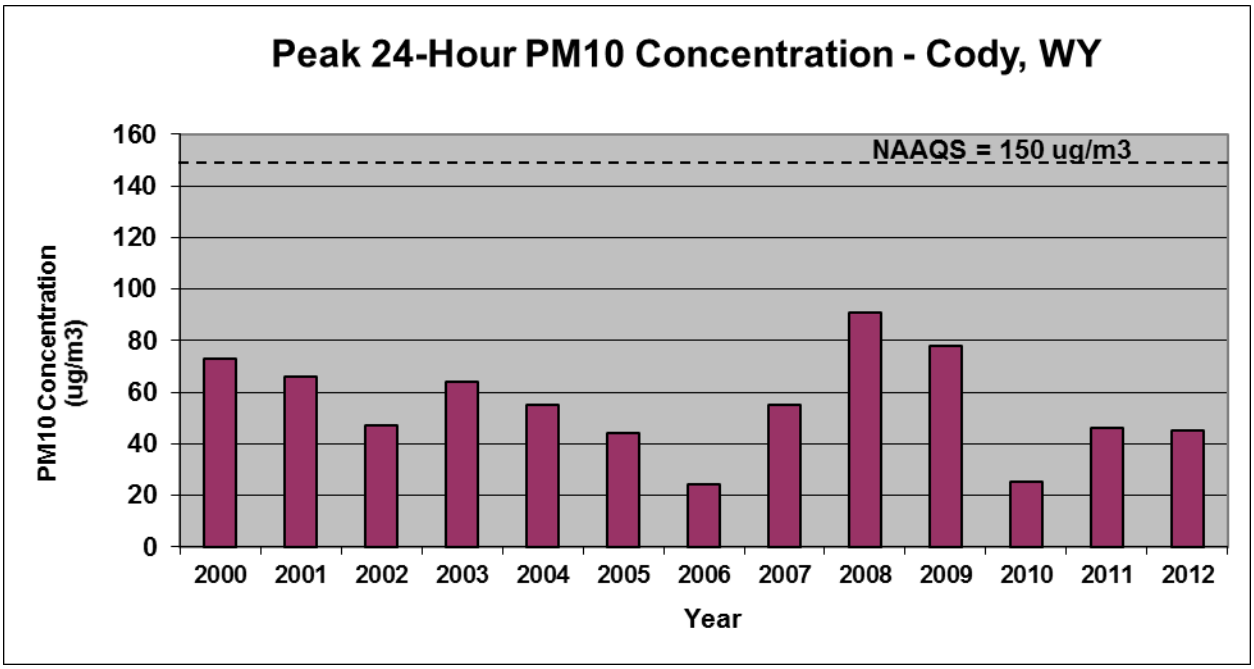
Table 3-3. Applicable National and State Primary Air Quality Standards for Criteria Pollutants and Current Representative Concentrations for the Planning Area

Pollutant	Averaging Time	NAAQS			WAAQS			Representative Concentrations		
		(ppm)	*(ppb)*	*(µg/m³)*	*(ppm)*	*(ppb)*	*(µg/m³)*	*(ppm)*	*(ppb)*	*(µg/m³)*
Carbon Monoxide	1 hour[1]	35	35,000	40,000	35	35,000	40,000	0.8	800	920
	8 hour[1]	9	9,000	10,000	9	9,000	10,000	0.3	300	345
Nitrogen Dioxide	1 hour [2]	0.10	100	188.7	N/A	N/A	N/A	0.011	11	21
	Annual[3] (Arithmetic Mean)	0.053	53	100	0.053	53	100	0.002	2.0	4
Ozone	8 hour[4]	0.075	75	147	0.075	75	147	0.056	56	110
PM_{10}	24 hour[5]	N/A	N/A	150	N/A	N/A	150	N/A	N/A	45
$PM_{2.5}$	24 hour[6]	N/A	N/A	35	N/A	N/A	65	N/A	N/A	11
	Annual[7]	N/A	N/A	15	N/A	N/A	15	N/A	N/A	2.4
Sulfur Dioxide[9]	1 hour[8]	0.075	75	195	N/A	N/A	N/A	0.033	33	86

[1]Not to be exceeded more than once per year. Data collected at Yellowstone National Park during 2012.
[2]To attain this standard, the 3-year average of the 98th percentile of 1-hour concentrations at each monitor within an area must not exceed 100 ppb. Thunder Basin data, 2010-2012.
[3]Thunder Basin annual average for 2012.
[4]To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 75 ppb. 3-year average of the fourth highest concentration for 2010-2012 for the Basin site.
[5]Not to be exceeded more than once per year on average over 3 years. Maximum 24-hour average for 2012 at Cody SLAMS site.
[6]To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations for 2010-2012 for the North Absaroka IMPROVE site.
[7]To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 12.0 µg/m³. 3-year average for 2010-2012 for the North Absaroka site.
[8]To attain this standard, the 3-year average of the 98th percentile of 1-hour concentrations at each monitor within an area must not exceed 75 ppb.
[9]The SO_2 value is from the Wyoming DEQ Casper monitor, located in Natrona County and is the 3-year average of the 98th percentile of 1-hour concentrations measured for 2011, 2012, and 2013. Although not located in the Bighorn Basin, this is the closest monitor with available recent data.

µg/m³	micrograms per cubic meter	ppb	parts per billion
N/A	Not Applicable	ppm	parts per million
NAAQS	National Ambient Air Quality Standards	SLAMS	State and Local Air Monitoring Site
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter	WAAQS	Wyoming Ambient Air Quality Standards
PM_{10}	particulate matter less than 10 microns in diameter	WARMS	Wyoming Air Resource Monitoring System

Figure 3-2. Peak 24-Hour Average Particulate Matter (PM_{10}) Concentrations (µg/m³) in Cody, Wyoming



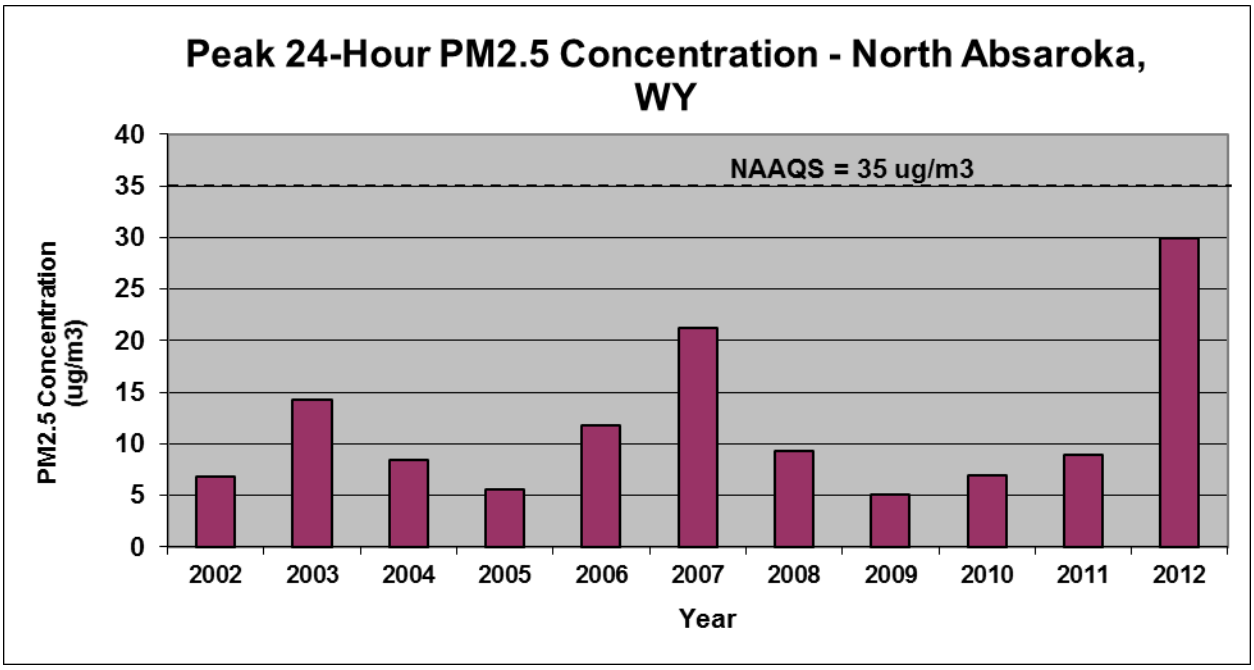
Source: EPA 2013

Note: The National Ambient Air Quality Standard for 24-hour average PM_{10} concentrations is 150 µg/m³.

µg/m³ micrograms per cubic meter
NAAQS National Ambient Air Quality Standards
PM_{10} particulate matter less than 10 microns in diameter

Figure 3-3 shows peak 24-hour average $PM_{2.5}$ data collected at the North Absaroka monitor for 2002 through 2012. With the exception of the peak value for 2012, the data indicate that the peak 24-hour average $PM_{2.5}$ concentration in the North Absaroka area was well below the NAAQS with no discernible trend during this period (IMPROVE 2013).

Figure 3-3. Peak 24-Hour Average Particulate Matter ($PM_{2.5}$) Concentrations (µg/m³) for the North Absaroka Site



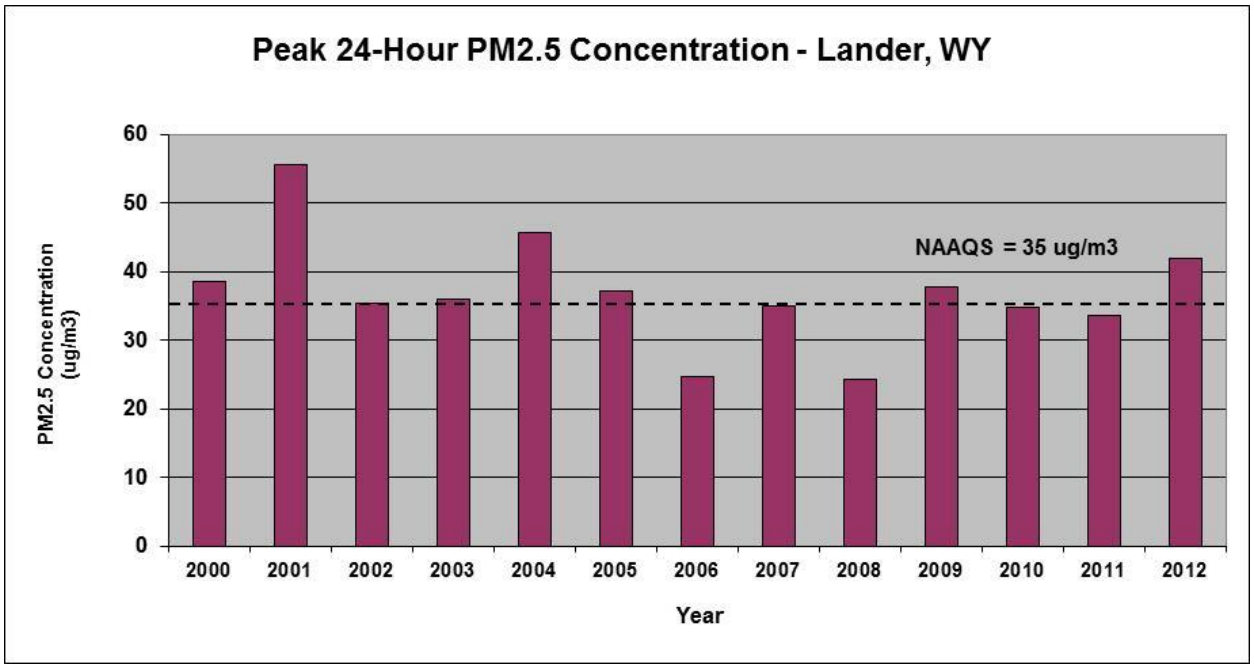
Sources: IMPROVE 2013; VIEWS 2013.

Note: The National Ambient Air Quality Standard for 24-hour average $PM_{2.5}$ concentrations is 35 µg/m³.

µg/m³ micrograms per cubic meter
NAAQS National Ambient Air Quality Standards
$PM_{2.5}$ particulate matter less than 2.5 microns in diameter

In addition to measurements collected in the Planning Area at North Absaroka, the BLM also examined data collected in an area to the south near Lander, Wyoming. Figure 3-4 lists peak 24-hour average $PM_{2.5}$ data collected at the Lander monitor for 2000 through 2012. The data for the last four years (2009-2012) indicate that these concentrations are approaching the NAAQS, however, the comparison with the NAAQS is with the 3-year average of the 98th percentile value, not the peak value. These values are comparable and vary from year to year, with peak values of 37.8 µg/m^3 in 2009 and 41.8 µg/m^3 in 2012.

Figure 3-4. Peak 24-Hour Average Particulate Matter ($PM_{2.5}$) Concentrations (µg/m^3) for the Lander Site



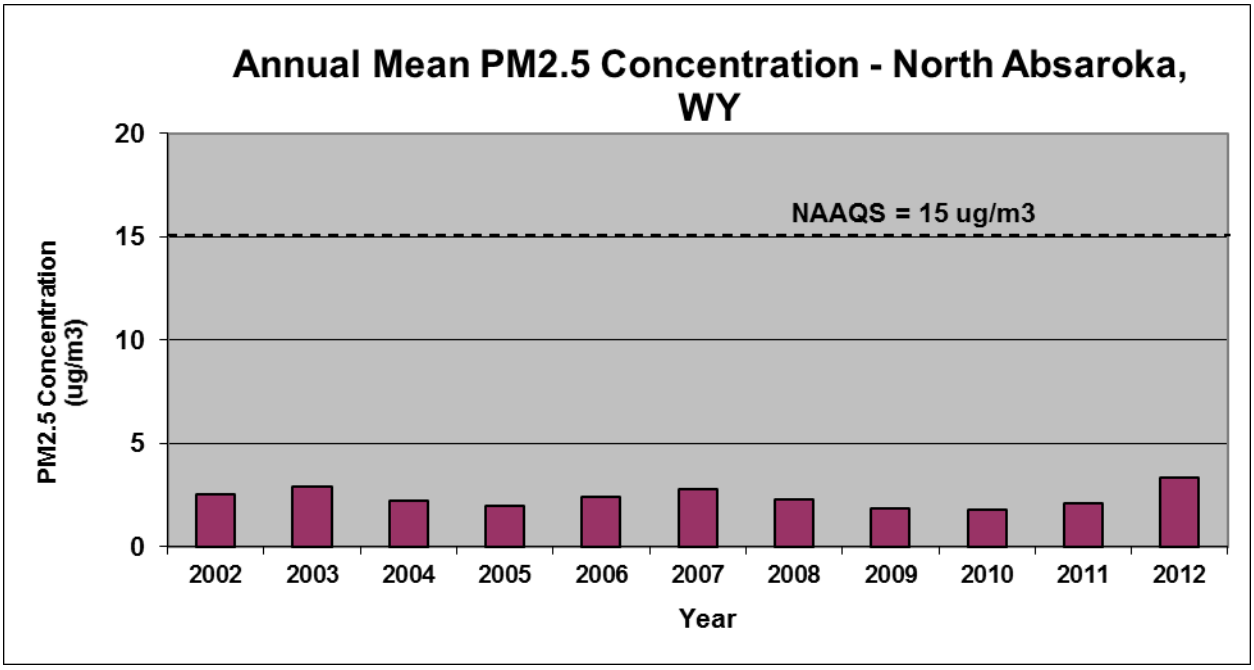
Source: EPA 2013

Note: The National Ambient Air Quality Standard for 24-hour average $PM_{2.5}$ concentrations is 35 µg/m^3.

µg/m^3 micrograms per cubic meter
NAAQS National Ambient Air Quality Standards
$PM_{2.5}$ particulate matter less than 2.5 microns in diameter

Figure 3-5 shows annual average $PM_{2.5}$ data collected at the North Absaroka monitor for 2002 through 2012, and Figure 3-6 presents annual average $PM_{2.5}$ data collected at the Lander monitor for 2000 through 2012. The data indicate that annual average $PM_{2.5}$ concentrations in the Lander area are higher than those measured at North Absaroka, but are still well below the NAAQS. Trends are relatively flat during this period at both monitors.

Figure 3-5. Annual Average Particulate Matter ($PM_{2.5}$) Concentrations ($\mu g/m^3$) for the North Absaroka Site

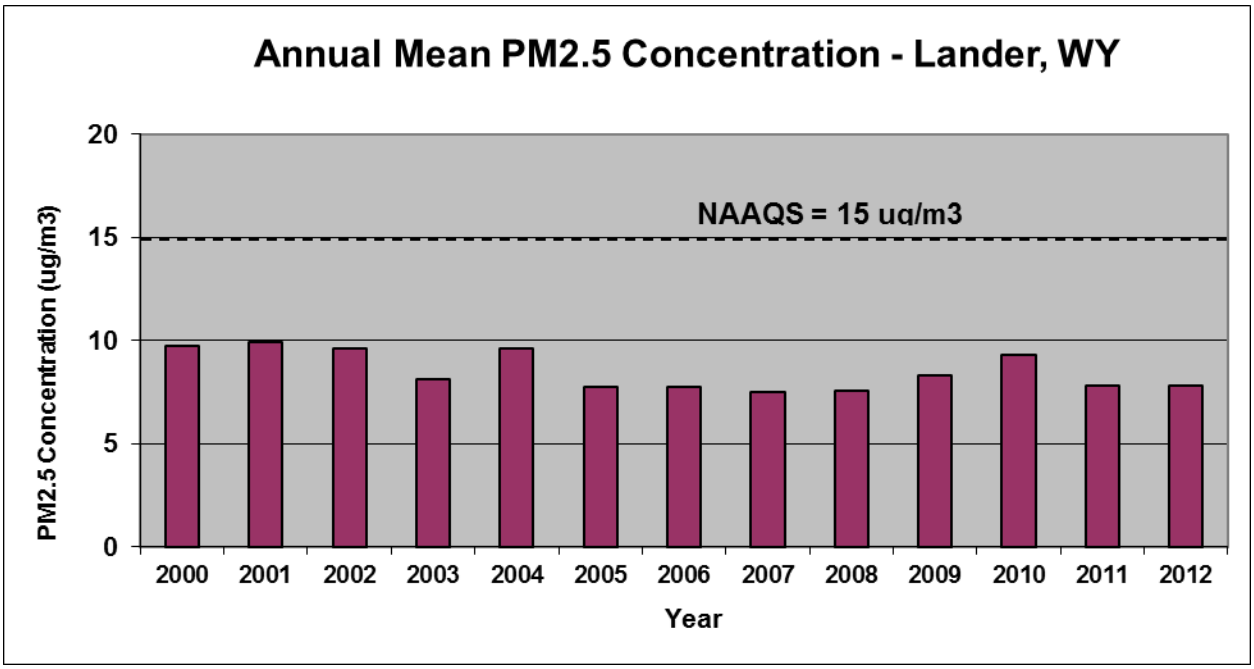


Sources: IMPROVE 2013; VIEWS 2013.

Note: The National Ambient Air Quality Standard for annual average $PM_{2.5}$ concentrations is 15 $\mu g/m^3$.

$\mu g/m^3$	micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter

Figure 3-6. Annual Average Particulate Matter ($PM_{2.5}$) Concentrations (µg/m³) for the Lander Site



Source: EPA 2013

Note: The National Ambient Air Quality Standard for annual average $PM_{2.5}$ concentrations is 15 µg/m³.

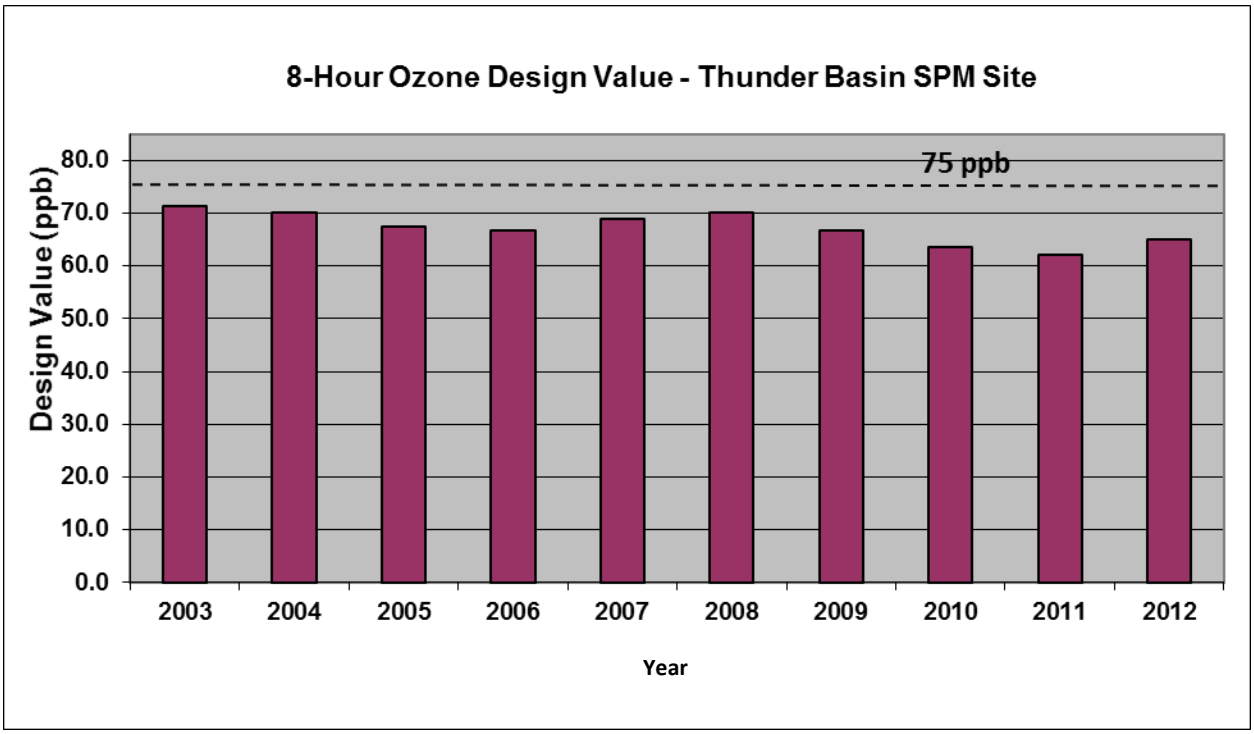
µg/m³	micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter

Although a new WARMS monitoring site, referred to as the "Basin" site, began operating northwest of Worland in March 2010, there are currently no other ozone monitors in the Planning Area with three complete years of data that are required to calculate an ozone design value, which is calculated as the 3-year average of the fourth highest observed concentration and is used to assess compliance with the NAAQS. The 4th highest 8-hour average ozone concentrations measured at the Basin site in recent years are 55, 56, and 57 ppb, for 2010, 2011, and 2012, respectively, for a calculated design value of 56 ppb, which is well below the current 8-hour ozone NAAQS.

For a longer-term evaluation of observed ozone near the Planning Area, Figure 3-7 lists the calculated design values for the Thunder Basin site calculated from data collected during the period for 2001 through 2012. The most recent design value for the Thunder Basin site for 2010 through 2012 is 65 parts per billion (ppb), which is below the current 8-hour ozone NAAQS of 75 ppb. (Currently EPA is evaluating the level of the standard and may reduce this value to 70 ppb or lower. If the 8-hour ozone NAAQS is reduced to 70 ppb, it is possible that areas with design values greater than the new standard (e.g., those located in the adjacent Buffalo and other planning areas in Wyoming) would be designated ozone nonattainment areas.) Although the data for Thunder Basin vary from year to year during this period, there is no discernible trend in the 8-hour ozone design values at this site. However, the Thunder Basin site also located in the adjacent Buffalo planning area on the other side of the Big Horn Mountain range and may not be representative of long-term ozone air quality trends in the Bighorn Basin. This is due to the influence of local sources of precursor emissions, differing weather conditions,

terrain, and other factors on secondary ozone production and transport in and throughout the Bighorn Basin.

Figure 3-7. 8-Hour Average Ozone Design Values for the Thunder Basin Special Purpose Monitoring Site



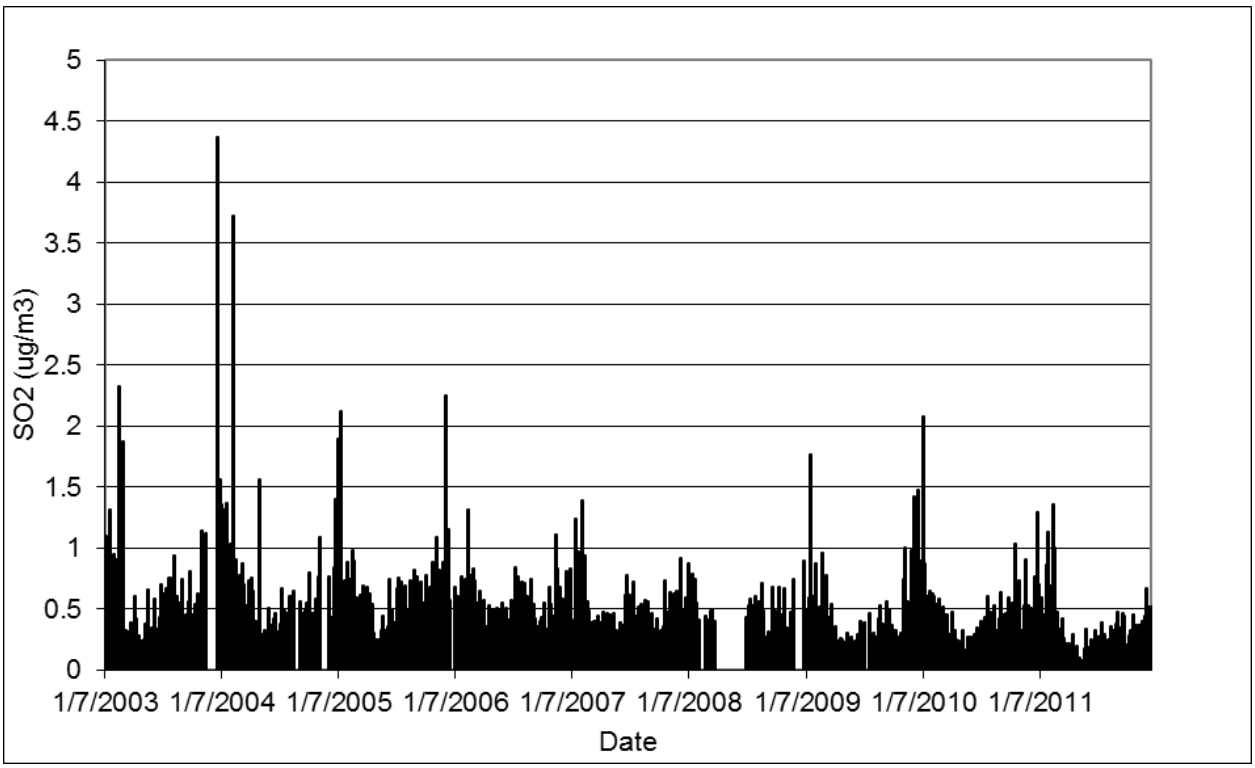
Source: Wyoming DEQ 2013b

Note: The National Ambient Air Quality Standard for 8-hour average ozone concentrations is 75 ppb.

ppb parts per billion

Although not in the Planning Area, the nearby Buffalo monitoring site is part of the WARMS network and provides a summary of observed concentrations of sulfur and nitrogen compounds in adjacent areas. Figures 3-8, 3-9, 3-10, and 3-11 show weekly average concentrations of SO_2, SO_4, NO_3, and NH_4 respectively, for the Buffalo site for 2003 through 2011. There are data missing for a number of weeks throughout this period, especially in 2008. The data show weekly and seasonal variations in these compounds, with no real discernible long-term trends over the period.

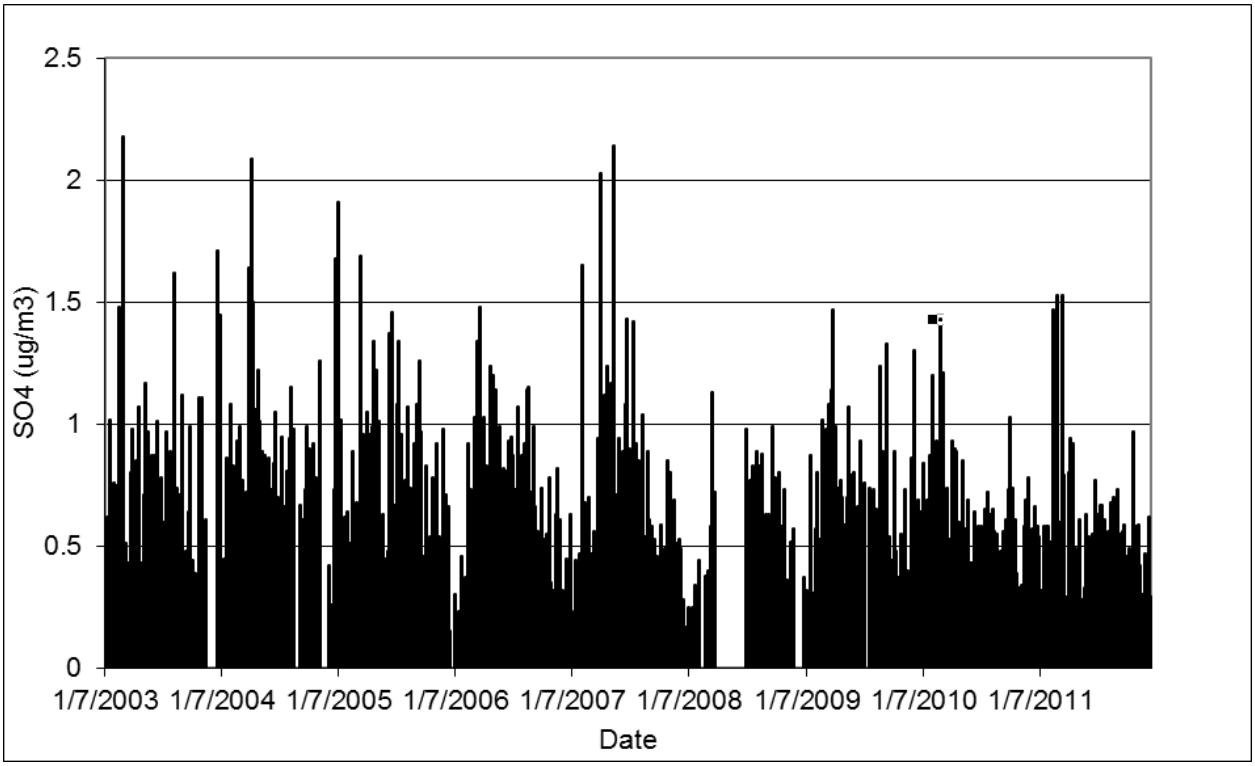
Figure 3-8. Weekly SO_2 Concentrations ($\mu g/m^3$) – Buffalo WARMS Monitor



Source: WARMS 2013

$\mu g/m^3$	micrograms per cubic meter
SO_2	sulfur dioxide
WARMS	Wyoming Air Resource Monitoring System

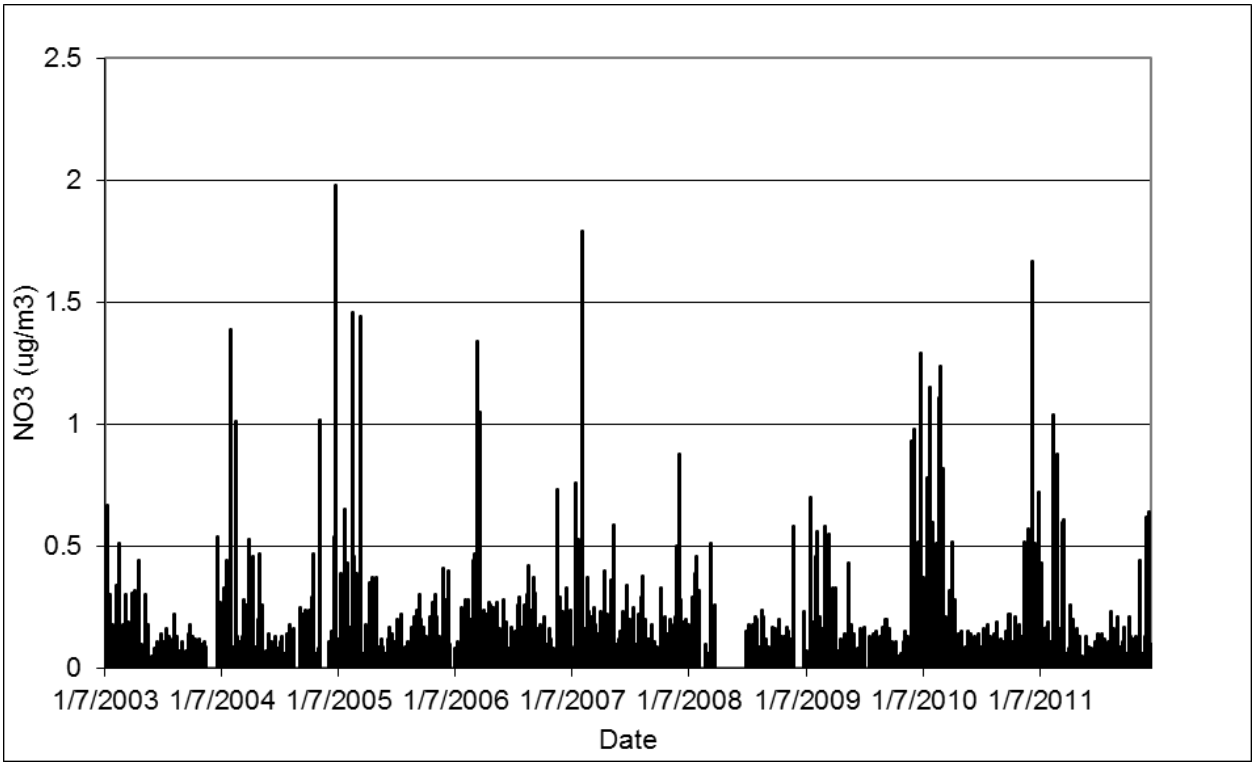
Figure 3-9. Weekly SO_4 Concentrations ($\mu g/m^3$) – Buffalo WARMS Monitor



Source: WARMS 2013

$\mu g/m^3$	micrograms per cubic meter
SO_4	sulfate
WARMS	Wyoming Air Resource Monitoring System

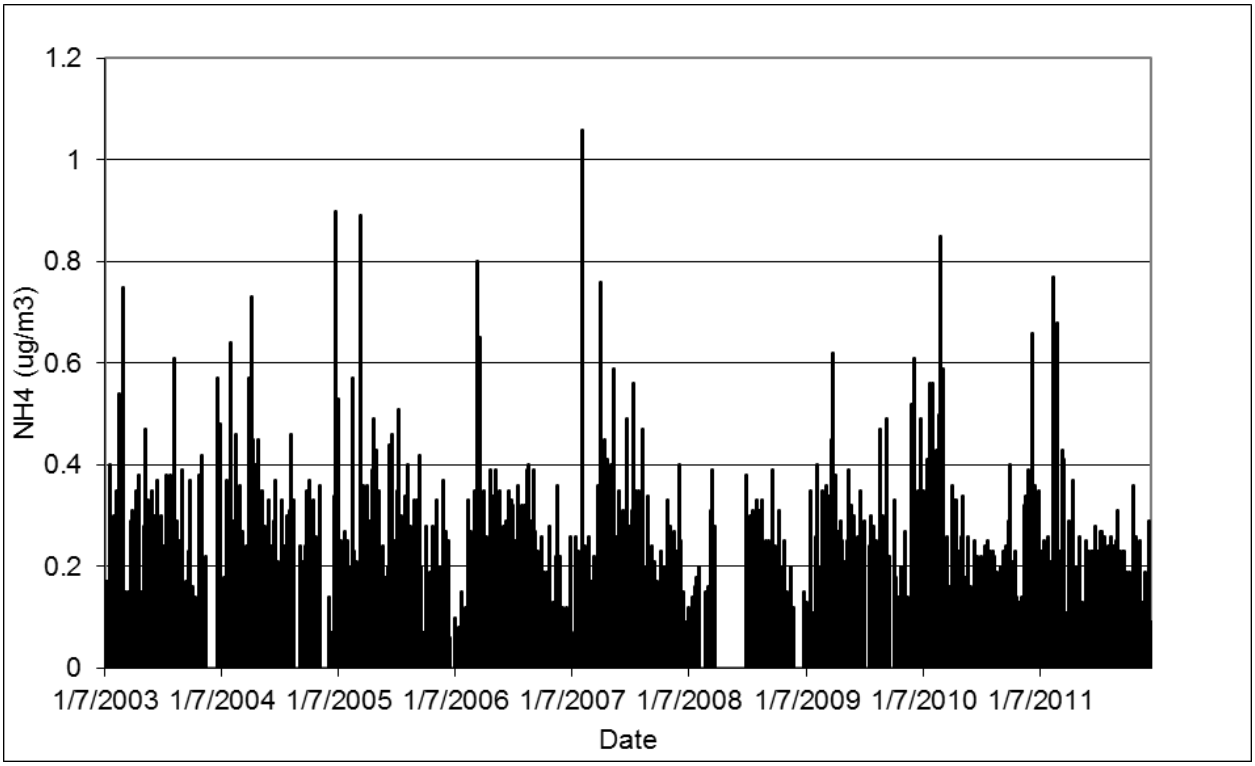
Figure 3-10. Weekly NO_3 Concentrations (µg/m³) – Buffalo WARMS Monitor



Source: WARMS 2013

µg/m³	micrograms per cubic meter
NO_3	nitrate
WARMS	Wyoming Air Resource Monitoring System

Figure 3-11. Weekly NH_4 Concentrations ($\mu g/m^3$) – Buffalo WARMS Monitor



Source: WARMS 2013

$\mu g/m^3$	micrograms per cubic meter
NH_4	ammonium
WARMS	Wyoming Air Resource Monitoring System

Visibility

There are several National Parks, recreation areas, wilderness areas, and National Forests in or near the Planning Area. As depicted on Figure 3-1, Table 3-4 lists areas designated as Class I or Class II.

Table 3-4. Class I and Class II Areas In or Near the Planning Area

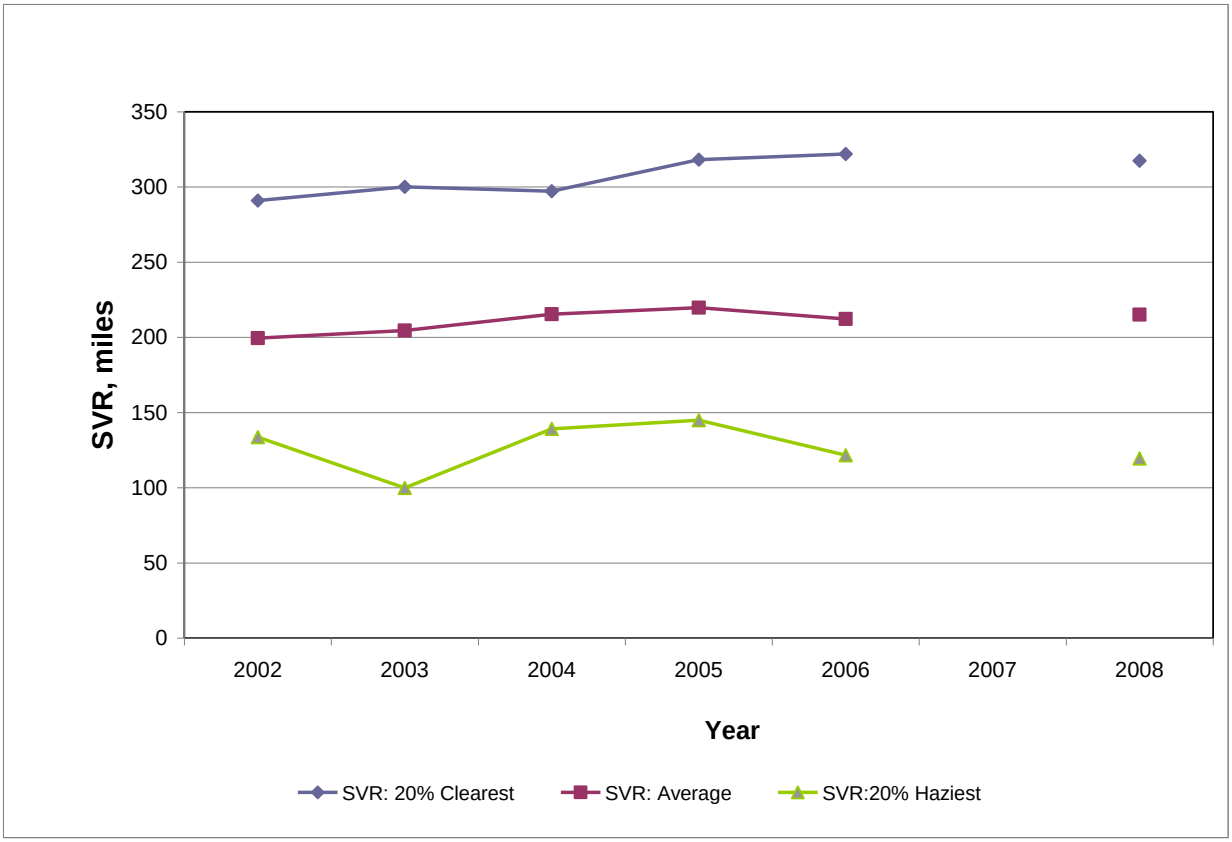
Area Type	Area Name	Closest Distance to the Planning Area (miles)	Direction from the Planning Area	Clean Air Act Status of the Area
National Park	Wind Cave National Park	200	East	Class I
	Yellowstone National Park	Adjacent	West	Class I
Recreation Area	Bighorn Canyon National Recreation Area	In	-	Class II
Wilderness Area	Cloud Peak Wilderness Area	In	-	Class II
	North Absaroka Wilderness Area	In	-	Class I
	Washakie Wilderness Area	In	-	Class I
	Fitzpatrick Wilderness Area	30	Southwest	Class I
	Popo Agie Wilderness Area	50	South	Class II
	Bridger Wilderness Area	35	Southwest	Class I
	Teton Wilderness Area	Adjacent	Southeast	Class II
National Forest	Bighorn National Forest	In	-	Class II
	Thunder Basin National Grassland	75	East	Class II

Source: NPS 2006

As noted above, estimates of visibility in the Planning Area are primarily derived from air quality and meteorological measurements taken at the North Absaroka IMPROVE site. To supplement these measurements, the BLM used recent data collected at the nearby Cloud Peak IMPROVE monitor to assess regional visibility conditions.

Figure 3-12 shows visibility estimates for the North Absaroka site for 2002 through 2008. There are no more recent data available for this monitor. Although missing for 2007, there are no real trends during this limited period. Figure 3-13 shows visibility data for the Cloud Peak IMPROVE site for 2003 through 2010. The data for the Cloud Peak site are quite consistent with the North Absaroka site, and reflect a slight trend of improved visibility for the 2007 to 2010 period.

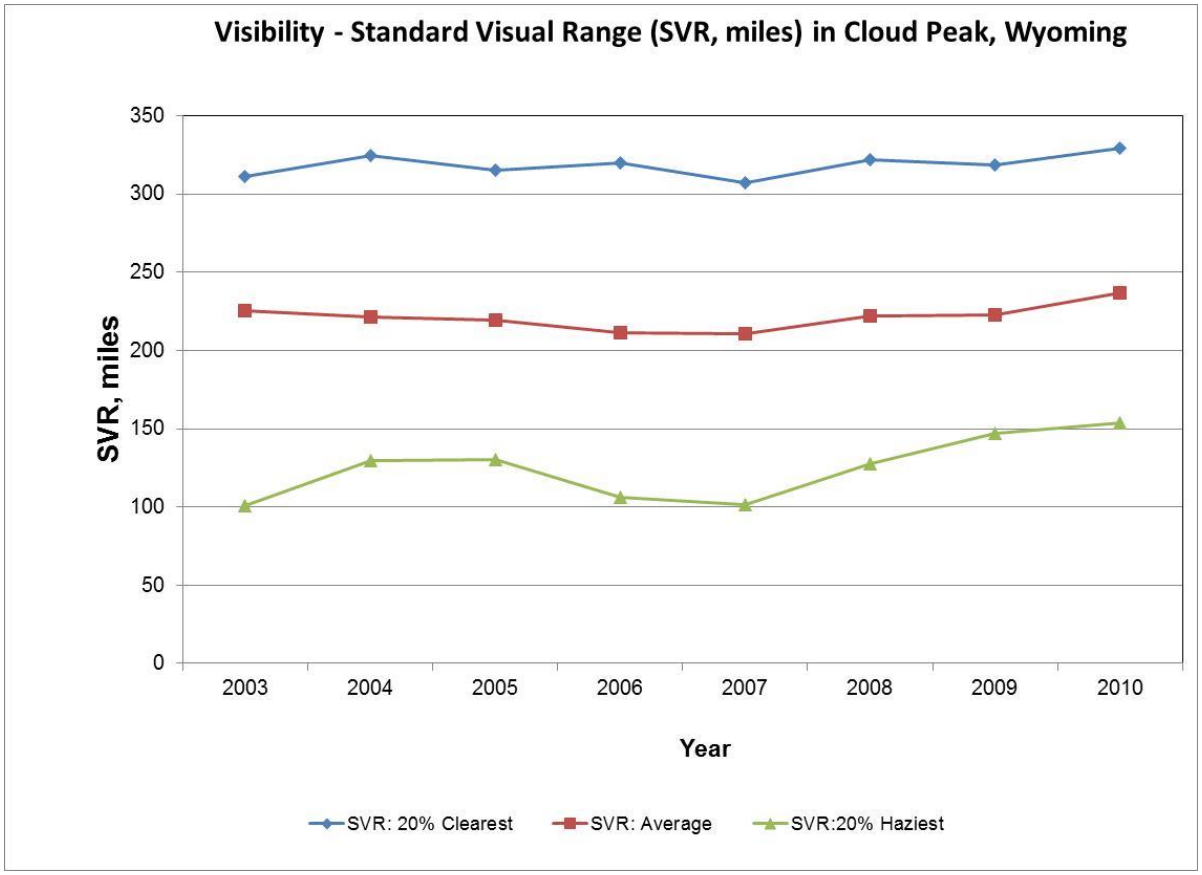
Figure 3-12. Visibility – Standard Visual Range (SVR, miles) for the North Absaroka, Wyoming, IMPROVE Site



Source: IMPROVE 2013

IMPROVE Interagency Monitoring of Protected Visual Environments
SVR standard visual range

Figure 3-13. Visibility – Standard Visual Range (SVR, miles) for the Cloud Peak, Wyoming, IMPROVE Site



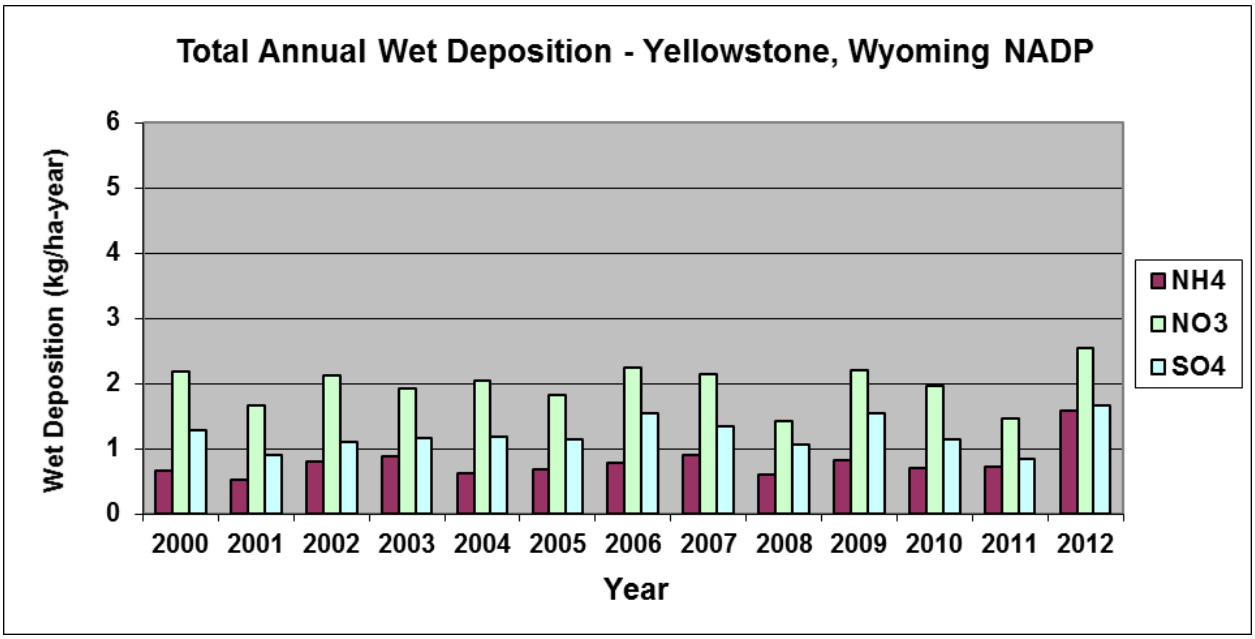
Source: IMPROVE 2013

IMPROVE Interagency Monitoring of Protected Visual Environments
SVR standard visual range

Atmospheric Deposition

There are no NADP monitors located within the Planning Area and no deposition data are available from the recently upgraded Basin CASTNet/WARMS monitor located within the Planning Area. However, wet deposition measurements are available for the nearby Yellowstone, Sinks Canyon, and South Pass City NADP monitors. Figure 3-14 shows total annual wet deposition for NH_4, NO_3, and SO_4 for 2000 through 2012 for Yellowstone. Figure 3-15 and Figure 3-16 show similar wet deposition information for the Sinks Canyon and South Pass sites, respectively. Wet deposition values are slightly higher at these two sites compared to Yellowstone, but the data indicate a general downward trend in deposition at these sites during the 2005 to 2012 period. While there was a spike in the wet nitrogen deposition for 2010 at the South Pass site, this could be considered a localized, outlier event. For all years examined and for all sites, annual wet nitrogen deposition exceeds the LOC of 1.5 kg per ha per year, with the largest values measured at the South Pass site. For annual wet sulfur deposition, the LOC of 3 kg per ha per year is exceeded for only a few years at the South Pass site.

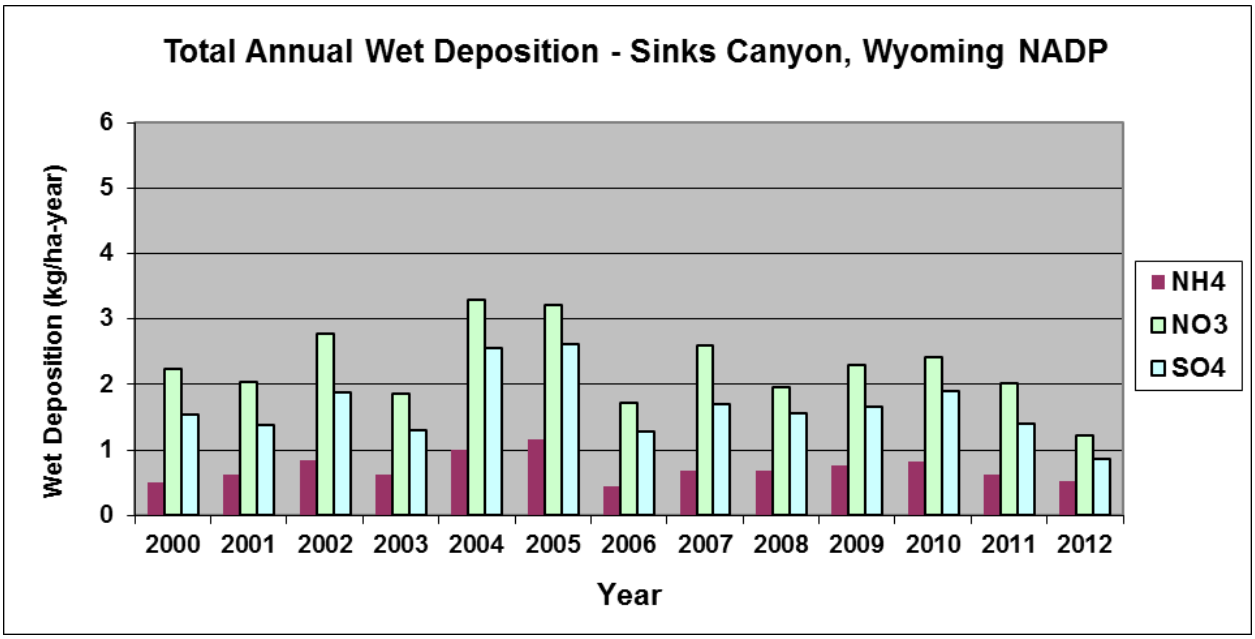
Figure 3-14. Total Annual Wet Deposition (kilograms per hectare per year) Yellowstone Park, Wyoming NADP Site



Source: NADP 2013

ha	hectare
kg	kilogram
NADP	National Atmospheric Deposition Program
NH_4	ammonium
NO_3	nitrate
SO_4	sulfate

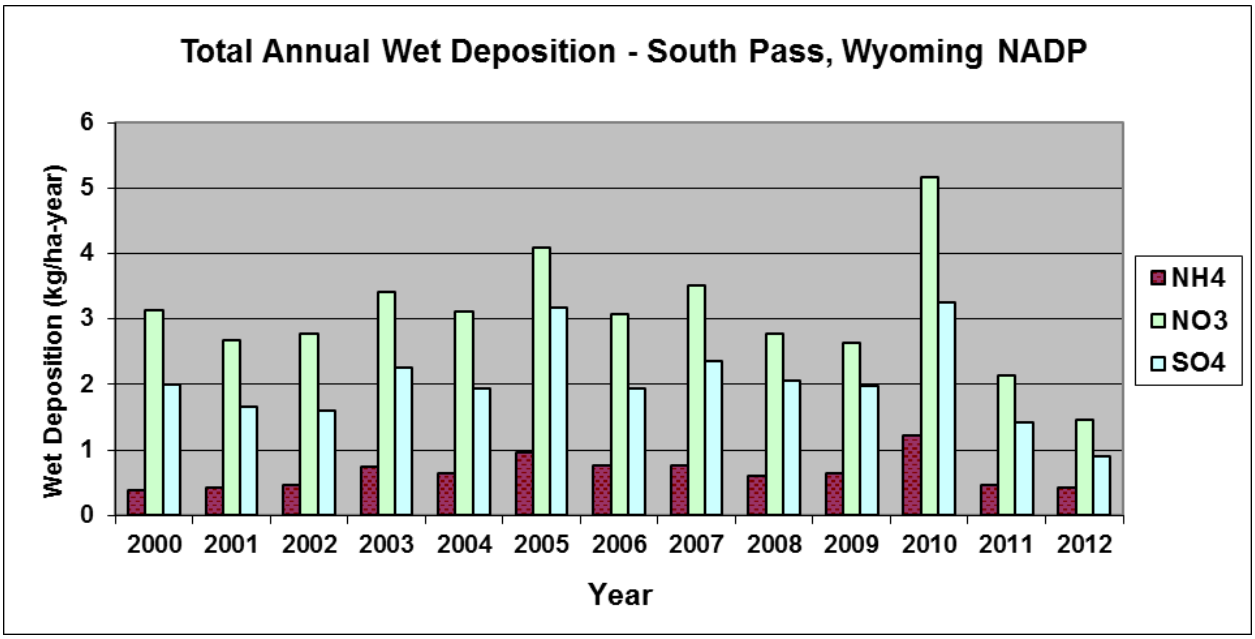
Figure 3-15 Total Annual Wet Deposition (kilograms per hectare per year) Sinks Canyon, Wyoming NADP Site



Source: NADP 2013

ha	hectare
kg	kilogram
NADP	National Acid Deposition Program
NH_4	ammonium
NO_3	nitrate
SO_4	sulfate

Figure 3-16. Total Annual Wet Deposition (kilograms per hectare per year) South Pass City, Wyoming NADP Site



Source: NADP 2013

ha	hectare
kg	kilogram
NADP	National Acid Deposition Program
NH_4	ammonium
NO_3	nitrate
SO_4	sulfate

Hazardous Air Pollutants, Other Criteria Pollutants, and Greenhouse Gases

Existing sources of HAPs, criteria pollutants (other than those discussed above), and GHGs in the Planning Area include fossil fuel combustion that emits HAPs; oil, natural gas, and coal development operations that emit VOCs; NO_X; and hydrogen sulfide (H_2S). In addition, large fires are a source of HAPs emissions. There are no measurements of HAPs or other criteria pollutants (e.g., NOx and VOC) available for analysis within the Planning Area. The lack of historical observations, and the growth in resource development and accompanying increases in emissions from these types of sources will depend on a number of external factors that make it difficult to estimate actual long-term trends in these pollutants.

Summary

Available air quality data for a number of criteria pollutants that were examined at various monitors in and near the Planning Area do not show any significant upward or downward trends over the various periods of record, except for peak 24-hour average $PM_{2.5}$ at the North Absaroka site. Concentrations of peak 24-hour average $PM_{2.5}$ at this site are low, vary from year to year, and show an upward trend during the last four years of the 11-year period examined. The annual average $PM_{2.5}$ data for North Absaroka show low concentrations well within the NAAQS and no discernible long-term trends. The peak 24-hour average $PM_{2.5}$ data for the Lander site show a relatively flat trend during the last 4 years of record (2009 through 2012). The newly installed Basin WARMS/CASTNet monitor has a calculated 8-

hour average ozone design value of 56 ppb, which is well below the NAAQS. No deposition or SO_2 data were available from the Basin monitor for inclusion in this analysis.

Although statistical trends were not explicitly calculated for SO_2, SO_4, NO_3, and NH_4, the data do not indicate any major trends for the 11-year period examined at the Buffalo site, which is adjacent to the Bighorn Basin. As noted above, these data may not be indicative of air quality within the Bighorn Basin, but were presented to illustrate air quality conditions in an adjacent area. The visibility data collected at the North Absaroka and Cloud Peak sites show very good to excellent visibility, even for the 20 percent haziest days, with a very slight degradation observed at the Cloud Peak monitor during the periods of record examined. Wet-deposition data for NH_4, NO_3, and SO_4 for the Yellowstone, Sinks Canyon, and South Pass City sites also show no distinct trend in deposition over the 13-year period of record (2000 through 2012) examined in this analysis.

Management Challenges

Due to limited data, accurately characterizing air quality in the Planning Area is a challenge. However, limited monitoring at two sites in the Planning Area and data collected at monitors in adjacent areas do reflect good to excellent air quality and visibility conditions. Continued maintenance of the federal and state air quality standards could be an issue without a complete understanding of existing air quality. As additional resource development scenarios are considered for the area, it will be important to evaluate the effects that emissions from development sources would have on criteria pollutants, visibility, and atmospheric deposition levels. The BLM will work cooperatively with the Wyoming DEQ Air Quality Division and the EPA and other federal agencies to address these issues.

Other management challenges include identifying the full spectrum of air quality issues in the Bighorn Basin and developing effective management actions aimed at maintaining compliance with standards and improving air quality.

3.1.2 Geologic Resources

Physiographic Regions/Regional Context

The Bighorn Basin is an intermontane basin in the Middle Rocky Mountain Foreland geologic province. It is an asymmetric, northwest-trending topographical and structural basin with an elliptical shape, bounded on the northeast by the Pryor Mountains, on the east by the Big Horn Mountains, on the south by the Owl Creek, Bridger and Washakie Ranges, on the northwest by the Beartooth Mountains, and open to the north into Montana. The basin is also bounded on the west by volcanic rocks of the Absaroka Mountains which were erupted and deposited atop older Laramide uplifts. The north end of the Bighorn Basin is considered to terminate structurally along a low-lying folded and faulted zone known as the Nye-Bowler lineament in Montana (Thomas 1965).

The topography of the Planning Area varies from rolling plains, flat mesas, and badlands to alluvial valleys, benches, foothills, and mountains (BLM 1993). Many pronounced anticlinal and synclinal folds, some of which have considerable structural relief (Pierce and Andrews 1941) occupy the foothills or "flank" areas of the basin. Riparian corridors, badlands, and benches/upland topography dominate the central basin. The paragraphs that follow further address geologic structure in the Bighorn Basin. See the *Solid Mineral Occurrence and Development Potential Report* for further discussion on the geology of the Bighorn Basin (BLM 2009d).

Stratigraphy and Economic Geology

Figure 3-17 provides a generalized stratigraphic and lithologic section for the Bighorn Basin; Map 96 displays a geologic map of the Planning Area.

Stratigraphically, rocks of all the geologic periods, with the exception of the Silurian Period, are represented in the numerous formations found in the Planning Area. The sedimentary rocks were deposited during the repeated advances and retreats of ancient seas and epicontinental seaways (such as the Sundance Seaway and the Cretaceous Seaway) that covered the Planning Area, and during other terrestrial depositional environments, including, fluvial, aeolian, and lacustrine.

Sedimentary rocks in the Planning Area range in age from Cambrian to Holocene, have an aggregate thickness of more than 33,000 feet, and overlie Precambrian metamorphic and granitic basement rock. Within the Bighorn Basin, younger sedimentary formations tend to be exposed toward the center of the basin, while progressively older formations crop out generally toward the eastern, southern, and western edges of the basin. Sedimentary rocks are folded and faulted as a result of uplifts of the mountains that rim the basin.

The geology of the basin is conducive to the accumulation of hydrocarbons (also known as fossil fuels) given the presence of sedimentary formations that act as source rocks, reservoir rocks, and impermeable caps to some of the reservoir rocks. See the *Reasonable Foreseeable Development Scenario (RFD) for Oil and Gas* for a discussion on oil and gas development potential in the Planning Area (BLM 2014a).

Some formations contain coal seams of varying thicknesses and grades. Other formations contain the remains of ancient volcanic ash deposits that were chemically altered into beds of montmorillonite and beidelite clay known as bentonite. Some formations are a source of dimension stone (material quarried as block or slabs that also meets certain size and shape specifications) and construction stone. There are thick sand and gravel deposits along rivers and streams throughout the basin.

Historical and Structural Geology

The Bighorn Basin formed as a result of the Laramide Orogeny, a compressional mountain-building and basin-forming event, which took place from late Cretaceous time (about 80 million years ago [MYA]) to middle Eocene time (about 45 MYA) (Downs 1952). Large blocks of Precambrian-age rock were displaced upward, generally along reverse or ramp faults of varying dips (Fanshawe 1971), with resultant folding and faulting of the overlying sedimentary rock layers. During this time, the Big Horn, Owl Creek, Pryor, Beartooth, and Washakie Ranges were uplifted, as were numerous smaller anticlinal structures along the inner flank or margin of the basin. The central portion of the Bighorn Basin was relatively undeformed during the Laramide Orogeny, and received sediment eroded from surrounding uplifts.

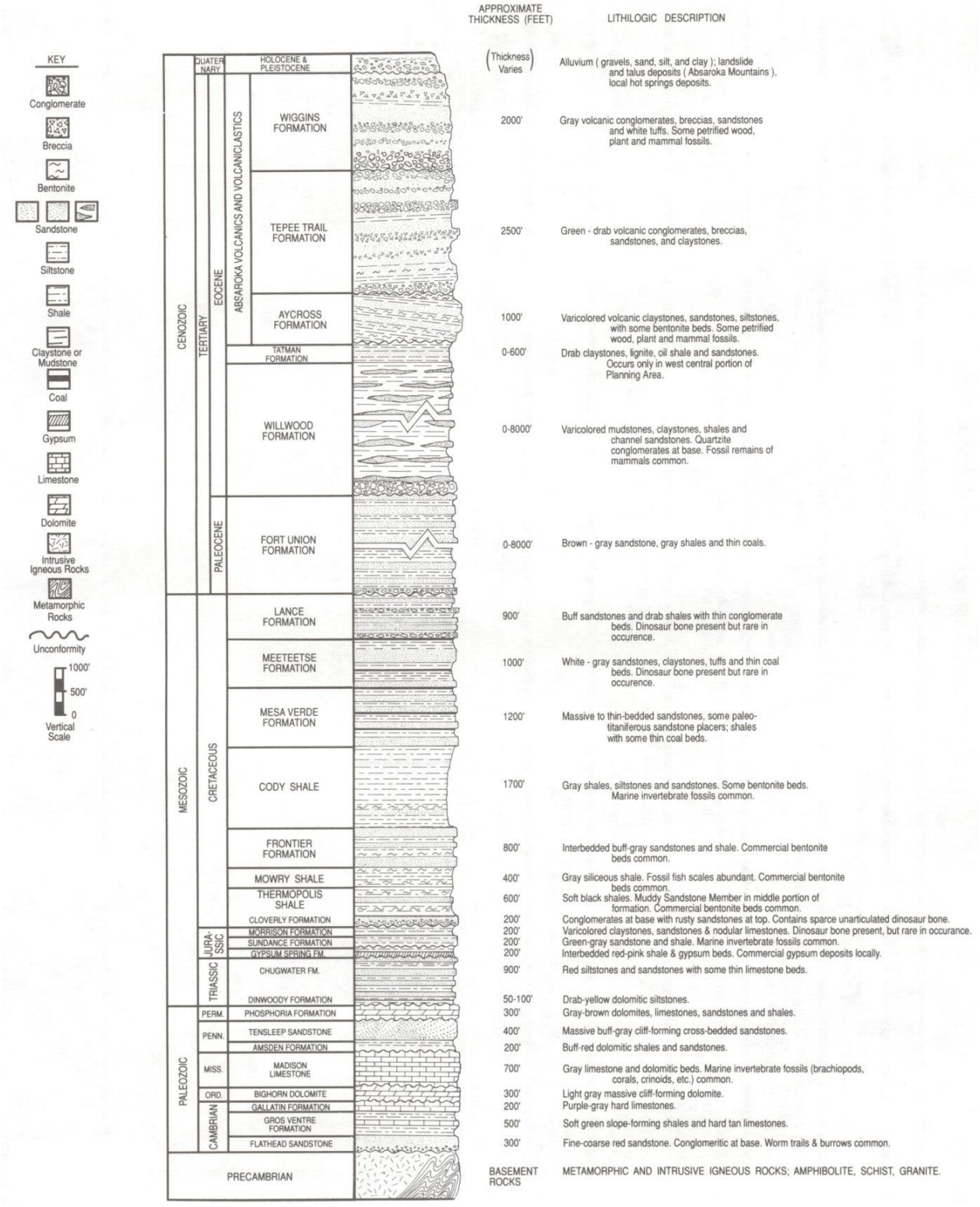
Approximately 10 to 12 MYA, a period of broad regional uplift and extension (epeirogeny) began in Miocene time that has continued into the present (Fanshawe 1971). This broad general uplift triggered increased erosional activities, leading to excavation of deep canyons, (i.e., Cottonwood Canyon, Wind River Canyon, Clarks Fork Canyon, Sheep Mountain Canyon, and Devil's Canyon), and removal of thousands of feet of basin sediment via large rivers and their tributaries. Streams such as the Shoshone River, the Bighorn River, Porcupine Creek, and Cottonwood Creek were rejuvenated during this time of uplift, and began to incise deep canyons into the underlying Paleozoic shales, limestones, and dolomites.

During the Pleistocene Epoch (approximately 2 MYA to 15,000 years ago), the mountain uplifts experienced several episodes of alpine glaciation. Alpine glaciation is responsible for numerous U-shaped glacial valleys, glacial lakes, terminal and lateral moraines, and other glacially derived landforms seen today along the Beartooth front, in the Absaroka Mountains, and in the Big Horn Mountains.

Current Geological Conditions

Currently, the Bighorn Basin is generally experiencing an erosional phase, with deposition of sediment occurring locally in rivers, streams, and lakes, and reservoirs. Erosion of sediment by rivers, streams, wind, gravity, and ice far exceeds sediment deposition in the basin. The consolidated rocks and unconsolidated sediments in the Planning Area are constantly affected by the forces of weathering and erosion. Rocks weather through mechanical processes, chemical processes, or both. Water, wind, ice, and gravity are the principal weathering agents. The mild acidity of rain or snow causes chemical erosion and tends to dissolve carbonate rocks. Water reacts with the calcium carbonate in limestone to form carbonic acid, which dissolves limestone even more aggressively than water alone.

Figure 3-17. Generalized Stratigraphic and Lithologic Section of the Bighorn Basin



Source: BLM 1993

Water weathers rocks by infiltrating pore spaces or fractures in rock, freezing, and then thawing, thereby acting to wedge the rock apart. Water flowing downslope transports sediment of various sizes down gradient. Pebbles and cobbles in channel and terrace deposits along streams and rivers in the Planning Area reveal their various sources in the varying lithologies seen in the deposits.

Bentonite, gypsum, and sand and gravel mining alter the existing geologic resources in the Planning Area, because these activities remove commercial quantities of minerals from the geologic formations. Other surface disturbances change the condition of existing geological resources by disturbing or loosening soil or rock at the surface.

The degree and direction of change to geology due to the weathering process would be imperceptible over the life of a land use plan. Typically, mining activities would tend to change the character of the surface over the short term, but over the long run, disturbed areas would be reclaimed and returned to the extent possible to the preexisting slope and vegetative cover.

3.1.3 Soil

Soils in the Planning Area are diverse and highly variable. Soil characteristics can differ over relatively short distances, reflecting differences in parent material, position on the landscape, elevation, aspect, and climatic variables such as precipitation and temperature. The plant communities supported by such a wide diversity of soils are equally diverse, ranging from sparsely vegetated desert saltbush and sagebrush-bunchgrass communities to forests and alpine meadows. More than 60 ecological sites have been identified in the Planning Area. Low annual precipitation, salinity, alkalinity, and shallow depths have the greatest effect on soil productivity and the plant communities they support.

The Washakie County soil survey is the only published soil survey for the Planning Area (NRCS 1983). Soil data for Hot Springs, Big Horn, and Park counties have been compiled from earlier inventory efforts and are available in digital format. A soil database allows soil data to be applied for use and suitability interpretations. This database is adequate for most soil interpretations.

Soil Characteristics and Regional Context

Soils in the Planning Area formed from a wide variety of geologic material. Variation in parent material, along with variable climate, topography, and vegetation, has resulted in soils with diverse characteristics and textures.

Soils commonly found in the Planning Area include soils with moderately fine to fine textures (clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay, clay) that formed over shale or were influenced by shale parent material. Soils in the Planning Area that formed over sandstone or were influenced by sandstone parent material generally have medium to moderately coarse textures (sandy loam, fine sandy loam, very fine sandy loam, loam). Coarse-textured soils (loamy sand, sand) in the Planning Area are generally associated with windblown soils derived from sandstone parent material. The soils characterized by reddish hues often are referred to as red bed soils. The formation of these highly productive soils was strongly influenced from the red sandstone common to the Chugwater formation. These soils have high gypsum content and generally have medium textures (very fine sandy loam, loam fine sandy loam). As a result, they are highly susceptible to erosion following surface disturbance or vegetation reduction.

Biological soil crusts, often referred to as cryptobiotic, cryptogamic, and microbial soil crusts, are found on all soil types throughout the Planning Area. Biological soil crusts are an intimate association between soil particles and cyanobacteria, mosses, lichens, microfungi, and algae (Rosentreter et al. 2007). The

presence of biological soil crusts increases soil stability and the soil's resistance to wind and water erosion, and by forming stable soil aggregates, allows for increased water infiltration. They also add carbon to the soil surface, convert atmospheric nitrogen to bio-available nitrogen, and increase bio-available phosphorus. The distribution and extent of biological soil crusts have not been well documented in the Planning Area largely due to the age of the soil survey data. Rangeland health surveys are documenting the presence of biological crusts using the 17 indicators of rangeland health. As the soil survey dataset is updated, key data collected will relate to biological crusts.

The Planning Area lies within two MLRAs: the Northern Intermountain Desertic Basins – 32 (5- to 9-inch and 10- to 14-inch precipitation zones) and Central Rocky Mountains – 43B (15- to 19-inch and 20+-inch precipitation zones) (USDA 2008). The following paragraphs provide an overview of Planning Area soils by MLRA.

Northern Intermountain Desertic Basins

The dominant soil orders in the Northern Intermountain Desertic Basins are Entisols and Aridisols. These soils have a mesic temperature regime, an aridic soil moisture regime, and mixed mineralogy. They generally are shallow to very deep, well drained, and loamy and consist of Torriorthents formed in alluvium on alluvial fans and flood plains (Apron and Kishona series) and in residuum and colluvium on hills and piedmonts (Chipeta, Greybull, Persayo, Shingle, and Worland series); Torrifluvents (Lostwells and Youngston series) and Natrargids (Uffens series) formed in alluvium on flood plains, alluvial fans, and stream terraces; and Ustorthents (Spearfish series) formed in residuum and colluvium on hills.

Central Rocky Mountains

The dominant soil orders in this area are Inceptisols, Alfisols, and Mollisols. These soils have a frigid or cryic soil temperature regime and an ustic, udic, or xeric soil moisture regime. Soils on mountain side slopes and ridges are formed in colluvium, residuum, and glacial till and have mixed mineralogy. Areas of rock outcrop and rubble land are on ridges and peaks above timberline. Most of the soils are skeletal and are medium textured to coarse textured.

Current Condition

There has been no comprehensive analysis of the current condition of soils and soil health in the Planning Area. There have been qualitative assessments throughout most of the Planning Area using the 17 indicators of rangeland health found in *Technical Reference 1734-6, Interpreting Indicators of Rangeland Health* (BLM 2005c). Of the 17 indicators of rangeland health, ten are used to assess soil and soil site stability. Qualitative assessments using the ten indicators infer improvement of the overall health of the soil resource. The ability of the watersheds to capture and slowly release water without excessive erosion is expected to continue to progress.

Past land uses in the Planning Area have resulted in a network of incised gullies extending into the uplands, often replacing what are thought to have been broad grass-covered swales. This gully network is not restricted to any particular ecological site or plant community and is present throughout the uplands in the 5- to 9-inch precipitation zone and 10- to 14-inch precipitation zone. As a result, peak runoff discharges are of greater intensity and shorter duration, and water is not being retained on the watersheds as it appears to have been in the past. Based on qualitative rangeland health assessments, most gullies are in the process of healing and stabilizing. However, a few gullies still continue to creep farther into the uplands.

Where native plant communities have retained a healthy stand of perennial grasses and shrubs, the ten indicators of soil and site stability reflect that the soils are relatively intact and stable. There is little

evidence (e.g., water flow patterns, pedestals/terracettes, bare ground, and gullies) of past or current erosion, and water is being captured and safely released. The upward trend in overall soil resource health is most pronounced in these plant communities and is expected to continue. Where incised gullies are present, they are expected to continue to heal and stabilize; however, they will continue to channel runoff from the uplands at an accelerated rate.

In areas where the plant communities have shifted to a blue grama sod plant community or a Gardner's saltbush/bare ground plant community, damage to the soil resource is evident. Bare ground is excessive and often interconnected. Loss of the nutrient-rich A horizon is common in bare areas and runoff and erosion exceed the expected rate for the site. However, these plant communities appear to be static, showing neither improvement nor further degradation. The incised gully network in these more degraded sites is expected to slowly improve or remain static.

In areas where the plant communities have shifted to annual grassland dominated by cheatgrass, there is little evidence of damage to the soil resource and runoff and erosion indicators are almost absent. These areas are often characterized by dense stands of cheatgrass, with excessive litter creating an oxidized layer of thatch. Little change to soil and soil site stability is anticipated in these communities. Ongoing research is revealing that cheatgrass-dominated sites undergo biogeochemical changes that alter soil evolution and plant succession.

Wildland fires are occurring more frequently and are becoming larger, and burn with greater intensity over longer periods. When viewed from a soils and watershed perspective, these larger fires lead to increased soil erosion. In many situations, as in the case of cheatgrass monocultures, entire plant communities are shifted as a result of wildland fire.

Despite some evidence that water is not being retained on the landscape as it once was and that soils are being affected in some areas, the soil resource remains capable of producing forage for wildlife and livestock. It is also proving capable of maintaining a balance between infiltration and runoff, thus protecting watershed condition. The soil resource should be capable of sustaining increased demands without long-term impacts. Surface-disturbing activities are likely to be the greatest demand on the soil resource. In the arid climatic conditions common to the Planning Area, long-term soil loss exceeding 2 tons per acre per year could adversely affect the soil resource.

Erosion

Position on the landscape, slope, physical properties, and most notably, surface texture and structure and chemical properties, contribute to susceptibility of soils to wind and water erosion. Slopes greater than 25 percent have a high water erosion potential, whereas slopes from 10 percent to 25 percent are considered to have a moderate water erosion potential (Map 62). Runoff potential is increased if plant communities are disturbed. Many other soils have naturally high runoff potential (Hydrologic Group D) due to high clay content and their tendency to swell when wet.

Susceptibility to water erosion is a function of slope and soil surface texture. As a rule, slopes greater than 25 percent are considered to be highly susceptible to water erosion, particularly after surface disturbance. Management of slopes of 10 percent or greater requires an emphasis on runoff and erosion control. Map 62 shows the percent slope in the Planning Area. Table 3-5 summarizes the number of acres susceptible to water erosion.

Table 3-5. Soils with High Water Erosion Potential in the Planning Area

BLM-Administered Surface		Federal Mineral Estate		All Land Ownership	
Acres	Percent of BLM-Administered Surface	Acres	Percent of Federal Mineral Estate	Acres	Percent of Lands within Planning Area
465,988	14.6	671,002	16.0	824,254	14.6

Source: BLM 2009a

BLM Bureau of Land Management

Using the USFS web-based Water Erosion Prediction Project (WEPP) erosion model, surface-disturbing activities have the potential to increase annual soil loss to levels far greater than 5 tons per acre (WEPP 2008). Site-specific mitigation measures, including timely reclamation, are needed to minimize soil erosion and protect long-term soil productivity. WEPP erosion predictions consistently show that erosion rates following surface-disturbing activities return to background levels within 3 to 5 years following full reclamation.

Wind erosion is not widespread in the Planning Area. Where high winds occur, the soils with sandy surface textures (sand, loamy sand, fine sandy loam, sandy loam) are highly susceptible to wind erosion. Existing soils data is not adequate to make a realistic determination of acres susceptible to wind erosion or to produce a meaningful map of their locations.

Management Challenges

Management challenges for soil resources in the Planning Area stem largely from surface-disturbing activities. Development of mineral resources, including road building, well pad construction, pipeline installation, and vegetation treatments all impact the soil resource. Other actions that affect soils include a variety of surface uses that loosen topsoil and remove vegetation or other ground cover, such as grazing and browsing by animals, off-highway vehicle (OHV) use, development of trails and campgrounds, rights-of-way (ROWs), fire-suppression activities, and prescribed fires. Soil compaction resulting from surface-disturbing activities and associated development can reduce infiltration, increase runoff, and hamper reclamation.

Other challenges include implementing improved reclamation techniques, control of invasive species, and establishment of native plant communities on disturbed sites. In addition, areas where plant communities have shifted to blue grama sod or Gardner's saltbush/bare ground offer a unique management challenge. The BLM applies restrictions and implements mitigation measures and BMPs to protect soil resources (Refer to Appendix H and Appendix L).

3.1.4 Water

This section characterizes surface water and groundwater resources and describes water use and current water management practices in the Planning Area.

The Bighorn Basin is a semi-arid desert that receives little moisture. Lower elevations of the Basin are some of the driest parts of Wyoming. Mean annual precipitation ranges from less than 5 inches to more than 40 inches at higher elevations of mountain ranges. Most precipitation at lower elevations of the basin comes in the form of periodic rainfall from April through June. During these months, most smaller stock reservoirs in the Planning Area depend on these rainfall events to capture and store surface runoff. Snow is very light, with annual averages of 15 to 20 inches at lower elevations and 36 to 48 inches at 5,000 to 6,000 feet amsl. Large snowfall events at lower elevations in the basin are infrequent, with fewer than 3 days annually receiving 5 or more inches.

Surface Water

Surface water resources in the Planning Area fall within U.S. Geological Survey (USGS) Water Resources Region 10 and are all tributaries of the Missouri River. The Bighorn River, Wind River, Clarks Fork of the Yellowstone River, and their associated tributaries, including the Nowood, Greybull and Shoshone river systems, comprise the main source of surface water in the Bighorn Basin. The Bighorn River begins at the Wedding of the Waters and flows through the center of the Bighorn Basin into Bighorn Lake (also known as Yellowtail Reservoir) on the Wyoming-Montana border. The river upstream of Wedding of the Waters is referred to as Wind River. Wind River and its tributaries flow into Boysen Reservoir, which the U.S. Bureau of Reclamation (BOR) manages. The Clarks Fork of the Yellowstone River, flowing out of the Absaroka Mountains, comprises an important source of surface water along the northwest corner of the Planning Area. The North and South Forks of the Shoshone River meet at Buffalo Bill Reservoir (an important water source for the City of Cody and surrounding communities) and then outflow into the Bighorn River, which flows into Bighorn Lake several miles south of the Wyoming-Montana border. Map 3 shows the locations of major surface water features and watersheds at hydrologic unit level 4 in the Planning Area.

Additional watersheds in the Planning Area include Kirby Creek, Nowater River, East Fork of the Nowater River, Fifteenmile Creek, Shell Creek and its tributary (Trapper Creek), Tenmile Creek, Coal Draw Creek, Sand Draw Creek, Elk Creek, Red Canyon Creek, Whistle Creek, Coon Creek, Dry Creek, and Little Dry Creek. Many of the streams in these watersheds, such as those located at lower elevations, are intermittent to ephemeral and flow only in response to snow melt and storm events.

The effective life (and associated costs) of water development projects, such as stock reservoirs and spring developments, depends on watershed conditions. The development and use of resources requiring surface disturbance, resource uses, motorized-vehicle use, and recreation can impact surface water quality, primarily by increasing sediment loads. Stream bank degradation and erosion, and gully erosion (see Section 3.1.3 *Soil*) due to poor vegetative cover and surface disturbances (e.g., roads and construction activities), are the predominant sources of excessive sediment in streams. Proper management of vegetation and surface-disturbing activities such as road construction, forestry, oil and gas discharges, and mining in the Planning Area can mitigate sediment delivery due to these activities.

Public comments during the scoping process indicated that, in particular, the movement of sediment into Bighorn Lake is an issue of concern. Bighorn Lake was formed in 1965 with completion of the Yellowtail Dam (managed by the BOR) across the Bighorn River. The contributing drainage area to this reservoir is 19,650 square miles and consists of the Planning Area and portions of the Bighorn Basin in

Wyoming (USACE and BOR 2009). A 2009 study by the BOR and U.S. Army Corps of Engineers summarized the major causes of sediment production in the drainage basin as the high gradients of the Bighorn Lake tributaries (ranging from about 50 feet per mile in the foothill zone to about 20 feet per mile in the central portion of the Bighorn Basin), low precipitation, the ease with which the underlying rocks in the Planning Area erode, and the lack of vegetative cover to prevent soil erosion (USACE and BOR 2009). The study noted that these factors lead to greater rates of sediment production relative to other nearby drainages, such as the Wind River Basin to the south.

Waters in Wyoming are classified for water quality protection according to existing and designated uses. There are four major classes of surface water in Wyoming with various subcategories within each class (see "Wyoming Water Quality Rules and Regulations, Chapter 1, Surface Water Quality Standards" [Wyoming DEQ 2013d] for descriptions of all subcategories and "Wyoming Surface Water Classification List" [Wyoming DEQ 2013e] for current classifications). The majority of waters in the Planning Area are Class 2 and Class 3. Except for Class 1 waters, each classification is protected for its designated uses plus all uses contained in each lower classification.

Class 1 waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices. The water quality and physical and biological integrity that existed on the Class 1 water at the time of designation will be maintained and protected. In designating Class 1 waters, the Wyoming Environmental Quality Council considers water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water and other values of present and future benefit to the people. The only Class 1 water in the Planning Area is the main stem of the Middle Fork of the Powder River through its entire length above the mouth of Buffalo Creek.

Class 2 waters are waters, other than those designated as Class 1, that are known to support fish and/or drinking water supplies or where those uses are attainable. Uses designated on Class 2 waters include game fisheries, drinking water, nongame fisheries, fish consumption, aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value. Class 2 waters in the Planning Area include the Clarks Fork of the Yellowstone River and the primary tributaries in the Bighorn River Drainage, including Bighorn River, Shoshone River, Greybull River, Nowood River, Shell Creek, Bear Creek, and Five Springs Creek. The BLM manages some smaller tracts on these waters that provide for habitat and fisheries. Other important Class 2 waters include perennial creeks on the west slope of the Big Horn Mountains and the Absaroka Front, Trapper Creek, Deer Creek, Medicine Lodge Creek, Dry Medicine Lodge Creek, Alkali Creek, Johnny Creek, White Creek, North Beaver Creek, South Beaver Creek, Grass Creek, Cottonwood Creek, Owl Creek, Gooseberry Creek, and others. All provide good-quality water and riparian habitat for wildlife, fisheries, and recreational pursuits.

Class 3 waters are waters, other than those designated as Class 1, that are intermittent, ephemeral, or isolated waters and because of natural habitat conditions, do not support nor have the potential to support fish populations or spawning, or certain perennial waters that lack the natural water quality to support fish (e.g., geothermal areas). Class 3 waters provide support for invertebrates, amphibians, or other flora and fauna that inhabit these waters at some stage of their life cycles. Class 3 waters in the Planning Area include most intermittent and ephemeral tributaries to Class 2 waters such as Sand Creek, Fifteen Mile Creek, and No Water Creek.

Class 4 waters are waters, other than some of those designated as Class 1, where it has been determined that aquatic life uses are not attainable. Uses designated on Class 4 waters include

recreation, wildlife, industry, agriculture, and scenic value. The majority of Class 4 waters in the Planning Area are canals.

The Wyoming DEQ-Water Quality Division (WQD) monitoring program collects scientifically defensible monitoring data using a tiered monitoring approach consisting of core monitoring procedures at all probabilistic and regional reference sites and more intensive, stressor-specific monitoring procedures at a subset of pre-screened sites where designated use support is unknown or at reference sites to meet specific data needs to meet the following objectives: (1) Determine water quality standards attainment, (2) Identify impaired waters, (3) Identify causes and sources of water quality impairments, (4) Assess water quality status and trends at multiple scales, and (5) Respond to complaints and emergencies (Wyoming DEQ 2010).

Wyoming's Integrated Water Quality Assessment Report (305[b] Report) (Wyoming DEQ 2012) summarizes water quality conditions in the state. Streams, rivers, ponds, and lakes that do not support designated uses are considered "impaired." This report includes Wyoming's 2012 303(d) List of Waters Requiring TMDLs (303[d] List), which identifies "impaired" waters that require development of a total maximum daily loads (TMDLs). The state updates this list of streams, rivers, ponds, and lakes every two years and uses the list to develop a TMDL allocation of pollutants. Other "impaired" waters might not require TMDLs, and are identified elsewhere in the 305(b) Report. Table 3-6 lists the streams in the Planning Area that are on the 303(d) List because waters in the stream exceed water quality criteria.

Most streams in the Planning Area are intermittent or ephemeral. When surface water flows occur, these creeks carry large amounts of sediment downstream. The conditions of these watersheds are linked to upland and riparian conditions. Monitoring performed by the BLM, such as proper functioning condition (PFC) assessments (refer to Section 3.4.3 *Vegetation – Riparian/Wetlands Resources*), provide indirect indicators of water quality and watershed health, is commonly tied to specific actions or activities, and is complementary to monitoring and assessments carried out by the Wyoming DEQ-WQD.

The Wyoming DEQ-WQD regulates all surface discharge of water, including water produced from oil and gas development and storm water discharges, through the Wyoming Pollutant Discharge Elimination System (WYPDES) permit process. WYPDES permitted discharges require periodic monitoring, cannot result in a violation of water quality standards in the receiving stream, and must be discharged in a manner that does not cause erosion. Most activities that result in one or more acres of surface disturbance require coverage under a WYPDES storm water permit and require a storm water pollution prevention plan that identifies specific BMPS to prevent or reduce erosion and pollution, prescribes periodic inspection and monitoring, and demonstrates how the proposed plan would prevent a violation of water quality standards in the receiving stream.

All of the waters listed in Table 3-6 have had TMDLs developed for *E. coli,* the current water quality parameter for fecal bacteria, but final approval of the TMDLs has not been granted by the EPA. The *Draft E. coli TMDL for the Bighorn River Watershed* is available online: http://deq.state.wy.us/wqd/watershed/TMDL/Front%20Page%20Misc/Big%20Horn%20TMDL%20Draft%207-5.pdf.

Table 3-6. Wyoming 303(d) Listed Impaired Waters Requiring TMDLs in the Planning Area

Surface Water	Location	Use Support	Cause
Beaver Creek	From Shell Creek upstream an undetermined distance.	Threatened	Fecal Coliform
Big Wash	From Sage Creek upstream to Sidon Canal.	Not Supporting	Fecal Coliform
Bighorn River	Confluence with Nowood River upstream an undetermined distance above the City of Worland.	Not Supporting	*E. coli*
Bighorn River	From Greybull River upstream to Nowood River.	Not Supporting	Fecal Coliform
Bighorn River	From Greybull River downstream an undetermined distance above Bighorn Lake.	Not Supporting	Fecal Coliform
Bitter Creek	From Shoshone River upstream an undetermined distance above Powell.	Not Supporting	Fecal Coliform
Dry Creek	From Bighorn River upstream an undetermined distance.	Threatened	Fecal Coliform
Dry Gulch	From confluence with Shoshone River upstream an undetermined distance.	Not Supporting	*E. coli*
Fifteenmile Creek	From confluence with Bighorn River upstream an undetermined distance.	Not Supporting	Fecal Coliform
Foster Gulch	From confluence with Shoshone River upstream an undetermined distance.	Threatened	Fecal Coliform
Granite Creek	From confluence with Shell Creek upstream to an undetermined point near Antelope Butte Ski Area.	Not Supporting	Fecal Coliform
Greybull River	From confluence with Bighorn River upstream to the Sheets Flat bridge.	Not Supporting	Fecal Coliform
Kirby Creek	From confluence with Bighorn River upstream an undetermined distance above Lake Creek.	Threatened	Fecal Coliform
Nowater Creek	From confluence with Bighorn River upstream an undetermined distance.	Not Supporting	Fecal Coliform
Nowood River	From confluence with Bighorn River upstream an undetermined distance.	Not Supporting	Fecal Coliform
Owl Creek	From confluence with Bighorn River upstream an undetermined distance.	Threatened	Fecal Coliform
Paint Rock Creek	From confluence with Nowood River upstream an undetermined distance.	Threatened	Fecal Coliform
Polecat Creek	From Sage Creek upstream an undetermined distance.	Not Supporting	Fecal Coliform
Sage Creek	From confluence with Bighorn River upstream an undetermined distance.	Not Supporting	Fecal Coliform
Sage Creek	From Shoshone River upstream an undetermined distance above Big Wash.	Not Supporting	Fecal Coliform
Shell Creek	From confluence with Bighorn River upstream an undetermined distance.	Not Supporting	Fecal Coliform
Shoshone River	From confluence with Bighorn Lake upstream an undetermined distance.	Not supporting	Fecal Coliform
Slick Creek	From confluence with Bighorn River upstream an undetermined distance.	Not Supporting	Fecal Coliform
Whistle Creek	From confluence with Shoshone River upstream an undetermined distance.	Not Supporting	Fecal Coliform

Source: Wyoming DEQ 2012

TMDL Total Maximum Daily Load

Groundwater

There are 12 major aquifers in the Planning Area – Quaternary, Fort Union/Lance, Willwood, Mesaverde, Frontier, Muddy, Cloverly, Sundance, Phosphoria, Ten Sleep, Madison, and Flathead. The Madison is the primary aquifer that supplies water for several municipalities in the Planning Area (Wyoming Water Development Commission 2003). A general description of physical characteristics, water availability, and water quality for each of the 12 major aquifers in the Planning Area is presented in Table 3-7. Refer to the *Wind/Bighorn River Basin Water Plan* (Wyoming Water Development Commission 2003) and the *Wind/Bighorn River Basin Water Plan Update Groundwater Study Level 1 (2008-2011)* (Taucher et al. 2012) for additional information on physical and chemical characteristics, water availability, recharge areas, and recharge rates of aquifers underlying the Planning Area.

Table 3-7. Major Aquifers in the Planning Area

Aquifer/Formation	Physical Characteristics	Aquifer Characteristics and Water Quality
Quaternary	Consists primarily of sand and gravel interbedded with finer-grained sediments, such as silt and clay; coarser deposits occur locally. Thickness is dependent on stream or river valley association and ranges between 50 and 200 feet.	Subaquifers in the Quaternary aquifer may have local development potential. Depending on local hydrogeologic conditions, individual wells may yield between 10 gpm to 500 gpm.
Fort Union/Lance	Consists of 4,000 to 6,000 feet of interbedded sandstones, siltstones, and coals.	Reported well yields are typically less than 200 gpm, though yields of more than 1,000 gpm are possible from wells that penetrate more than 1,000 feet of the aquifer. Water quality varies and is typically useful for domestic and livestock use, though sulfate concentrations have exceeded 500 mg/L in some areas.
Willwood	Consists of fine-grained mudstone and shale interbedded with medium grained sandstone and sporadic conglomerates. The Willwood aquifer is nearly indistinguishable from the Fort Union/Lance aquifer in the Bighorn Basin.	Similar to the Fort Union/Lance aquifer.
Mesaverde	Consists of 500 to 2,200 feet of variable sequence of massive lenticular fine- to coarse-grained sandstone, carbonaceous shale, and lesser amounts of coal.	Discharge from the Mesaverde aquifer is both natural and anthropodenic. The primary anthropogenic source of discharge is oil and gas wells. Concentrations of some properties and constituents in the Mesaverde aquifer approached or exceeded applicable EPA or State of Wyoming water-quality standards and could limit suitability for some uses.
Frontier	Consists of 700 to 1,200 feet of alternating sequence of very-fine- to medium-grained sandstone and shale.	Concentrations of some properties and constituents in water from the Frontier aquifer exceeded State of Wyoming standards for agricultural and livestock use.
Muddy	Consists of 20 to 134 feet of sandstone interbedded with mudstone.	The Muddy aquifer is a major oil and gas reservoir. Concentrations of some properties and constituents in the Muddy aquifer approached or exceeded applicable EPA or State of Wyoming water-quality standards and could limit suitability for some uses (i.e., agricultural and livestock use).

Table 3-7. Major Aquifers in the Planning Area (Continued)

Aquifer/Formation	Physical Characteristics	Aquifer Characteristics and Water Quality
Cloverly	Consists of 200 to 300 feet of sandstone interbedded with lenticular cherty pebble conglomerate and thin variegated shale known as the "Dakota Sandstone"; a middle shale unit known as the "Fuson Shale"; and a basal fine- to coarse-grained sandstone known as the "Lakota Sandstone".	Concentrations of some properties and constituents in the Cloverly aquifer approached or exceeded applicable EPA or State of Wyoming water-quality standards and could limit suitability for some uses (i.e., agricultural and livestock use).
Sundance	Consists of 200 to 900 feet of fine- to coarse-grained sandstone with some thin shale and fossiliferous limestone interbeds, and a basal unit that includes siltstone and sandstone grading downward into limestone, dolomite, and cherty pebble conglomerate.	Concentrations of some properties and constituents in the Sundance aquifer exceeded State of Wyoming standards for agricultural and livestock use.
Phosphoria	Consists of 100 to 300 feet of siltstone, mudstone, and silty shale.	Concentrations of some properties and constituents in water from the Phosphoria aquifer and confining unit in the BHB approached or exceeded applicable EPA or State of Wyoming water-quality standards and could limit suitability for some uses (i.e., agricultural and livestock use).
Ten Sleep	Consists of 200 to 600 feet of medium-grained well-sorted sandstone. Present throughout the Planning Area.	Excellent aquifer yielding water under artesian to flowing artesian conditions near range front. Well yield increased quantities where fractured. Water quality decreases away from recharge area (with distance from range front).
Madison	Consists of 300 to 700 feet of massive to thin-bedded limestone, containing some thin beds of chert and shale near the top. Present throughout the area.	Potentially voluminous producer where extensive fracturing and cavities are known to exist. Water quality data are sparse. Completion could be cost prohibitive basin-ward.
Flathead	Cambrian-age Flathead Sandstone consisting of fine- to medium-grained arkosic and quartzitic sandstone.	Might be good source of groundwater where weathered or fractured, yielding high-quality water near outcrops. Depth to completion could be cost prohibitive basin-ward.

Sources: Taucher et al. 2012; Arneson et al. 1998.

EPA Environmental Protection Agency
gpm gallons per minute
mg/L milligrams per liter

Groundwater recharge occurs from direct infiltration of precipitation into the shallower aquifers, from infiltration into the rock outcrop areas of the deeper aquifers, and from leakage between aquifers. Groundwater quality depends primarily on the source geologic formation or aquifer. Groundwater is used to meet the demand of current uses on public land, such as livestock, wildlife, mineral development, and industrial.

Geologic formations aging from Precambrian to the shallow Quaternary deposits produce groundwater throughout the basin. The most reliable and accessible shallow groundwater supplies are from aquifers in unconsolidated deposits along the larger waterbodies such as the Bighorn, Greybull, Nowood, and Shoshone Rivers (Plafcan et al. 1993). The Clarks Fork of the Yellowstone River also provides reliable and accessible supplies of groundwater. Larger producing wells also originate in deep limestone and dolomite aquifers of the Madison Limestone and Bighorn Dolomite formations. These formations crop out along

the flanks of the basin and are found at extensive depths that produce large amounts of water for municipalities and agricultural purposes.

The Madison Aquifer is an important regional water source for the northern plains states (including western South Dakota, Wyoming, and potentially western Montana in the near future) due to increasing populations and development in this area and the limited number of other undeveloped water sources (USGS 2009). Issues related to water levels and the aquifer's recharge rate are some of the primary areas of concern related to this water resource. An important area within the Madison aquifer is the Spanish Point Karst Area of Critical Environmental Concern (ACEC), a specially designated area that protects surface and groundwater recharge areas and sensitive karst watercourses; refer to Section 3.7.1 *Areas of Critical Environmental Concern* for additional information on the Spanish Point Karst ACEC.

Surface Water and Groundwater Quantity and Use

Both surface water and groundwater are sources of water in the Planning Area. Surface water sources typically meet existing uses on public lands, but natural climatic fluctuations, such as drought, can make marginally adequate sources unreliable. Groundwater sources are adequate to meet the demand of all current uses on public land (primarily for agricultural, municipal, industrial, livestock, and wildlife).

Active water wells in the Planning Area are permitted through the Wyoming State Engineer's Office within the four counties of the Planning Area (Wyoming State Engineer's Office 2006). A permittee can apply for water rights on BLM-administered land; if the permittee demonstrates beneficial use, then the Wyoming State Engineer's Office can permit the water right. The issuance of the water right in no way authorizes a permittee to develop water on BLM-administered lands, or any lands that they do not own. This requires independent negotiations between the permittee and the BLM to acquire the appropriate special use permit or ROW. The Wyoming State Engineer's Office does not require that landowner authorization be obtained before it issues the water right. Table 3-8 summarizes water uses in each of the four counties. Approximately 85 percent of the total surface water and groundwater consumptive use in the Planning Area is for agricultural purposes (Table 3-9).

According to the Wyoming Water Development Commission's 2010 Wind/Bighorn River Basin Plan (Wyoming Water Development Commission 2010), there remains approximately 1.8 million acre-feet of unallocated flow for the State of Wyoming to develop. Despite this apparent surplus, many areas in these basins chronically experience water shortages. Groundwater sources are adequate to meet the demand of all current uses on public land (primarily livestock, wildlife, and recreation); however, there has been substantial local water development in recent years, which may result in excessive depletion that could affect current or future demand.

There is an anticipated increase in future demand for surface water for irrigation and other consumptive uses in the Planning Area. The *Wind/Bighorn River Basin Plan Update* (Wyoming Water Development Commission 2010) projected future demand for water in the Bighorn Basin based on three planning scenarios for 2020, 2040, and 2060:

- Low scenario: This scenario represents the minimal likely development, or possible contraction, in the Basin. Although this scenario will not result in any new water demand pressures in the Basin due to socioeconomic activity, it provides a supportable lower limit for water planning purposes.
- Medium scenario: This scenario represents the most likely set of factors that will occur in each of the Basins over the planning horizon. This scenario represents the most probable future conditions in the Basin in the opinion of the study team.

- High scenario: This scenario represents the highest growth that could potentially occur in the Basin over the planning horizon. These conditions will provide an upper boundary for water planning in the Basin.

Table 3-10 lists the total new water requirements in the Bighorn Basin for each scenario discussed above. Due to unappropriated surface water, future reservoirs in the area are possible.

Oil and gas development can result in large volumes of produced water that can have beneficial and adverse effects on surface water and can reduce groundwater availability; however, water users in the Planning Area overwhelmingly view produced water as beneficial. The release of produced water can increase or extend the period of flow in drainages; such releases can provide valuable sources of water and are highly coveted by users in the Planning Area. However, discharges of produced water also can increase the total dissolved solids concentration of surface waters, result in increased survival and spread of invasive species adapted to the conditions created, and substantially increase erosion in ephemeral drainages (BLM, State of Montana DEQ, and MBOGC 2003; BLM 2009g).

Table 3-8. Uses of Active Well Permits by County

County	Use	Number of Active Permits
Big Horn County	Domestic	2
	Industrial, Miscellaneous	2
	Miscellaneous	10
	Miscellaneous, Irrigation	1
	Miscellaneous, Municipal	1
	Stock	106
	Stock, Irrigation	1
	Stock, Municipal	6
	Total	**129**
Hot Springs County	Domestic, Stock	3
	Industrial	2
	Industrial, Miscellaneous	5
	Miscellaneous	12
	Monitoring	5
	Stock	277
	Test Well	3
	Wildlife	1
	Wildlife, Stock	3
	Total	**311**

Table 3-8. Uses of Active Well Permits by County (Continued)

County	Use	Number of Active Permits
Park County	Domestic	2
	Domestic, Stock	7
	Industrial	9
	Industrial, Miscellaneous	1
	Irrigation	2
	Miscellaneous	5
	Stock	82
	Total	**108**
Washakie County	Domestic	1
	Domestic, Stock	2
	Industrial	2
	Irrigation	1
	Miscellaneous	5
	Stock	115
	Total	**126**

Source: Wyoming State Engineer's Office 2006

Table 3-9. Water Use Summary in the Wind/Bighorn River Basin, 2010

Type of Water Usage	Diversion (acre-feet)[1]	Consumptive Use (acre-feet)
Municipal and Domestic	21,324	8,743
Industrial/Mining	91,906	19,163
Agricultural (Irrigation)	3,136,728	1,079,971
Stock Water[2]	6,370	6,370
Reservoir Evaporation	156,157	156,157
Recreation	Non-consumptive	
Environmental	Non-consumptive	
Total	**3,412,485**	**1,270,404**

Source: Wyoming Water Development Commission 2010

[1]Includes both surface water and groundwater use.
[2]Consumptive use not calculated for stock water use.

Table 3-10. Projected New Demand for Water Usage from the Wind/Bighorn River Basin

Year	Water Usage	Projected Growth Scenario (acre-feet)		
		Low	Moderate	High
2020	Municipal and Domestic	-300	500	1,600
	Industrial	22,800	35,300	40,800
	Agricultural	-75,000	100	55,000
	Wind River Indian Reservation	0	0	0
	2020 Total	**-51,900**	**35,900**	**97,400**
2040	Municipal and Domestic	1,000	2,000	4,800
	Industrial	74,200	126,600	152,700
	Agricultural	-200,000	200	153,000
	Wind River Indian Reservation	0	19,000	75,000
	2040 Total	**-124,800**	**147,800**	**385,500**
2060	Municipal and Domestic	1,700	3,500	8,600
	Industrial	148,800	283,600	359,200
	Agricultural	-320,000	500	254,000
	Wind River Indian Reservation	0	19,000	209,000
	2060 Total	**-169,500**	**306,600**	**830,800**

Source: Wyoming Water Development Commission 2010

Management Challenges

There are a number of management challenges for water resources in the Planning Area. Surface water quality must be maintained or improved in compliance with federal standards, while development and other resource use can impact surface water quality by increasing sediment load. Sediment loading into Bighorn Lake is an issue of public concern. Currently, groundwater sources are adequate to meet the demand of all current uses on public land, yet the anticipated increase in future demand for irrigation and other consumptive uses could affect the level and recharge rate of important aquifers. Produced water is also a management challenge. Many residents indicate produced water is beneficial to the users, yet these discharges can also adversely affect surface water quality and increase invasive species prevalence and erosion.

3.1.5 Cave and Karst Resources

A cave is any naturally occurring void, cavity, recess, or system of interconnected passages beneath the surface of the Earth, or within a cliff or ledge large enough to permit an individual to enter, whether or not the entrance was naturally formed or man-made (The Federal Cave Resources Protection Act [FCRPA], Sec. 3[1]). Cave and karst resources are abundant in the Bighorn Basin. Karst topography consists of landforms produced by the dissolution of rock creating a variety of landscape features, including caves, which are common in the Planning Area. Cave and karst resources are fragile because of their association with other resources such as groundwater systems and biological communities. They also might be considered nonrenewable resources because of paleontological and archeological deposits, and speleothems (mineral formations inside caves) they contain.

In the Planning Area, the cave and karst system along the west slope of the Big Horn Mountains in the Medicine Lodge area is important due to mineral features such as speleothems, potential for diverse karst aquatic organisms, cultural and paleontological resources, and recreation opportunities. This area is hydrologically important because of the presence of disappearing surface water streams and its link to regional groundwater aquifers. This system includes rock outcrops of the Madison Limestone, Bighorn Dolomite, and Ten Sleep Sandstone, all of which are primary recharge areas for regional aquifers in the Bighorn Basin. A portion of this area is designated as an ACEC for the protection of cave and karst resources (refer to Section 3.7.1 *Areas of Critical Environmental Concern* for more information).

The FCRPA of 1988 was the first federal legislation to recognize caves and their contents as whole, integrated ecosystems. FCRPA declares significant caves on federal lands as an invaluable and irreplaceable part of the Nation's heritage. U.S. Department of the Interior (DOI) implementation regulations for FCRPA require that federal lands be managed in a manner that, to the extent practical, protects and maintains significant caves and cave resources (43 Code of Federal Regulations [CFR] Part 37.2). BLM policy and guidance for managing cave resources is to protect sensitive, fragile, biological, ecological, hydrological, geological, scientific, recreational, cultural, and other cave values from damage and to ensure they are maintained for public use, both now and in the future (BLM 2008b).

Under FCRPA, a cave is considered significant if it meets one or more of the following six criteria:

Biota – The cave serves as seasonal or yearlong habitat for organisms or animals, or contains species or subspecies of flora or fauna native to caves, or is sensitive to disruption, or contains species found on state or federal sensitive, threatened, or endangered species lists.

Cultural – The cave contains historic or archeological resources included on or eligible for inclusion on the National Register of Historic Places (NRHP) because of its research importance for history or prehistory, its historical association, or other historical or traditional significance.

Geological/Mineralogical/Paleontological – The cave has fragile geologic or mineralogic features, features that exhibit interesting formations, or paleontological resources.

Hydrologic – The cave is part of a hydrologic system or contains water important to humans, biota, or development of cave resources.

Recreational – The cave provides or could provide recreational opportunities or scenic values.

Educational or Scientific – The resource offers opportunities for educational or scientific use or is in a virtually pristine state, lacking evidence of contemporary human disturbance or impact, or the length, height, volume, total depth, or similar measurements are notable (43 CFR Part 37).

There are 32 known caves in the Planning Area, of which 19 are considered significant according to FCRPA criteria (BLM 2009a). Eight caves are gated and locked and three caves are open through the issuance of a key and permit. Recreational use of these caves is minimal, except by local cave enthusiasts. Horsethief, Spirit Mountain, and Great Expectations caves typically experience the highest level of recreational use. The BLM manages all caves in the Planning Area in a wild state; there are no developed caves on public lands in the Planning Area. Bats use several caves in the Planning Area and the BLM lists three of those bat species (Townsend's big-eared bat, spotted bat, and long-eared myotis) as sensitive.

Management Challenges

Management challenges for cave resources include preventing degradation of the resources while allowing for recreational use and scientific research.

3.2 Mineral Resources

Mineral resources in the Planning Area include locatable (bentonite, gypsum), leasable (coal, oil shale, geothermal, oil and gas, other solid leasable minerals), and salable (sand, gravel) minerals. Each section below defines and describes the resource, its current condition, and management challenges. Split-estate lands are where the United States owns the minerals under privately owned surface. Most of the split-estates resulted from patents for the surface issued under homestead laws such as the Stock Raising Homestead Act of 1916. Federal mineral lease holders or persons locating a mining claim may enter onto a privately owned surface to the extent necessary to explore and produce the federal minerals in compliance with relevant statutes and BLM regulations and land use designations. See 43 U.S.C. 299; 43 C.F.R. subpart 3814, and Onshore Oil and Gas Order No. 1, sec. VI (72 Fed. Reg. 10308, 10336). The BLM does not have the authority to regulate a surface owner's use of the surface estate, but does have the authority to regulate various activities of federal mineral lessees and mining claimants. See Appendix Z for additional details regarding split-estate lands and BLM administrative responsibilities for managing the federal minerals.

3.2.1 Locatable Minerals

Locatable minerals (metallic and nonmetallic) are those open to mining claim location under the General Mining Law of 1872, as amended (30 U.S. Code [U.S.C.] 22-54 and 611-615). The primary locatable minerals mined commercially in the Planning Area are bentonite (Map 4) and gypsum (Map 5). Other locatable minerals known to occur in the Planning Area include titaniferous sandstone, placer gold, uranium, and sulfur; however, these minerals are not known to occur in commercially viable quantities in the Planning Area. Silica sand is present in the Bighorn Basin in the John Blue Canyon deposit, and is of sufficient quality for glass, fused silica, metallurgical flux, abrasives, fillers in ceramics, and as an ore for making silicon metal (BLM 2009d). However, the prohibitive quantity of overburden overlying known silica sand resources would make any attempt at commercial production very difficult. Base and precious lode metals such as gold, silver, platinum, and copper are not known to occur in commercial quantities in the Bighorn Basin. Precious and semiprecious stones are not known to occur in the Planning Area. For more information on locatable minerals in the Planning Area, refer to the *Solid Mineral Occurrence and Development Potential Report* (BLM 2009d).

A mining claim is an ownership interest in a particular parcel of federal land that is valued for a specific mineral deposit. Mineral prospecting and claim location can take place only on lands open to mineral entry. Claims may not be staked in areas withdrawn from mineral entry by a special Act of Congress, regulation, or public land order. These areas are withdrawn from the operation of the mining laws.

The right of possession provided by a mining claim is restricted to the extraction and development of a mineral deposit as regulated by the BLM or the USFS. The rights granted by a mining claim are valid against a challenge by the United States and other claimants only after the discovery of a valuable mineral deposit. A mining claim is generally referred to as a "lode claim" if mineralization occurs as a vein of ore in place, or as a "placer claim" if minerals are dispersed among particles of sand or gravel. A millsite claim is one used to process locatable minerals.

The BLM locatable mineral program addresses authorization and permitting of locatable mineral exploration, mining, and reclamation activities on BLM-administered land, and is mandated by section 302(b) of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1732[b] and 603[c]; 43 CFR 3802 and 43 CFR 3809). All locatable mineral exploration and development activities that disturb the surface of the mining claim (site) require prior BLM acceptance (for a notice) or authorization (for a

plan of operations). Operations obtain necessary authorizations and permits through the BLM field office responsible for administering the land in which the minerals are located.

Operators must obtain all necessary permits before they begin mining, even if they already filed a mining claim. Surface management regulations apply to activities on unpatented mining claims. These regulations are designed to prevent unnecessary or undue degradation of public lands from operations authorized by the mining laws. They require the filing of a notice or a plan of operations for all activity exceeding casual use. Regulations that went into effect on January 20, 2001 (revised 3809 regulations), require that notices include a bond, and will only apply to exploration activities, not to any production operations. Disturbed areas must be reclaimed after exploration and mining activities are completed. All reclaimed areas and reclamation plans will fulfill federal, state, county, and other local agencies requirements in compliance with the BLM Solid Minerals Reclamation Handbook, H-3042-1. The state of Wyoming also has statutes and rules regarding mining and reclamation requirements. To avoid duplication, the BLM and the Wyoming DEQ have entered into a cooperative agreement via a Memorandum of Understanding (MOU). Operators are advised to check with the BLM and the Wyoming DEQ to determine the proper lead agency before submitting a notice or plan of operations.

Bentonite and gypsum are the only locatable minerals currently extracted in commercial quantities in the Planning Area. Bentonite consists of hydrous silicate of alumina, more commonly known as montmorillinite or beidelite. It can swell up to 16 times its original size, and absorb up to 10 times its own weight in water. It is used for absorbents, animal feed, drilling fluids, foundry, iron-ore pelletizing, and sealants. It is increasingly being used for cat litter, and this could become the largest single market for Wyoming bentonite early in the 21st Century. It is used in drilling mud to lubricate oilfield drilling equipment, hold back formation pressure, and to help prevent caving of the drill hole. Used in the foundry industry, it acts as a molding sand binder when added to taconite and for binding iron pellets, which are later fed into a blast furnace for processing. Bentonite is also used to seal reservoirs and landfills. Other uses include crayons, medicines, food thickeners, and cosmetics.

Bentonite deposits in Wyoming make up approximately 70 percent of the world's known supply. In 2010, Wyoming's bentonite industry mined approximately 4.5 million tons of bentonite, of which approximately 2.8 million tons were mined at six operations in the Bighorn Basin. The six mines in the Bighorn Basin employ 108 persons, and another 190 persons are employed at the milling-processing facilities at six different mills (one in the Worland area, two near Greybull, and three near Lovell, Wyoming (Wyoming Water Development Commission 2010). This is a reduction from 116 mine workers and 340 mill workers working in the basin in 2006 (Wyoming Water Development Commission 2010). The number of additional contracted employees performing jobs that service the bentonite industry in the Bighorn Basin, such as equipment operators and truck drivers, is subject to change based on market conditions. The Wyoming DEQ Land Quality Division permits these broad mining areas; the BLM has surface management plan of operation files covering portions of bentonite mine operations on public lands.

Wyoming bentonite production has increased from 1,141 tons in 1927, to more than 500,000 tons in 1950, more than 2 million tons in 1970, almost 3 million tons in 1990, and more than 4.5 million tons in 2005. Production of Wyoming and Bighorn Basin bentonite has been relatively steady since 2005.

Gypsum (hydrated calcium sulfate) is used primarily in the manufacture of plaster. The development of prefabricated wallboard revolutionized the industry again in the 1960s. Approximately two-thirds of the gypsum currently marketed is in the form of prefabricated products. Gypsum is precipitated primarily from seawater, but can be deposited in saline lakes or hot springs. It often occurs as a product of volcanic activity and can occur in metallic mineral veins.

Commercially important gypsum deposits in the Bighorn Basin are found only in the Jurassic Gypsum Spring Formation. Two mines actively mine gypsum in the Planning Area and employ up to 200 persons in their mines and mills. The CertainTeed gypsum mine is south of Cody, Wyoming, and produces from three thick gypsum beds totaling approximately 35 feet. The Georgia Pacific Gypsum, LLC, mine southeast of Lovell, Wyoming, mines nine seams of gypsum, each separated by thin red shale, for a total of approximately 30 to 40 feet of gypsum.

Most of the gypsum from the Bighorn Basin is used to make wallboard, although other related products are also being made. A total of about 1.5 million tons of gypsum have been mined in the Planning Area since commercial mining began.

Table 3-11 lists active mining notices, the number of plans of operation, and production quantities for bentonite and gypsum in the Planning Area. Other locatable mineral commodities such as sulfur, uranium, titaniferous, or silica sand are not expected to be developed in the Planning Area, subject to market conditions that are not easily forecast. For more information on other locatable minerals that are present in the Planning Area, refer to the *Solid Mineral Occurrence and Development Potential Report* (BLM 2009d).

Table 3-11. Mining Notices and Plans of Operations in the Planning Area, as of 2008

Commodity	Number of Notices	Number of Plans of Operation	Produced Amount (tons)
Bentonite	30	21	2,996,858
Gypsum	1	2	296,862

Sources: CertainTeed Gypsum 2008; Georgia Pacific Gypsum, LLC 2008; BLM 2009d; Wyoming Department of Employment, Office Of Mine Inspector 2008.

Management Challenges

Management challenges for locatable minerals in the Planning Area include surface disturbance and impacts to other resources due to mining activities. Approximately 30,000 acres of land has been or is proposed to be disturbed in the Bighorn Basin due to bentonite mining, which includes approximately 4,000 acres of road and haul-road disturbance (BLM 2008a). Between the CYFO and the WFO, another 20,000 acres of additional bentonite mining is a RFD scenario over the next 20 to 30 years (BLM 2008c).

As surface disturbance due to increased amounts of locatable mineral mining continues to grow in the Planning Area, loss of native habitats and resources increases. Sagebrush is very difficult to reestablish once removed, and can take 30 to 50 years to become reestablished in a mined area. Critical thresholds relevant to continued development of locatable minerals in the Planning Area have not been specifically determined under the existing management scenario. However, using the Geographic Information System (GIS), the BLM might be better able to determine threshold levels of disturbance in relation to locatable mineral (primarily bentonite) mining, and be better able to make future decisions because of these capabilities. A major challenge the BLM faces relates to improvement of sagebrush reclamation in mine areas and determination of direct and cumulative effects of locatable minerals mining on sage-grouse and their habitat, and how to mitigate these effects. In particular, the cumulative, ongoing effect of bentonite mining related to loss of sagebrush habitat and reclamation issues, coupled with the increase in focus on protection of the greater sage-grouse, will become a much more important issue for the BLM.

3.2.2 Leasable Minerals – Coal

Coal is a combustible stratified organic sedimentary rock composed of altered or decomposed and reconstituted plant remains of non-marine origin, combined with varying minor amounts of inorganic material. Different types of coals are classified by their degree of metamorphism in accordance with standard specifications of the American Society for Testing Materials. Most Wyoming coals are classified as bituminous or sub-bituminous.

Coal is classified as a leasable solid mineral under the Mineral Leasing Act of 1920. The BLM manages coal leasing and other administrative duties related to coal production from federal coal lands throughout the United States pursuant to the 43 CFR Part 3400, Coal Management.

Wyoming has the largest federal coal program in the BLM. Most Wyoming coal is used for steam generation in the electrical utility industry. Coal production in Wyoming comes from four primary areas – (1) the Powder River Basin in northeastern Wyoming, (2) the Hanna Basin in south central Wyoming, (3) the Rock Springs area, and (4) the Kemmerer area in southwestern Wyoming.

Coal mining in the Bighorn Basin dates back to the 1890s (Glass et al. 1975), when it was primarily mined for use as a domestic fuel and fuel for the railroad industry. Between 1910 and 1929, approximately 500,000 tons per year were mined; between 1920 and 1956 approximately 90,000 to 200,000 tons per year were mined; however, by the mid-1950s, after railroads converted to diesel engines, annual tonnage dropped to less than 10,000 (Glass et al. 1975; BLM 1993). Historically, most coal mined in the Bighorn Basin was extracted from coalbeds within the Mesaverde Formation, which is, therefore, the most important coal-producing formation in the Bighorn Basin (Glass 1981). Most coal produced from the Bighorn Basin has been mined from the Gebo and Grass Creek Coal Fields.

Coal is the only solid leasable mineral currently mined in the Planning Area. There is only one active coal mine in the Planning Area, and it produces about 70,000 to 100,000 tons per year from the Grass Creek Coal Field. This coal mine is on private land, not BLM-administered land (BLM 2008c).

Currently, there are no exploration licenses or leases issued for federally administered coal in the Planning Area (BLM 2008c). However, there are federal coal resources in the Planning Area, primarily in the Cretaceous Mesa Verde, Meeteetse, and Paleocene Fort Union Formations. Several scattered parcels of land have mineral reservations specifically for coal or designated coal classifications. Although there is record of historic mining in the area and the USGS has identified eight important coal fields (DOI 2009), coal production in the Planning Area is generally not considered economically feasible due to the relative thinness of the coalbeds, thickness of the overburden, and low quality of the coal. Map 6 shows known and potential coal-bearing strata in the Planning Area.

Management Challenges

At present, there is no coal leasing or production on BLM-administered land in the Planning Area. Therefore, the BLM has not identified management challenges for this resource. However, if coal leasing and development were to occur in the Planning Area, management challenges could result due to conflicts with other program areas, such as oil and gas activities.

3.2.3 Leasable Minerals – Oil Shale

Oil shale is considered a leasable solid mineral under the Mineral Leasing Act of 1920. The BLM manages oil shale leasing, research and development leasing, and production, and performs other administrative duties related to oil shale production from federal lands in the western United States.

In August 2005, the U.S. Congress enacted the Energy Policy Act of 2005 (Public Law 109-58). In Section 369 of this Act, also known as the "Oil Shale, Tar Sands, and Other Strategic Unconventional Fuels Act of 2005," Congress declared that oil shale and tar sands (and other unconventional fuels) are strategically important domestic energy resources that should be developed to reduce the Nation's growing dependence on oil from politically and economically unstable foreign sources. In 2008, the BLM released a Programmatic EIS for oil shale and tar sands that amended existing RMPs in Wyoming and other states. The only areas of Wyoming addressed in that Programmatic EIS were the Washakie and Green River Basins in the southwestern part of the state. In 2011, the BLM re-reviewed the land allocations analyzed in the 2008 PEIS and subsequently, via a 2013 ROD, closed certain areas in Wyoming that were open for application for future leasing and development of oil shale and tar sands resources under the 2008 Programmatic EIS.

Oil shale has been described as occurring in thin, low-quality beds in the Eocene Tatman Formation in the central Bighorn Basin. Oil shale resources in the Bighorn Basin are not considered economically feasible to produce using mining or in-place production of kerogen, due to the relative thinness of the oil shale beds, thickness of the overburden, and extremely poor quality of any oil shale. There are an estimated 27 million barrels of undiscovered oil in the Bighorn Basin. At present, due to a lack of commercially valuable resources, no oil shale is leased on BLM-administered land in the Planning Area. Based on these resource values, the BLM did not amend existing plans for the Planning Area for oil shale leasing under the Programmatic EIS for Oil Shale and Tar Sands Resources (BLM 2009c), nor did the BLM make lands in the Planning Area available for applications for oil shale leasing.

Management Challenges

Because there is no oil shale leasing in the Planning Area, the BLM has not identified management challenges.

3.2.4 Leasable Minerals – Geothermal

Geothermal resources are underground reservoirs of hot water or steam created by heat from Earth's interior. Geothermal steam and associated geothermal resources include (1) all products of geothermal processes, including indigenous steam, hot water, and hot brines, (2) steam and other gases, hot water, and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations, (3) heat or other associated energy found in geothermal formations, and (4) any byproducts (see 43 CFR 3200.1) of the above resources. Geothermal steam and hot water are naturally discharged at Earth's surface in the form of hot springs, geysers, mud pots, and steam vents. As an energy source, geothermal resources of hot water or steam are extracted and supplied to steam turbines that generate electrical energy. Geothermal resources also include subsurface areas of hot, dry rock (BLM and USFS 2008a). The BLM field offices in the Bighorn Basin are responsible for supervising and managing all exploration, development, and production operations on any federal geothermal leases in the Planning Area.

Energy derived from geothermal sources is considered a renewable energy resource. Geothermal energy is classified as a renewable energy source because the water used for geothermal energy is replenished by rainfall and the heat and steam harvested for geothermal energy is continuously produced inside Earth.

There are three geothermal areas in the Planning Area, although none is considered viable for use to generate electricity (with current technology and market conditions), and the BLM has not issued

federal geothermal leases (BLM 2008c). The Cody Hydrothermal System extends from the DeMaris Hot Springs 1 mile west of Cody to the Horse Center anticline 7 miles south of Cody. The Cody Hydrothermal system reaches maximum temperatures of 113°F to 131°F at depths of 853 to 1,640 feet. The Thermopolis Hydrothermal System extends east from the Hamilton Dome oil field area about 15 miles to the Warm Springs oil field area. This area reaches temperatures between 115°F and 176°F and is used by several private residences and commercial entities. Water from this system surfaces naturally at Hot Springs State Park, but is not used for municipal heating purposes in the nearby town of Thermopolis. The Bighorn Basin area produces high-temperature water in some of its aquifers because of the thickness of the overlaying sedimentary rock layer; the highest temperature measured in the basin was 306°F at a recorded depth of 23,081 feet (BLM 2009a).

The USGS has not identified any conventional (hydrothermal) geothermal resources in the Planning Area capable of generating electricity (USGS 2008a). In addition, the USGS reports geothermal resource occurrence as low for the entire Planning Area, with the exception of the thermal springs near Thermopolis, which the USGS ranks as moderately low. It should be noted, however, that at an average depth of 6.5 kilometers (approximately 21,000 feet), all of the lands in the Planning Area have temperatures in excess of 150 degrees Celsius (°C) (approximately 300°F), sufficiently hot for hot- and moderate-temperature hydrothermal systems, but at depths currently uneconomical for development (BLM 2008a). Known geothermal resources being exploited by the public or by individuals are primarily on private or state-owned lands in the Planning Area.

The Final Programmatic EIS for Geothermal Resources in the Western United States (BLM and USFS 2008a) describes the Bighorn Basin as having "potential" for geothermal resource development. The BLM is aware of a low to moderate potential for some level of interest in Bighorn Basin geothermal resources over the next 10 to 20 years.

Due to current policy direction guiding the development of renewable energy resources on public lands, there could be increased interest in geothermal development in the Planning Area. The American Reinvestment and Recovery Act of 2009 provides for $350 million in new investment in geothermal energy for research on technology, exploration, development techniques, and geothermal resource assessments (DOE 2009). Should geothermal leasing begin in the Bighorn Basin at some level, the CYFO and WFO would likely be able to accommodate some geothermal resource development over the next planning cycle (BLM 2009a). The BLM would work carefully to ensure that interests in geothermal development in the Bighorn Basin would not adversely affect the geothermal resource at Thermopolis, which the community holds in high regard.

Readers can find additional information and related studies on geothermal resources and development potential in the *Reasonable Foreseeable Development Scenario for Geothermal, Bighorn Basin Planning Area* (BLM 2009h).

Management Challenges

Management challenges are most apparent near the natural hot springs at Thermopolis. The management challenge would be to ensure that any potential geothermal development did not deplete water or heat from the system and therefore adversely affect the Thermopolis hot springs, the local tourism based economy, or the quality of life of local residents. The BLM would take care to consider the views of local, state, and national communities, and use the best available scientific information, before considering geothermal leasing in this area.

3.2.5 Leasable Minerals – Oil and Gas

Oil and gas resources are often found in the pore spaces of sedimentary reservoir rocks, such as sandstone and limestone. These resources migrated from source rocks rich in organic material, such as marine shales. When rocks containing this organic material are subjected to heat and pressure, the organic compounds break down over time, resulting in the formation of oil and natural gas. Once formed, oil and gas can migrate through pores spaces in the host rock or along fractures until it encounters structural, stratigraphic, or combination traps. Coalbed natural gas (CBNG) is present in areas where gas is trapped in the coalbed where it was generated.

The Planning Area has 4,138,024 acres of BLM-administered oil and gas mineral estate out of 5,644,868 acres in the Planning Area, or about 73 percent of the total Planning Area. State, private, and other entities manage the remaining 1,506,844 Planning Area acres (27 percent). Approximately 879,994 acres of state and private surface lands in the Planning Area are split-estate lands that overlie BLM-administered oil and gas mineral estate (subsurface) (BLM 2014a).

Exploration

The BLM is responsible for authorizing and administering geophysical exploration operations on all public surface lands, and under the rights granted under all federal oil and gas leases unless the USFS administers the surface (whether or not such leases are under non-federal land) in the Planning Area. The Wyoming Oil and Gas Conservation Commission (WOGCC) is responsible for authorizing all operations on state and private surface land in instances where such operations are not covered by rights granted under federal oil and gas leases. The BLM authorizes geophysical exploration under a federal oil and gas lease via Sundry Notice approval if the applicant of the geophysical Notice of Intent (NOI) is the federal oil and gas lessee/operator (43 CFR 3150). At the leasing stage, the BLM applies appropriate stipulations on federal oil and gas leases, including standard oil and gas stipulations (Appendix I), and special stipulations identified in the RMP.

Oil and gas reservoirs can be discovered by direct or indirect exploration methods. Direct methods include mapping of surface geology, observing seeps, and gathering information on hydrocarbon observed in drilling wells. Indirect methods often use geophysical methods such as gravity and magnetic and seismic surveys to delineate subsurface features that might contain oil and gas resources not directly observable. The petroleum industry utilizes 2D and 3D seismic technology to obtain subsurface stratigraphic and structural information useful for exploration of oil and gas reserves. 2D seismic technology uses explosives in drilled shot holes for source points along linear survey lines. 3D seismic techniques generally use source points such as vibroseis or shaker trucks in a grid pattern over a large area that can cover hundreds of square miles.

Several companies have leased BLM-administered lands in the Planning Area, and limited exploratory drilling for natural gas has commenced. Two specific areas include:

Southeastern Beartooth Front – There has been seismic exploration along the eastern Beartooth Front northwest of Clark, Wyoming, and exploratory drilling is anticipated. Initially, this activity was situated on private and state land and mineral estates, but is now expanding onto federal (USFS and BLM) lands.

Deep Basin-Centered Gas – Another area receiving new interest is a northwest-trending structural trend related to the deep Bighorn Basin-center gas play, although there is disagreement to the amount of natural gas in these reserves. The USGS estimates that there are more than 989 billion cubic feet (Bcf) of natural gas in low permeability basin-centered gas accumulations in the Bighorn Basin (USGS 2008b). In addition, an estimated 13 million barrels of undiscovered natural gas liquids are projected to exist in

the Bighorn Basin. The Wyoming State Geological Survey is investigating three major types of natural gas resources in Wyoming – tight-sand gas (basin-center gas or deep basin gas), shale gas, and under-pressured gas (Wyoming State Geological Survey 2008). There could be large amounts of all three types of natural gas in the Bighorn Basin.

The approved number of NOI to conduct geophysical exploration operations has been approximately one or two per year since 1999 (BLM 2009a). There has been an increase in the number of seismic ventures in the state, and this trend is expected to continue based on data from the WOGCC (BLM 2009a).

Oil and Gas Leasing Procedures

Leasing procedures for oil and gas, including CBNG, are the same. Based on the federal Onshore Oil and Gas Leasing Reform Act of 1987, all parcels must first be offered competitively. Lands that do not receive competitive interest are available for noncompetitive leasing for a period not to exceed 2 years. Before making a decision whether to offer lands for leasing, BLM conducts an environmental review and determines what resource conflicts exist on the parcels under consideration. Leases for offered parcels may include stipulations to protect other resource values, including:

- Phased leasing;
- Lease stipulations, including No Surface Occupancy, Timing Limitation, and Controlled Surface Use;
- Planned or required unitization of federal lands;
- Phased development; and
- Caps on new surface disturbance, pending acceptable interim or final reclamation;
- Best management practices, such as:
- Use of existing infrastructure;
- Multiple wells on a single pad;
- Requirements to reduce or capture emissions;
- Liquids gathering systems to centralized offsite production facilities;
- Placement of all linear disturbances in corridors;
- Extensive interim reclamation of roadway disturbance to the road surface and of pads to the wellhead; and
- Final reclamation to restore the landform and native plant community.

The BLM Wyoming State Office holds competitive sales four times a year by oral auction and issues competitive and noncompetitive leases for a term of 10 years. If the lessee establishes hydrocarbon production, the competitive and noncompetitive leases can be held for as long as oil or gas is produced. The federal government receives yearly rental fees on nonproducing leases. The state of Wyoming receives approximately half of all money generated from oil and gas leases. Royalty on production is received on producing leases, approximately one-half of which is allocated to the state of Wyoming. After acquiring an oil and gas lease, and prior to development, an application for permit to drill (APD) must be filed with the WOGCC and the appropriate BLM field office if the well proposes to explore or develop a federal oil and gas lease in the Planning Area. After the BLM approves the permit, the company may proceed with drilling according to the conditions of the permit's approval.

Numerous oil and gas operators depend on the ability to lease federal minerals under the BLM leasing program. Public land/leasable fluid minerals are leased to oil and gas operators through an established process for opening public land and areas nominated and approved for leasing. The BLM field offices are responsible for supervising and managing all exploration, development, and production operations on federal oil and gas leases in the Planning Area.

The general policy and main objectives of the BLM oil and gas program are to foster a fair return to the public for its resources, to ensure activities are environmentally acceptable, and to provide for conservation of the fluid mineral resources without compromising the long-term health and diversity of the land.

Oil and Gas Activity in the Planning Area

Under the existing plans, except for Wilderness Study Areas (WSA), some wild and scenic river (WSR) eligible waterways, and the Spanish Point Karst ACEC, BLM-administered lands in the Planning Area are open to oil and gas leasing and exploration. These specially designated areas represent a total of approximately 154,861 acres that are closed to leasing in the Planning Area. This is almost 5 percent of the BLM-administered surface acres in the Planning Area and 3.7 percent of the total 4,203,213 acres of federal mineral estate in the Planning Area (including split-estate lands).

There are 82 operators actively exploring for or producing oil and gas resources in the Planning Area. As of June 2008, federal oil and gas leases covered approximately 960,000 acres in the Planning Area (BLM 2008a) (Map 7). Table 3-12 lists the number of leases and total number of acres under lease in each county.

Table 3-12. Number of Oil and Gas Leases by County, as of June 2008

County	Number of Leases	Area under Lease (acres)
Big Horn	180	158,565
Hot Springs	304	230,473
Park	156	106,944
Washakie	477	465,281

Source: BLM 2008a

Approximately 547 oil and gas wells were spudded (started) in the Planning Area from January 1, 1999, to December 31, 2008 (BLM 2014a). Each well, including roads, pipelines, and similar infrastructure, is assumed to disturb approximately 2.5 acres for initial drilling operations (accounting for approximately 1,368 acres of new disturbance in the Planning Area). Upon completion of operations, interim reclamation measures are implemented, reducing the disturbance by up to 50 percent, or 684 acres (BLM 2009a). Table 3-13 lists oil and gas well statistics for the Planning Area.

There have been 9,928 surface well locations spudded in the Planning Area through March 3, 2009 (WOGCC 2009). Of the 9,928 wells spudded or drilled in the Planning Area, 6,133 wells, or 61.8 percent, have been on BLM-administered mineral estate. Twenty-five wells (0.25 percent) have been drilled on USFS-managed lands. An additional 3,770 wells (38 percent) have been drilled on private and state-owned oil and gas mineral ownership. At the close of 2008, there were 4,544 active oil and gas wells in the Planning Area (BLM 2009d).

There was an upward trend in Application for Permit to Drill (APD) approvals in the Planning Area between 2002 and 2005, peaking in 2005, when 378 APDs were approved (164 of which were on BLM-administered lands) (WOGCC 2009). APD approvals remained relatively steady from 2006 to 2008, averaging 104 approvals per year, but well below the 2005 peak. The number of APD submissions decreased further in 2009, likely driven by market conditions for oil and natural gas.

Table 3-13. Well Statistics by County for the Planning Area, as of June 2008

Statistic	Federal	Fee or State	Total
Big Horn County			
Number of Plugged and Abandoned Wells	849	842	1,691
Number of Dormant Wells	39	65	104
Number of Completed Wells	287	256	543
Number of Monitoring Wells	0	18	18
Notice of Intent to Abandon	7	11	18
Number of Spuds	5	16	21
Number of Expired Permits	60	35	95
Number of Permits To Drill	3	9	12
Permits Issued	1,250	1,252	2,502
Waiting On Approval	1	0	1
Total Permits (issued and pending)	**1,251**	**1,252**	**2,503**
Hot Springs County			
Number of Plugged and Abandoned Wells	936	537	1,473
Number of Dormant Wells	73	34	107
Number of Completed Wells	459	302	761
Number of Monitoring Wells	0	0	0
Notice of Intent to Abandon	11	1	12
Number of Spuds	33	9	42
Number of Expired Permits	58	51	109
Number of Permits To Drill	6	0	6
Permits Issued	1,576	934	2,510
Waiting On Approval	1	0	1
Total Permits (issued and pending)	**1,577**	**934**	**2,511**

Table 3-13. Well Statistics by County for the Planning Area, as of June 2008 (Continued)

Statistic	Federal	Fee or State	Total
Park County			
Number of Plugged and Abandoned Wells	886	611	1,497
Number of Dormant Wells	145	36	181
Number of Completed Wells	831	442	1,273
Number of Monitoring Wells	3	4	7
Notice of Intent to Abandon	9	6	15
Number of Spuds	77	25	102
Number of Expired Permits	127	75	202
Number of Permits To Drill	37	13	50
Permits Issued	2,115	1,212	3,327
Waiting On Approval	0	1	1
Total Permits (issued and pending)	**2,115**	**1,213**	**3,328**
Washakie County			
Number of Plugged and Abandoned Wells	624	104	728
Number of Dormant Wells	35	5	40
Number of Completed Wells	378	62	440
Number of Monitoring Wells	0	0	0
Notice of Intent to Abandon	12	3	15
Number of Spuds	8	5	13
Number of Expired Permits	74	12	86
Number of Permits To Drill	4	0	4
Permits Issued	1,135	191	1,326
Waiting On Approval	0	0	0
Total Permits (issued and pending)	**1,135**	**191**	**1,326**

Source: WOGCC 2009

Oil and Gas Production in the Planning Area

Oil and gas occurs in the Planning Area in numerous geologic formations, and members of formations that range in age from the oldest producing formation, the Flathead Sandstone (Cambrian age), through the youngest formation, the Fort Union (Tertiary age). Table 3-14 lists oil- and gas-producing formations and zones in the Planning Area through December 2008. In some formations, hydrocarbons are produced from more than one zone. The corresponding formations can be found in the stratigraphic chart (Figure 3-17) in Section 3.1.2 *Geologic Resources*. Cumulative production through 2008 in the Planning Area was approximately 2,168,185,301 thousand cubic feet of gas and 2,869,788,177 barrels of oil. The most prolific oil-producing formations have been the Phosphoria Formation and Ten Sleep Sandstone. The Madison has produced the third largest quantity of oil. A large amount of gas production has also been associated with the Phosphoria Formation, the Ten Sleep Sandstone, and within the Frontier Formation.

Table 3-14. Productive Zones in the Planning Area (through December 2008)

Producing Zone/Formation	Fields	Cumulative Gas (thousand cubic feet)	Cumulative Oil (barrels)	Inactive Wells	Active Wells	Total Wells
Amsden	15	5,446,804	17,239,333	55	47	102
Amsden-Madison	3	63,250	7,704,323	22	9	31
Amsden/Phosphoria	1	0	90	1	0	1
Big Horn	2	328,738	7,887,032	10	4	14
Chugwater	3	111,136,829	208,143	17	52	69
Cloverly	30	37,091,000	1,458,953	50	28	78
Cody	4	417,958	100,119	7	1	8
Coverly/Mowry	1	58,357	39,133	0	1	1
Crow Mountain	1	12,829	287,645	13	0	13
Crow Mountain-Phosphoria-Ten Sleep	1	0	2,081	1	0	1
Darby	3	3,734	30,257	4	1	5
Devonian	1	18,203	119,266	4	0	4
Dinwoody	2	0	628,973	49	0	49
Dinwoody/Phosphoria/Ten Sleep/ Amsden/Madison	1	0	3,220,368	10	33	43
Dinwoody-Phosphoria	3	13,784	2,464,787	16	8	24
Dinwoody-Phosphoria-Ten Sleep	1	0	25,866	2	1	3
Flathead	1	2,464,282	40,192	3	2	5
Fort Union	4	791,051	0	7	1	8
Fort Union-Lance	2	75,379	0	0	2	2
Frontier	88	677,344,620	88,171,606	793	428	1,221
Frontier-Cloverly	1	130,560	11,425	2	0	2
Frontier/Muddy	3	29,561,414	234,612	3	12	15
Gros Venture	1	4,687,895	36,530	1	2	3
Lance	3	452,241	5,658	2	2	4
Lewis/Mesaverde	1	3,250	0	1	0	1
Madison	21	152,110,544	359,644,999	360	392	752
Madison/Amsden	1	0	20,469	0	1	1
Madison/Amsden/Ten Sleep	4	5,036	373,837	1	4	5
Madison/Ten Sleep	4	1,119	1,049,110	7	7	14
Meeteetse	3	1,262,763	1,228	1	9	10
Mesaverde	6	5,089,224	99,028	9	16	25
Morrison	5	955,610	148,735	10	1	11
Mowry	6	1,474,326	276,963	24	15	39
Mowry/Frontier	3	1,626,429	167,008	0	3	3
Muddy	25	118,716,719	1,509,001	52	64	116
Muddy/Cloverly	2	385,731	21,085	1	1	2
Muddy/Frontier	1	133,703	7,805	0	1	1

Table 3-14. Productive Zones in the Planning Area (through December 2008) (Continued)

Producing Zone/Formation	Fields	Cumulative Gas (thousand cubic feet)	Cumulative Oil (barrels)	Inactive Wells	Active Wells	Total Wells
Phosphoria	120	559,517,419	976,280,423	1,443	1,543	2,986
Phosphoria/Ten Sleep	27	19,848,843	260,501,835	248	226	474
Phosphoria/Ten Sleep/Amsden	2	8,335	123,550	1	1	2
Phosphoria/Ten Sleep/ Amsden/Madison	2	36,625	451,433	0	7	7
Phosphoria/Ten Sleep/Madison	1	47,575	232,637	1	2	3
Precambrian	1	31,234	0	1	0	1
Sundance	16	8,341,739	73,371,516	209	62	271
Teapot	1	0	163	1	0	1
Ten Sleep	62	428,077,091	1,063,488,792	1,098	1,307	2,405
Ten Sleep/Amsden	4	14,655	412,160	1	5	6
Ten Sleep/Phosphoria/Dinwoody	1	0	22	1	0	1
Unknown	2	398,403	1,689,986	2	0	2
Totals		**2,168,185,301**	**2,869,788,177**	**4,544**	**4,301**	**8,845**

Source: IHS Energy Group 2009

There are 137 named fields and 1 unnamed field in the Planning Area (Table 3-15) (Map 26). There are eight major producing oil fields in the Planning Area (by volume), with production of 130 to 590 million barrels of cumulative oil production. These fields are, in descending order, the Oregon Basin, Elk Basin, Hamilton Dome, Grass Creek, Garland, Little Buffalo Basin, Frannie, and Byron. There are six major producing gas fields in the Planning Area, with production of 151 to more than 408 Bcf of cumulative gas production. In descending order, they are Worland, Elk Basin, Oregon Basin, Hamilton Dome, Garland, and Little Buffalo Basin.

Table 3-15. Producing Fields within the Planning Area (through December 2008)

Field Name	Producing Zones	Cumulative Gas (thousand cubic feet)	Cumulative Oil (barrels)	Inactive Wells	Active Wells	Total Wells
Adam	2	0	119,588	1	1	2
Alkali Anticline	4	159,893	2,862,004	28	12	40
Aspen Cree	1	0	341,678	4	0	4
Badger Basin	2	7,253,556	3,699,785	12	9	21
Baird Peak	1	0	469,211	1	1	2
Banjo Flats	1	3,808	34,696	1	0	1
Bearcat	7	1,649,457	846,138	4	9	13
Big Polecat	4	16,221,497	6,236,269	18	10	28
Black Mountain	6	104,512	21,925,035	24	52	76
Blue Springs	1	525	1,636	1	0	1
Bonanza	2	0	43,899,199	25	16	41
Boulder Gulch	1	148,987	84,485	4	0	4
Bud	1	0	13,863	1	0	1

Table 3-15. Producing Fields within the Planning Area (through December 2008) (Continued)

Field Name	Producing Zones	Cumulative Gas (thousand cubic feet)	Cumulative Oil (barrels)	Inactive Wells	Active Wells	Total Wells
Buffalo Rim	1	0	3,373	1	0	1
Byron	9	10,004,560	130,898,136	143	115	258
Byron South	1	4,434,390	42,519	1	0	1
Byron Southeast	2	655,689	135,520	4	0	4
Centennial	1	0	84,116	1	4	5
City	1	0	311	1	0	1
Cody	3	279,412	8,626,740	28	29	57
Coon Creek	2	159,840	168,353	3	4	7
Cottonwood Creek	6	66,892,025	60,028,218	109	198	307
Cottonwood Creek South	1	0	14	1	0	1
Coulee	2	279,422	18,329	2	1	3
Cowley	1	0	931,755	3	2	5
Crystal Creek	3	0	20,532	6	1	7
Danker North	5	2,819,760	1,149,009	9	4	13
Deaver North	1	146	1,566,094	3	9	12
Dickie	1	0	36,340	2	0	2
Dobie Creek	3	17,970,481	359,120	6	7	13
Doctor Ditch	2	794,669	49,391	2	0	2
Elk Basin	18	387,899,398	499,334,538	245	283	528
Elk Basin South	9	36,197,273	24,973,266	41	29	70
Emblem	1	542,230	5,651	1	1	2
Enigma	1	0	3,432,292	2	20	22
Enos Creek	4	402,225	289,810	10	1	11
Ferguson Ranch	2	31	5,186,274	5	12	17
Five Mile	7	52,325,845	1,364,026	14	26	40
Flashlight	1	0	98,202	1	0	1
Foster Gulch	2	0	17,315	2	0	2
Fourbear	7	279,989	40,526,593	179	64	243
Fourteen Mile	4	1,581,228	175,767	3	4	7
Franks Fork	1	0	2,081	1	0	1
Frannie	5	1,091,967	136,543,590	136	81	217
Freedom	1	0	27,694	0	1	1
Frisby South	2	5,855,515	7,379,642	22	24	46
Fritz	2	1,522,500	94,090	2	1	3
Garland	26	163,580,431	205,015,262	344	321	665
Garland South	2	1,343,934	6,460,395	4	0	4
Gebo	4	1,018,991	34,426,393	135	49	184
Golden Eagle	9	1,255,225	9,028,188	18	7	25
Goose Egg	1	13,372	131,089	2	4	6

Table 3-15. Producing Fields within the Planning Area (through December 2008) (Continued)

Field Name	Producing Zones	Cumulative Gas (thousand cubic feet)	Cumulative Oil (barrels)	Inactive Wells	Active Wells	Total Wells
Gooseberry	4	215,076	12,927,564	29	33	62
Grass Creek	23	15,503,950	269,309,750	761	370	1,131
Grass Creek South	1	0	10,808	1	0	1
Greybull	2	293	640,359	48	5	53
Greybull West	3	1,237,718	68,543	1	2	3
Half Moon	3	744,477	13,001,587	72	27	99
Hamilton Dome	14	265,434,111	293,140,149	278	307	585
Hand Creek	1	0	181,254	1	2	3
Heart Mountain	2	51,657,553	113,866	5	14	19
Hidden Dome	7	414,718	9,987,965	39	26	65
Homestead	1	30	1,953,450	10	4	14
Hunt	3	0	842,423	6	3	9
King Dome	3	1,274	391,351	9	1	10
Kirby Creek	2	554,782	1,720,414	9	29	38
Kirby Creek East	1	0	1,291	1	0	1
Lake Creek	4	31,282	7,640,419	18	23	41
Lamb	5	521,093	1,221,804	16	3	19
Lite Butte	2	0	465,493	1	3	4
Little Buffalo Basin	8	151,557,087	168,629,557	318	233	551
Little Grass Creek	5	13,092,748	213,499	3	4	7
Little Polecat	4	1,307,425	819,003	8	3	11
Little Sand Draw	5	396,802	12,110,782	41	13	54
Lovell Draw	1	0	860	1	0	1
Manderson	7	47,603,392	4,007,116	82	53	135
Marshall	1	24,779	701,148	4	5	9
McCulloch Peak	2	749,788	1,867	2	0	2
Meeteetse	5	35,109,102	465,097	10	16	26
Middle Dome	2	2,811	389,284	4	2	6
Murphy Dome	3	26,881	38,381,717	28	39	67
Neiber Dome	6	238,073	702,770	7	4	11
No Water Creek	2	481,939	4,162,667	25	10	35
Northline	2	27,768	3,401	2	0	2
Nowood	2	8	999,210	11	3	14
Nowood Southeast	1	7,238	242,836	2	6	8
Oregon Basin	16	304,132,678	590,084,882	362	954	1,316
Oregon Basin South	2	0	0	2	0	2
Oregon Basin Southeast	4	8,808,554	2,814	4	4	8
Oregon Basin West	2	143,610	802,410	2	4	6
Packsaddle	1	260,596	418,158	1	2	3

Table 3-15. Producing Fields within the Planning Area (through December 2008) (Continued)

Field Name	Producing Zones	Cumulative Gas (thousand cubic feet)	Cumulative Oil (barrels)	Inactive Wells	Active Wells	Total Wells
Penney Gulch	1	204	0	1	0	1
Pistol	1	5,918	9,069	2	0	2
Pitchfork	5	2,341,961	54,912,466	39	122	161
Prospect Creek	1	12,829	287,645	13	0	13
Pullium	3	8,372	5,117	3	0	3
Ralston	2	318,404	100,705	3	0	3
Rattlesnake	1	6,490,144	6,897,674	28	24	52
Rawhide	1	0	121,879	0	4	4
Red Springs	3	0	21,185	13	7	20
Rose Creek	2	0	99,624	5	0	5
Sage Creek	2	50	13,526,646	14	24	38
Sage Creek West	1	54,469	1,316,421	8	6	14
Sagebush	1	0	16,517	1	1	2
Sand Creek	2	0	438	2	0	2
Seller Draw	2	3,385,929	1,938	1	1	2
Sheep Point	1	9,846	590,046	3	3	6
Shoshone	4	38,268	4,832,776	30	17	47
Shoshone North	5	6,990	308,553	10	0	10
Siddon	1	0	60,151	3	0	3
Silver Tip	9	32,880,103	5,540,377	30	69	99
Silver Tip South	5	640,245	176,514	11	1	12
Skelton Dome	1	57,850	2,159	1	0	1
Slick Creek	4	9,620,887	6,340,130	41	15	56
South Fork	3	136,626	1,428,697	9	2	11
Spence Dome	2	2,352	1,060,644	27	50	77
Spring Creek	1	959	80,410	0	1	1
Spring Creek South	16	3,535,202	29,872,887	74	96	170
Sunshine North	5	0	4,332,341	16	33	49
Sunshine South	3	0	628,870	6	0	6
T E Ranch	3	1	217,007	5	1	6
Terry	2	766,513	22,180	1	2	3
Torchlight	7	6,412,788	16,474,302	80	32	112
Trench	1	0	40	1	0	1
Tuffy	2	91,168	98,920	2	1	3
Tumbler Ridge	1	0	6,989	4	0	4
Unnamed	10	1,684,786	210,095	10	5	15
Wagonhound	2	9,521	317,490	3	1	4
Walker Dome	5	1,251,818	5,051,159	17	11	28
Warm Springs	1	3,950	4,815,107	89	92	181

Table 3-15. Producing Fields within the Planning Area (through December 2008) (Continued)

Field Name	Producing Zones	Cumulative Gas (thousand cubic feet)	Cumulative Oil (barrels)	Inactive Wells	Active Wells	Total Wells
Water Creek	1	0	210,723	3	0	3
Waugh	1	0	355,393	1	3	4
Whistle Creek	6	3,430,583	4,818,206	25	2	27
Whistle Creek South	2	1,124,597	741	3	0	3
Wildhorse Butte	1	0	508	3	0	3
Wiley	1	153,745	81,127	1	3	4
Willow Draw	4	13,783	2,417,118	18	8	26
Worland	7	408,660,331	5,525,268	39	44	83
Zimmerman Butte	5	3,690	672,742	5	1	6
Totals	**N/A[1]**	**2,168,185,301**	**2,869,788,177**	**4,544**	**4,301**	**8,845**

Source: IHS Energy Group 2009

[1]Not applicable. Producing zones are not additive.

Since a production high during 1978, the rate of oil production in the Planning Area has steadily declined, with only a few short periods when production rates were flat. The rate of gas production declined from 1974 to 1983 and essentially flattened until 1989. The overall rate then increased until 1998, after which there was a decline in production rates. In 2008, oil production was at its lowest rate for the period from 1974 through 2008, and gas production was near its lowest rate for the same period (BLM 2014a).

Increases in production have occurred in some older oil fields within the Planning Area through different types of enhanced oil recovery projects. Enhanced oil recovery involves the injection of fluids (e.g., water, surfactants, polymers, or carbon dioxide) or sources of heat (steam or hot water) to stimulate hydrocarbon flow and move hydrocarbons that were bypassed in earlier recovery phases. Water floods have been the predominate method of increasing oil recovery and fewer floods of different types have been used. As of 2010, there were 46 active secondary recovery projects, 24 inactive projects, and 3 terminated projects in 37 total units/fields (BLM 2014a). Table 3-16 summarizes past and recent oil and gas production rates for counties in the Planning Area.

Table 3-16. Oil and Gas Production Rates for Counties in the Planning Area

County	Oil Production (barrels per month)[1]		Gas Production (thousand cubic feet per month)	
	1997	2007	1997	2007
Big Horn	309,385	169,654	547,594	242,199
Hot Springs	262,357	264,794	44,223	44,113
Park	868,917	707,279	1,105,218	1,211,575
Washakie	199,958	65,578	577,232	237,338

Source: WOGCC 2009

[1]Oil production is reported in barrels of 42 gallons each.

Coalbed Natural Gas

CBNG occurs in coal seams and may remain trapped where it was generated. The Bighorn Basin coalfield contains only minor amounts of coal compared to other Wyoming coal basins and is therefore not considered an important source of CBNG. Perhaps the single most limiting factor reducing the potential for CBNG resources in the Fort Union Formation is the apparent lack of thick, persistent coal in much of the basin (Roberts and Rossi 1999). Most of Wyoming's CBNG is produced from the Powder River Basin of northeastern Wyoming. According to WOGCC, no actual CBNG has been produced from any of the Bighorn Basin coals. In 2006, an attempt was made to produce CBNG from several wells located on private surface and mineral estate; however, only water was produced (WOGCC 2008).

Coals in the Paleocene Fort Union Formation, and the Cretaceous Meeteetse and Mesaverde Formations are classified as sub-bituminous, and are estimated to contain 116 Bcf of CBNG as undiscovered resources (Roberts and Rossi 1999; USGS 2008b).

Fourteen CBNG wells have been drilled in the Planning Area on lands with privately owned surface and minerals; 13 of those have been plugged. The remaining well is currently shut-in (IHS Energy Group 2009). No CBNG has actually been produced from any of the wells drilled in the Planning Area.

Carbon Dioxide Sequestration

Carbon dioxide is produced in association with natural gas production in several oil producing reservoirs in the Planning Area. Oil and gas reservoirs, unminable coal seams, and saline formations, all of which are present in the Planning Area, have been identified as potential carbon dioxide sequestration sites (DOE 2008). These sites could provide underground storage for carbon dioxide from natural gas production and other sources, such as power plants. There are currently no carbon dioxide injection enhanced recovery projects in the Planning Area or a pipeline for carbon dioxide transportation. The uncertain economic and technical aspects associated with carbon sequestration activities make it difficult to forecast future development. See *Reasonable Foreseeable Development Scenario for Oil and Gas, Bighorn Basin Planning Are*a for additional information on carbon sequestration in the Planning Area (BLM 2014a).

Oil and Gas Reserve/Resource Estimates

Oil and gas resources have high potential for occurrence throughout most of the Planning Area, with lower potential around the fringes (BLM 2014a). Table 3-17 lists projections of the amount of oil, gas, and natural gas liquid resources in the Planning Area for conventional and continual assessment units. It is estimated that the Planning Area contains a mean undiscovered volume of approximately 62.05 million barrels of oil, approximately 913.23 Bcf of gas, and 12.05 million barrels of natural gas liquids (in the two assessment units with projected hydrocarbon volumes). The Planning Area's oil resource could range from 16.51 to 124.99 million barrels, the gas resource could range from 293.61 to 1,879.61 Bcf, and natural gas liquids resource could range from 2.63 to 25.95 million barrels. For a more detailed description of the methodology behind these estimates, see the *Reasonable Foreseeable Development Scenario for Oil and Gas, Bighorn Basin Planning Area* (BLM 2014a).

Table 3-17. United States Geological Survey Undiscovered Conventional and Continuous Resources of Assessment Units in the Planning Area

Assessment Unit	Percent of Unit within Planning Area	Oil (mmb)			Gas (Bcf)			Natural Gas Liquids (mmb)		
		95%[1]	*5%*	*Mean*	*95%*	*5%*	*Mean*	*95%*	*5%*	*Mean*
Paleozoic-Mesozoic Conventional Oil and Gas	84.10	10.93	92.51	45.41	46.26	377.61	183.34	0.84	15.14	7.57
Cretaceous-Tertiary Conventional Oil and Gas	89.52	3.58	21.48	11.64	55.10	390.31	197.84	1.79	8.95	4.48
Muddy-Frontier Sandstone and Mowry Fractured Shale Continuous Gas	100.00	-	-	-	119.00	743.00	348.00	0.00	1.00	0.00
Mowry Fractured Shale Continuous Oil	100.00	2.00	11.00	5.00	1.00	6.00	2.00	0.00	0.00	0.00
Cody Sandstone Continuous Gas	100.00	-	-	-	14.00	80.00	38.00	0.00	0.00	0.00
Mesaverde Sandstone Continuous Gas	100.00	-	-	-	13.00	63.00	32.00	0.00	0.00	0.00
Mesaverde-Meeteetse Formation Continuous Coalbed Gas	85.52	-	-	-	62.50	167.62	83.81	0.00	0.86	0.00
Fort Union Formation Continuous Coalbed Gas	88.26	-	-	-	12.36	52.07	28.24	0.00	0.00	0.00
Total Undiscovered Resources	**-**	**16.51**	**124.99**	**62.05**	**323.22**	**1,879.61**	**913.23**	**2.63**	**25.95**	**12.05**

Source: USGS 2008b

[1]Estimates of recoverable resources for each oil and gas assessment unit area within the province and within the Planning Area, are presented as a range of possibilities: a low case having a 95 percent probability of that amount or more occurring, a high case having a 5 percent probability of that amount or more occurring, and a mean case representing an arithmetic average of all possible outcomes.

Bcf billion cubic feet
mmb million barrels

Projected Oil, Gas, and Coalbed Natural Gas Drilling Activity

For a baseline unconstrained RFD projection (limiting factors such as lease stipulations or the possibility that some areas might not be administratively available for leasing are not considered at this stage of analysis), it is estimated that during the 20-year planning cycle of 2008 through 2027, as many as 1,865 wells could be drilled in the Planning Area. Up to 150 of these wells could be CBNG wells. As many as 175 of the conventional wells could be deep wells (defined here as wells more than 15,000 feet deep) in the central portion of the Bighorn Basin (BLM 2014a).

Development potential is defined as high, moderate, low, very low, and none. Note that development potential is evaluated based on a broader range of factors then occurrence potential, which only considers the presence or absence of oil and gas resources regardless of the economic viability of

development. It is estimated that average drilling densities per township (one township is about 36 square miles) during the planning cycle will be:

- High: 100 or more wells
- Moderate: 20 to 100 wells
- Low: 2 to fewer than 20 wells
- Very Low: fewer than 2 wells
- None: no wells

Development potential classifications for oil and gas and coalbed natural gas in the Planning Area are shown in Table 3-18, based on projections in the *Reasonable Foreseeable Development Scenario for Oil and Gas, Bighorn Basin Planning Are*a (BLM 2014a).

Table 3-18. Oil and Gas Development Potential in the Planning Area

Development Potential	Oil and Gas[1]		Coalbed Natural Gas[2]	
	Acres	*Percent of Planning Area*	*Acres*	*Percent of Planning Area*
High	0	0	0	0
Moderate	344,736	8.2	0	0
Low	1,793,204	42.6	578,635	13.7
Very Low	1,819,780	43.3	1,388,845	33
None	106,242	2.5	2,095,570	49.8
Not Assessed	143,587	3.4	143,499	3.4
Total	**4,207,549**	**100**	**4,207,549**	**100**

[1]BLM 2013a
[2]BLM 2014a

Oil and gas drilling activity is projected to be concentrated in several locations in the Planning Area, including:

- In and around the Elk Basin and Garland fields in the northern portion in the Planning Area.
- In, around, and east of Oregon Basin Field near the City of Cody.
- Around Fritz Field in the east-central portion of the Planning Area.
- In and around several smaller, isolated fields around the margins of the basin.
- In additional scattered townships where moderate levels of activity are projected.

Most of these fields are densely drilled. Many new wells in these areas will likely be drilled as infill or fringe wells in existing fields, or as reentries into existing wellbores. Some minor exploratory activity could occur just beyond field boundaries. Well spacing is projected to be variable, in the range of 20 to 160 acres (BLM 2014a).

Future well-drilling activity is likely to occur in association with: (1) enhanced oil recovery projects, which could include the addition of wells in and around existing, mature oil and gas fields or residual oil zones, or (2) the exploration of new oil and gas reserves away from existing, developed areas. Well densities will likely remain similar to current densities, with isolated townships having the potential for an increase in drilling density (BLM 2014a).

Numerous fields in the Planning Area have been identified as candidates for carbon dioxide enhanced oil recovery, including but not limited to Big Polecat, Frannie, and Murphy Dome (Nummedal et al. 2003; Advanced Resources International 2006). Carbon dioxide supply, pipeline infrastructure, technological considerations, and economic factors are major determinants of future enhanced oil recovery using carbon dioxide (BLM 2014a). The USGS has also identified the Mesaverde-Meeteetse Formation and Fort Union Formation coalbed gas assessment units as potentially productive for CBNG in the Planning Area. Only limited exploratory drilling for CBNG has occurred in the Planning Area. Based on available information, there are no current plans for CBNG development in the Planning Area. However, because there has been limited CBNG exploration in the recent past (though unsuccessful) and the Planning Area includes the two previously identified USGS CBNG assessment units, it is possible that limited exploration and development could take place during the life of the plan` (BLM 2014a).

Readers will find additional information on projected oil and gas activity, including potential sites for future enhanced oil recovery projects, in the Planning Area in the *Reasonable Foreseeable Development Scenario for Oil and Gas, Bighorn Basin Planning Are*a (BLM 2014a).

Oil and Gas Master Leasing Plans

The Master Leasing Plan (MLP) concept promotes a proactive approach to planning for oil and gas development. During the final preparation of the Draft RMP and Draft EIS, the BLM issued IM 2010-117 regarding MLPs to address oil and gas leasing in areas with resource values of concern.

RMPs make oil and gas planning decisions, such as areas closed to leasing, open to leasing, or open to leasing with major or moderate constraints (lease stipulations) based on known resource values. However, additional planning and analysis may be necessary prior to oil and gas leasing because of changing circumstances, updated policies, and new information. Criteria for determining whether such additional planning and analysis is warranted are provided in IM 2010-117 and summarized below. When such analysis is warranted, the MLP process is conducted through the National Environmental Policy Act (NEPA) process before lease issuance and may reconsider RMP decisions.

MLP preparation is required when all four of the following criteria are met:

- A substantial portion of the area to be analyzed in the MLP is not currently leased.
- There is a majority federal mineral interest.
- The oil and gas industry has expressed a specific interest in leasing, and there is a moderate or high potential for oil and gas confirmed by the discovery of oil and gas in the general area.
- Additional analysis or information is needed to address likely resource or cumulative impacts if oil and gas development were to occur where there are:
    - Multiple-use or natural/cultural resource conflicts;
    - Impacts to air quality;
    - Impacts on the resources or values of any unit of the National Park System, national wildlife refuge, or National Forest wilderness area, as determined after consultation or coordination with the NPS, the USFWS, or the USFS; or
    - Impacts on other specially designated areas.

An MLP analysis may also be completed under other circumstances at the discretion of the BLM.

In late 2010, several groups nominated areas for MLP analysis. The BLM evaluated the requests and found that none of the nominated areas met the criteria requiring MLP analysis (BLM 2010a). After

State Director review, three areas within the Planning Area were determined to warrant additional analysis; these areas are the Absaroka Front, the Fifteenmile area, and the Big Horn Front.

Oil and gas development potential and resources of concern in Master Leasing Plan areas are identified in Table 3-19.

Table 3-19. Oil and Gas Development Potential and Resources of Concern in Master Leasing Plan Analysis Areas

Topic	Absaroka Front	Fifteenmile	Big Horn Front
Total Acreage	**402,646**	**230,699**	**444,830**
Acres BLM-administered Mineral Estate Minerals	253,112	180,816	379,308
Acres Existing Leases (Map 7)	6,533	43,112	0
Occurrence Potential of Total Acreage (RFD Figure 40)	High – 259,242 Low – 142,720	High – 192,247	High – 361,170 Low – 60,194
Conventional Oil and Gas Development Potential of Total Acreage (RFD Figure 45)	Moderate – 5,380 Low – 102,773 Very Low – 293,768	Moderate – 18,216 Low – 174,031	Low – 277 Very Low – 360,891
Coalbed Natural Gas Development Potential of Total Acreage (RFD Figure 46)	Low – 5,400 Very Low – 8,108	Low – 70 Very Low – 192,177	0
Resources of Concern	Wildlife habitat and recreational settings	Recreational settings, geologic features, and LRP soils	Wildlife habitat and recreational settings

Source: BLM 2010a

BLM Bureau of Land Management
LRP limited reclamation potential
RFD Reasonable Foreseeable Development

Absaroka Front Master Leasing Plan Analysis Area

This area provides crucial habitat, ranges, and migration corridors for a diversity of wildlife. The Master Leasing Plan Analysis Area contains part of one of the longest known elk migration routes in North America. The natural character of the Absaroka Front also attracts a diversity of recreational users (BLM 2010a). The key management concerns in this area are big game habitat, migration corridors, and dispersed recreational opportunities.

Fifteenmile Master Leasing Plan Analysis Area

The Fifteenmile MLP Analysis Area lies in the center of the Bighorn basin, containing scenic qualities and remoteness. The area is a popular recreation destination due to the primitive to semi-primitive setting characteristics. The entire MLP Analysis Area is within the Willwood formation and weathering by wind and water has created a rugged landscape with badland features. These fragile soils create challenges for reclamation. Fragile soils and recreational opportunities are the key management concerns in the area (BLM 2010a).

Big Horn Front Master Leasing Plan Analysis Area

Big game species rely on lands along Big Horn Front for winter habitat. Recreational opportunities attract visitors from the surrounding communities and from outside the region due to the spectacular scenery, abundant wildlife, and exposed geologic formations (BLM 2010a). Big game habitat, migration corridors, and dispersed recreational uses are the key management concerns in this area.

Management Challenges

A variety of management challenges for oil and gas exploration and development are associated with both public and internal BLM issues. Oil and gas development has a variety of beneficial and adverse impacts, which create a host of management challenges. Due to the breadth and depth of these management challenges, this section provides only a summary. The following is a partial list of known and potential management challenges for oil and gas exploration and development in the Planning Area:

- Processing timeframes for APDs and notices to perform seismic exploration.
- Timing restrictions on oil and gas leases, NOI to perform geophysical exploration, and APDs.
- Potential Endangered Species Act (ESA) listing of wildlife species such as the greater sage-grouse and how such listing would affect oil and gas development.
- Processing timeframes for ROW applications.
- Road design requirements.
- Lessee's/operator's surface-use rights.
- Impacts to wildlife and threatened and endangered species from oil and gas development and seismic exploration activities.
- Impacts to grazing permittees and lessees from oil and gas development and seismic exploration activities.
- Impacts to visual resources and cultural resources from oil and gas development and seismic exploration activities.
- Impacts to air and water quality from oil and gas development and seismic exploration activities.
- Impacts to soils and vegetation from oil and gas development and seismic exploration activities.
- Impacts to climate change from levels of CO_2 in the atmosphere from oil and gas development.
- Multiple-use conflicts resulting in restricted access to oil and gas resources.
- Economic impacts to local, state and federal governments from oil and gas production in the Planning Area.
- Split-estate issues.
- Staffing and priority to complete oil and gas workload.

3.2.6 Leasable Minerals – Other Solid Leasable Minerals

Other solid leasable minerals are those solid minerals, other than coal and oil shale, leased under the Mineral Leasing Act of 1920 and not related to energy production. Examples of other solid leasable minerals are phosphate, chloride minerals, SO_4 minerals, carbonate minerals, silicate minerals, borate minerals, and other "hardrock minerals." Hardrock (locatable) minerals on acquired public lands open to mineral leasing can be developed only under a leasing system. Access to other solid leasable minerals on federal estate is at BLM discretion.

No other solid leasable minerals are being leased or produced in the Planning Area. Other solid leasable minerals found in the Bighorn Basin are not currently considered economically viable to produce. Future demand for other solid leasable minerals will likely increase over time in parts of Wyoming and the west, but this is not anticipated to result in any new leasing or production in the Planning Area.

Management Challenges

The BLM has not identified management challenges for other solid leasable minerals.

3.2.7 Salable Minerals

Salable minerals, also known as mineral materials, include common varieties of sand, stone (such as decorative stone), gravel, pumice, clay, rock and petrified wood. These non-energy-related materials are typically used in construction, agriculture, and decorative applications. Under the BLM mineral materials program (43 CFR 3600), the BLM manages exploration, development, and disposal of salable minerals by sale (disposal) or free use. Recreational collection of this material is allowed, but large-volume removal requires a mineral sale. The BLM does not sell salable minerals at less than fair market value. Salable minerals in the Planning Area are an important component of the regional economy.

The Planning Area contains a variety of geological features and landforms that give rise to a diverse assortment of salable minerals. The primary salable minerals found in commercial quantities in the Planning Area are sand and gravel (aggregate), limestone, and decorative/construction stone (sandstone or limestone). Other salable minerals known to occur in the Planning Area in lesser quantities include flagstone and petrified wood.

Sand and gravel deposits consist of durable rock fragments (pebbles, cobbles) and particles. They are the result of bedrock that has been weathered and broken down into fragments that have been subsequently transported and deposited. Alluvial sand and gravel, terrace sand and gravel, and conglomeratic sand and gravel deposits are all found in the Bighorn Basin (Map 29).

As of April 2008, the CYFO and WFO had authorized a total of approximately 5 million cubic yards of sand and gravel disposals and 550,000 tons of rock disposals. The estimated annual production of salable minerals for the Planning Area is approximately 220,000 cubic yards per year (BLM 2008c). Map 8 shows the mineral materials sites in the Planning Area. Table 3-20 lists active community pits (16), free use permits (51), and contract sales (16) authorized in the Planning Area (by field office) as of January 1, 2009.

Table 3-20. Mineral Material Sites in the Planning Area

Operator/Permittee/ Pit Name	BLM Serial Number	Salable Mineral	Location
Cody Field Office Mineral Material Contracts			
Nicholls & Lewis/BLM	WYW-111944	Limestone Quarry	Quarry on west side of Little Sheep Mountain southeast of Lovell, Wyoming; S2SE Sec 28, T56N R95W
Nicholson Dirt Contracting	WYW-160176	Sand and Gravel	Pit on Eagle Pass east of Cody, Wyoming
Mountain Construction	WYW-165827	Sand and Gravel	Pit north of the Shoshone River east of Lovell, Wyoming
Frank Heiser	WYW-164329	Flagstone	Small sale southeast of Lovell, Wyoming
Frank Heiser	WYW-165847	Sand and Gravel	Small sale east of Lovell, Wyoming
L&M Excavation	WYW-165843	Sand and Gravel	Mineral material contract west of Cody, Wyoming
Cody Field Office Community Pits			
Windy Flats	WYW-084627	Sand and Gravel	NE Sec. 28, T52N 101W
Cowley	WYW-070870	Sand and Gravel	SESW Sec. 34, T58N R96W
Greybull	WYW-084713	Sand and Gravel	NWNE Sec. 7, T52N R93W
Northfork	WYW-123832	Sand and Gravel	NESW, N2SE Sec. 11, NWSE Sec. 12 T52N R104W
Frannie	WYW-089729	Sand and Gravel	N2SWNW Sec. 26, T58N R98W
Elk Basin	WYW-084714	Sand and Gravel	S2SE Sec. 20, T57N R99W
Eagle Pass	WYW-112058	Sand and Gravel	SENE Sec. 11, T52N R100W
Elk Basin Community Pit Expansion	WYW-165835	Sand and Gravel	S2SE Sec. 20, T57N R99W
Cody Field Office Free Use Permits			
Big Horn County	WYW-165887	Sand and Gravel	Crystal Creek Pit
Big Horn County	WYW-165888	Sand and Gravel	Greybull River Pit
Big Horn County	WYW-165889	Sand and Gravel	Table Mountain Southeast Pit
Big Horn County	WYW-165890	Sand and Gravel	Cody Pit
Big Horn County	WYW-165891	Sand and Gravel	Spence Pit
Big Horn County	WYW-165892	Sand and Gravel	Table Mountain Northwest Pit
Big Horn County	WYW-165893	Sand and Gravel	Greybull Cemetery Pit
Big Horn County	WYW-165894	Sand and Gravel	Yellowtail Causeway Pit
Big Horn County	WYW-165833	Sand and Gravel	Table Mountain Northwest expansion
Park County	WYW-165760	Sand and Gravel	Sheep Mountain Pit
Park County	WYW-165761	Sand and Gravel	New YU Bench Pit
Park County	WYW-165762	Sand and Gravel	Canyon Road Pit
Park County	WYW-119009	Sand and Gravel	Eagle Pass Pit – in reclamation
Park County	WYW-165763	Sand and Gravel	Lower Greybull Pit
Park County	WYW-165764	Sand and Gravel	Polecat Bench Pit

Table 3-20. Mineral Material Sites in the Planning Area (Continued)

Operator/Permittee/ Pit Name	BLM Serial Number	Salable Mineral	Location
Deaver Irrigation District	WYW-162990	Sand and Gravel	Issued from Park County FUP WYW-165764
Korean War Veterans Assn.	WYW-165844	Sand and Gravel	Issued from Windy Flats Community Pit
BLM CYFO	WYW-165828	Red Fill Material	Triassic Chugwater Formation Red Fill
BLM CYFO	WYW-165838	Sand and Gravel	Issued from Eagle Pass Community Pit
Town of Byron	WYW-165739	Sand and Gravel	N/A
Town of Byron	WYW-165740	Sand and Gravel	N/A
Town of Cowley	WYW-160170	Sand and Gravel	N/A
Town of Greybull	WYW-160162	Sand and Gravel	N/A
Sidon Canal Co.	WYW-119015	Sand and Gravel	N/A
Sidon Canal Co.	WYW-120878	Sand and Gravel	N/A
WYDOT	WYW-137818	Sand and Gravel	N/A
WYDOT	WYW-148687	Sand and Gravel	Exclusive pit on Eagle Pass east of Cody
WYDOT	WYW-157415	Sand and Gravel	Issued from Windy Flats Community Pit
WYDOT	WYW-142437	Sand and Gravel	N/A
WYDOT	WYW-165834	Sand and Gravel	Issued from Windy Flats Community Pit
Worland Field Office Mineral Material Contracts			
Dan Madden	WYW-159550	Sand and Gravel	SWSE Sec. 27, T46N R93W
Jerry Brown Constr.	WYW-159551	Sand and Gravel	NWSW Sec. 14, T47N R93W
McGarvin-Moberly	WYW-156317	Sand and Gravel	SWSE Sec. 11 and N2 Sec. 14, T47N R93W
Hunt Oil Co.	WYW-159559	Sand and Gravel	N/A
Big Horn RediMix	WYW-162887	Sand and Gravel	N/A
McGarvin-Moberly	WYW-165045	Sand and Gravel	NWSW Sec. 14, T47N R93W
Worland Field Office Community Pits			
Kirby	WYW-069560	Specialty Stone	NWSE Sec. 35, T45N R95W
Manderson	WYW-084781	Sand and Gravel	SWSE Sec. 28, T50N R89W
Worland	WYW-094069	Sand and Gravel	N2 Lot 2 Sec. 23, T47N R93W
Fox Mountain	WYW-094110	Moss Rock	SESW SWSE Sec. 11, T52N R92W
Sulphur Tract	WYW-123834	Sand and Gravel	N/A
Thermopolis	WYW-136132	Flagstone	E2NW W2NE Sec. 8, T42N R96W
Six-mile	WYW-137821	Sand and Gravel	N/A
Rome Hill	WYW-142389	Specialty Stone	Portions of Sec.'s 19, 20, 29, 30, 32, T47N R87W

Table 3-20. Mineral Material Sites in the Planning Area (Continued)

Operator/Permittee/ Pit Name	BLM Serial Number	Salable Mineral	Location
Worland Field Office Free Use Permits			
Hanover Canal Co.	WYW-138717	Sand and Gravel	N/A
Washakie County	WYW-142435	Sand and Gravel	N/A
Washakie County	WYW-142436	Sand and Gravel	N/A
Big Horn County	WYW-144844	Sand and Gravel	N/A
Washakie County	WYW-144861	Sand and Gravel	N/A
Washakie County	WYW-148812	Sand and Gravel	N/A
Washakie County	WYW-148813	Sand and Gravel	N/A
Washakie County	WYW-148814	Sand and Gravel	N/A
Washakie County	WYW-148815	Sand and Gravel	N/A
Washakie County	WYW-150999	Sand and Gravel	N/A
Big Horn County	WYW-153881	Sand and Gravel	N/A
Hot Springs County	WYW-153882	Sand and Gravel	N/A
Hot Springs County	WYW-153883	Sand and Gravel	N/A
Washakie County	WYW-153916	Sand and Gravel	N/A
Washakie County	WYW-153918	Sand and Gravel	N/A
Washakie County	WYW-156315	Sand and Gravel	N/A
Hot Springs County	WYW-159540	Sand and Gravel	N/A
Big Horn County	WYW-159558	Sand and Gravel	N/A
Big Horn County	WYW-162889	Sand and Gravel	N/A

Source: BLM 2009d

BLM	Bureau of Land Management	N	north	Sec	section
Co.	Company	NE	northeast	SW	southwest
CYFO	Cody Field Office	NW	northwest	T	Township
E	East	R	Range	W	west
FUP	free use permit	S	south	WYDOT	Wyoming Department of Transportation
N/A	not applicable	SE	southeast		

As of June 2008, disturbances related to various types of salable mineral disposals in the Planning Area totaled 3,760 acres (BLM 2008a). This includes disturbances from free use permits totaling approximately 1,780 acres, from community pits totaling 1,630 acres, and from noncompetitive contract sales totaling 345 acres (Map 8). Review of 2013 data indicated that disturbances from free use permits totaled approximately 1,719 acres, while community pits totaled 1,937 acres and noncompetitive contract sales totaled 154 acres (BLM 2013a).

With an increase in construction and general growth, nationwide demand for salable minerals is increasing, particularly in western states. Matching this trend, the Planning Area has seen an increase in the amount of salable minerals sold and in the number of contracts and requests for contracts for salable minerals. The Planning Area has seen an increase in the amount of inquiries related to obtaining decorative stone, "moss rock," and field stone or boulders. These types of salable minerals are common

throughout Wyoming and the Planning Area, and are typically composed of sandstone, granite or limestone partially covered with colorful lichens (not moss), or not covered.

Large estimated quantities of salable mineral reserves are present in the Planning Area; therefore, a sustainable level of mineral resources is available to meet demand. The salable minerals industry working in the Planning Area has been able to sustain or increase its production in response to increasing demand for their product, despite fluctuating gas prices and occasional equipment and labor shortages.

Readers can find additional information about salable minerals in the Planning Area in the *Solid Mineral Occurrence and Development Potential Report* (BLM 2009d).

Management Challenges

Management challenges associated with disposal of salable minerals result from salable mineral mining activities. Salable mineral mining activities in areas close to housing create noise associated with equipment, odors associated with hot mix plants, and air quality concerns related to processing of salable minerals (chiefly involving dust or PM). Additional management challenges associated with salable mineral mining activities include impacts from surface disturbance; proximity of existing and potential mineral materials sites to important wildlife and their habitat, such as sagebrush and greater sage-grouse; and the impacts to sensitive species.

Construction/dimension stone or flat slabs of flagstone are not widely available in the Planning Area. One negotiated sale has been processed for a small quantity of thin lime flagstone from the Sundance Formation north of Greybull, Wyoming. However, demand for this material is up due to the increase in residential and commercial construction in Big Horn and Park counties. The BLM will likely need to identify additional sites on public lands during the next planning cycle to help meet this demand.

Illegal (unpermitted) trespass removal of mineral materials, including decorative stone, is an additional management challenge associated with salable minerals in the Planning Area. Another management challenge involves handling the demand, availability, and location of salable minerals in response to anticipated demand, both locally and nationally.

3.3 Fire and Fuels Management

Fire is an integral part of the ecological process of many plant communities in the Bighorn Basin. Several vegetation types in the basin have developed under a regime of intermittent fire and have adapted to the effects of fire in some way. Fire behavior within each vegetation type varies with many factors, including topography and site productivity. Highly productive sites, such as north slopes, generally have more biomass and, therefore, can carry fires better than less productive sites.

The BLM fire management program focuses on two categories of wildland fire – wildfires (previously referred to as unplanned ignitions) and prescribed fires (previously referred to as planned ignitions). The *Guidance for Implementation of the Federal Wildland Fire Policy* (USFS et al. 2009) directs BLM field offices to have a Fire Management Plan (FMP) for all areas with burnable vegetation that provides for firefighter and public safety; includes fire management strategies, tactics and alternatives; addresses values to be protected and public health issues; and is consistent with resource management objectives, activities of the area, and environmental laws and regulations. Within the Planning Area, the BLM manages wildfires and prescribed fires in accordance with the Northern Zone FMP (BLM 2004b).

The Planning Area is in the Big Horn Basin Fire Planning Unit. The Big Horn Basin Fire Planning Unit consists of the Bighorn National Forest, Shoshone National Forest, Wind River Indian Reservation, and the Bighorn Canyon National Recreation Area (BLM 2004b). The BLM has interagency cooperative agreements with the agencies responsible for managing these areas. The Cody Interagency Dispatch Center coordinates fire suppression operations (BLM 2004b).

In accordance with *Guidance for Implementation of Federal Wildland Fire Management Policy* (USFS et al. 2009), the BLM will continue interagency and local cooperation to set priorities for fire management planning, preparedness, prevention, suppression, use of wildland fire, restoration and rehabilitation, monitoring, research, and education. Interagency cooperation ensures accountability by instituting meaningful performance measures and monitoring results.

Table 3-21 lists the annual average number of acres of wildfires, prescribed fires, and mechanical and chemical treatments in the Planning Area. The acreage burned has been calculated as an annual average from 1981 to 2009 for both prescribed fires and wildfires. The BLM also modifies fuels with mechanical and chemical treatments in the Planning Area. The BLM did not use mechanical and chemical treatments to reduce fuel loads in the Planning Area until 2002, when the National Fire Plan began making funds available for these kinds of projects.

Table 3-21. Wildfires, Prescribed Fires, and Mechanical and Chemical Treatments in the Planning Area

	Wildfire	Prescribed Fire	Mechanical Treatment	Chemical Treatment
Average Acres Per Year	5,881	3,294	1,408	250

Source: BLM 2009i

The Fire Regime Condition Classification System (FRCC) classifies existing ecosystem conditions to determine priority areas for treatment (Table 3-22). The FRCC measures the vegetation's degree of departure from reference conditions, or how different the current vegetation condition is from a particular reference condition. This could result in changes to key ecosystem components such as vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated

disturbances (e.g., insect- or disease-related mortality). FRCC involves two pieces of information – (1) the historic fire regime and (2) the condition class. Fire regime is the inferred historic fire return interval and severity on a given landscape; condition class is the departure of the given area from the historic fire interval. Fire regimes in the Planning Area, by vegetation type, appear in the Northern Zone FMP (BLM 2004b). Information on fire regimes and the Northern Zone FMP is available at: http://www.blm.gov/wy/st/en/programs/Fire/planning.html.

Table 3-22. Fire Regimes

Group	Percent of Planning Area[1]	Frequency	Severity	Severity Description
I	2%	0 to 35 years	Low/mixed	Generally low-severity fires replacing less than 75% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory.
II	4%	0 to 35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation.
III	9%	35 to 100 years	Mixed/low	Mixed-severity with less than 75% of the overstory vegetation replaced.
IV	45%	35 to 200 years	Replacement	High stand replacement-severity fires with greater than 75% of the dominant overstory vegetation replaced.
V	41%	200+ years	Replacement/any severity	High (stand replacement) severity.

Source: DOI and the Nature Conservancy 2008

[1]The percentages presented in this table are estimates only and due to rounding add up to more than 100 percent.

Condition class describes ecosystem health as follows:

- ***Condition Class 1***. For the most part, fire regimes in this Fire Condition Class are within historical ranges. Vegetation composition and structure are intact. Therefore, the risk of losing key ecosystem components from the occurrence of fire remains relatively low.
- ***Condition Class 2***. Fire regimes on these lands have been moderately altered from their historical range by increased or decreased fire frequency. A moderate risk of losing key ecosystem components has been identified on these lands.
- ***Condition Class 3***. Fire regimes on these lands have been substantially altered from their historical return interval. The risk of losing key ecosystem components from fire is high. Fire frequencies have departed from historical ranges by multiple return intervals. Vegetation composition, structure, and diversity have been substantially altered. Consequently, these lands have the greatest risk of ecological collapse.

The Planning Area is broken up into five Fire Management Units (FMUs) – Absaroka Front, Basin Bottom, Foothills Sagebrush, Nowater, and West Slope Bighorn. An FMU is a geographic area with similar plant communities and resource and fire management objectives. Detailed descriptions of the five FMUs appear in the Northern Zone FMP (BLM 2004b). For example, portions of the Nowater, Foothills Sagebrush, and the lower elevations of the West Slope Bighorn FMUs have extensive areas of cheatgrass invasion in burned and unburned areas that are important greater sage-grouse habitat. BLM fire managers have learned that wildland fires in these FMUs often experience extreme rates of spread and can be difficult to control. Thousands of acres that burned in the 1996 wildfires in these FMUs are now occupied by cheatgrass with little or no sagebrush present. In an effort to protect the remaining

sagebrush/bunchgrass plant communities, the management prescription for these FMUs calls for aggressive fire suppression and rehabilitation of burned areas. In contrast, higher-elevation areas in the West Slope Bighorn FMU employ less aggressive suppression techniques because of inaccessible rugged terrain and the largely beneficial effects of fire on plant communities and overall watershed condition. General management guidelines for fire suppression are found in the Northern Zone FMP (BLM 2004b).

Table 3-23 provides a coarse-scale landscape-level assessment of fire regime condition classes for the area covered by the Northern Zone FMP based on University of Wyoming GAP Analysis Program Data (University of Wyoming 1994), ground-truthing, Risk Assessment Mitigation Strategy (RAMS) data, and expert input. The Northern Zone FMP and maps are available at: http://www.blm.gov/wy/st/en/programs/Fire/planning.html. Based on this assessment, it was estimated that nearly 35 percent of the Planning Area is in FRCC Classes 2 and 3.

Table 3-23. Acreages of Fire Regime Condition Classes in the Planning Area, 2007

Condition Class 1		Condition Class 2		Condition Class 3		Total Acres
Acres	*%*	*Acres*	*%*	*Acres*	*%*	
4,074,067	65	1,379,116	22	821,052	13	6,274,235

Source: BLM 2008a

Management Challenges

The challenges of fire and fuels management center on preventing wildfires and adequately addressing stabilization and rehabilitation efforts after wildfires. Fire size and frequency is likely to increase, due primarily to the spread of cheatgrass, but also due to mixed conifer forests affected by bark beetles and blister rust. The spread of cheatgrass, and the associated increase in wildfires, threatens greater sage-grouse and other sagebrush habitat-dependent species. Despite treatment efforts, cheatgrass has recently become more widespread and has extirpated native vegetation in some areas (BLM 2009a).

3.3.1 Wildfires (Unplanned Ignitions)

Between 1981 and 2009, lightning caused most of the wildfires in the Planning Area (118). The remaining fires were human caused (71) or, in a few cases, the cause of the fire was unknown (BLM 2004b).

Wildfires are unplanned ignitions and include fires that burn outside the parameters defined in land use plans and FMPs for that location under current and expected conditions, such as fires burning in areas where fire is specifically excluded; fires that exhibit burning characteristics (intensity, frequency, and seasonality) outside prescribed ranges, including fires expected to produce severe fire effects; and fires that occur during periods of high fire danger. Wildfires are typically caused by lightning, unauthorized and accidental human-caused action (e.g., arson, escaped camp fires, and equipment fires), or escaped prescribed fires.

However, a lightning-caused wildfire could still be used to meet fuels and ecosystem management objectives if:

- that type of fire is expected within the parameters of an approved plan;
- the fire is burning within the parameters for the area;
- the fire is not causing, or does not have the potential to cause, unacceptable effects; and,
- funding and resources to manage the fire are available.

A diversity of fuel types occur in the Planning Area, primarily because of its location in three physiographic areas (the Northern Shortgrass Prairie to the north and east, the Central Rocky Mountains on the west, and the Wyoming Basin south of and including the Planning Area). The Bighorn Basin is bounded by mountains on all sides; thus, there is a rain shadow effect in the basin bottom. This effect generally limits both wildfires and prescribed fires, except in river bottoms due to denser vegetation growth, by limiting the growth of vegetation to fuel wildland fires. Upslope from the basin bottom, fuel types and fire regimes are similar to those found in the Northern Shortgrass Prairie and Central Rocky Mountain physiographic areas, and nearly all wildfires and prescribed fires occur in these areas.

Table 3-24 lists the burned acres in the Planning Area from 1981 through 2009 for fires larger than 10 acres. During the same period, more than 4,000 acres in the Planning Area burned twice. It is noteworthy that these areas, which experienced no major fires since European settlement, have now burned twice since 1996; this is largely a result of an increase in vegetative ground cover, including cheatgrass, in these areas.

It is expected that the average number and size of wildfires will increase compared to the period from 1981 through 2009 in most of the Planning Area (BLM 2009a). It has been documented that cheatgrass is more widespread, especially in the Nowater FMU, than it was 25 years ago (BLM 2009a). In all likelihood, fire size and frequency will increase in areas affected by cheatgrass. Another area of concern is the mixed conifer forest with health issues caused by bark beetles and blister rust. The Northern Zone FMP provides a more in-depth history of wildfire occurrence in each FMU from 1981 through 2003, the years reviewed for that plan (BLM 2004b).

Table 3-24. Acres Burned and Ignitions for Fires Larger than 10 Acres in the Planning Area, 1981-2009

Year	Acres Burned	Total Number of Fires
1981	85	3
1982	513	5
1983	1,471	6
1984	134	2
1985	3,425	2
1986	0	0
1987	0	0
1988	3,800	7
1989	466	1
1990	213	2
1991	576	4
1992	780	3
1993	299	3
1994	2,494	14
1995	408	8
1996	110,016	25
1997	0	0
1998	401	3
1999	407	1
2000	18,266	9
2001	4,113	7
2002	1,396	8
2003	2,795	3
2004	482	8
2005	1,567	1
2006	5,003	9
2007	7,213	8
2008	558	7
2009	186	2
Total	**167,067**	**151**

Sources: BLM 2008d; Neighbors 2010.

Note: Fires have occurred in the Planning Area since 2009; however, the total burned acreage has not changed appreciably.

Changes in temperature and precipitation can lead to fluctuations in wildfire occurrence. A series of years with below normal temperatures and above normal precipitation usually leads to a decrease in the number and size of wildfires. However, seasonal and yearly variations in temperature and precipitation have different effects on different fuel types. For example, above normal spring precipitation can increase fire danger in areas dominated by cheatgrass and at the same time decrease fire danger in timber types. Higher temperatures could increase the size and intensity of fires in timber and woodland types. Below normal precipitation leading to sustained drought can actually decrease fire danger on some rangeland types due to lack of grass or fine-fuel production.

3.3.2 Prescribed Fires (Planned Ignitions)

Prescribed fire is used in a controlled manner for specific purposes, such as improving habitat and plant community health, and reducing hazardous fuels. The BLM manages the fire program in the Planning Area to protect public safety, life, and property, and uses both wildland fire and fuels treatments. Fire and fuels treatments are management tools to maintain or increase age-class diversity within plant communities (e.g., big sagebrush/grassland); rejuvenate fire-dependent plant communities (e.g., aspen and ponderosa pine); maintain or increase vegetation productivity, nutrient content, and palatability; and maintain or improve wildlife habitat, rangeland, and watershed condition. Fire is also a management tool for disposing of timber slash, preparing seedbeds, reducing hazardous fuels, controlling disease or insects, improving rangeland health, managing livestock grazing, thinning, or manipulating species in support of forest management objectives.

Though treated acres vary widely by year, fire-treated acres have generally declined in recent years in relation to peaks in the mid to late 1990s (prescribed fires) and early 2000s (mechanical treatments) (BLM 2009a).

Concerns about cheatgrass and greater sage-grouse habitat have decreased the feasibility of using prescribed fire in some areas. However, advances in mechanical and chemical vegetation treatment options are making those types of vegetation treatments more feasible.

3.3.3 Stabilization and Rehabilitation

The BLM implements long-term rehabilitation measures to repair land damaged by wildfire that is unlikely to recover naturally according to BLM Emergency Stabilization and Rehabilitation standards in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a). The BLM will implement rehabilitation measures for reasons such as preventing impacts to crucial fisheries habitat from erosion and sediment, preventing mass wasting onto private property, preventing the invasion of noxious weeds, and restoring a municipal watershed. Each FMU in the Northern Zone FMP has stated general objectives for stabilization and rehabilitation (BLM 2004b).

Emergency stabilization and burned-area rehabilitation are part of a holistic approach to addressing post wildland fire issues, which also includes repairing damage from suppression activities and long-term (more than 3 years) restoration. The incident management team begins the process by repairing damage from suppression activities. Emergency stabilization refers to Burned Area Emergency Response Team planned actions implemented within 1 year of wildfire containment to stabilize and prevent unacceptable degradation to natural and cultural resources; to minimize threats to life or property resulting from the effects of a fire; or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Burned-area rehabilitation refers to efforts undertaken within 3 years of wildfire containment to repair or improve fire-damaged lands unlikely to

recover naturally to management-approved conditions, or to repair or replace minor facilities damaged by fire. The process concludes with long-term restoration.

From 1993 through 2009, wildfires burned 164,717 acres in the Planning Area. Of the burned acres, treatments, as stabilization or rehabilitation, include 9,726 acres of seeding, 331 acres of sagebrush seedling plantings, 182 acres of mechanical manipulation, and 19,131 acres of chemical application to decrease noxious and invasive weed distribution and density (BLM 2009a; Neighbors 2010). At present, despite chemical and seeding treatment, 57,000 acres of wildfire-burned areas have invasive, exotic cheatgrass present, some to the extent that native vegetation is extirpated (BLM 2009a).

3.4 Biological Resources

This section describes biological resources in the Planning Area. It describes the current condition of vegetation, invasive species and pest management, fish, wildlife, special status species, and wild horses. Because biological resources are complex and the Planning Area is large, this section does not attempt to provide an encyclopedic description of all vegetation, fish, wildlife, and special status species in the Planning Area. This section and the remainder of this document use common names for species. Appendix K provides a complete list of scientific names for species referenced in this document.

Information in this section is based on plant communities and cover types identified through the Wyoming Gap Analysis performed as part of the National Gap Analysis program between 1991 and 2012. The Wyoming Gap Analysis is the basis for vegetation types that will be used throughout this analysis. The Wyoming Gap Analysis is a product of the University of Wyoming. This data set contains land cover for the entire state of Wyoming at a 1:100,000 scale. This data is useful for providing a broad overview of vegetation resources in the Planning Area, and is suitable for planning purposes at the RMP level of analysis. Each vegetation type consists of several ecological sites.

Habitat Fragmentation

As large contiguous blocks of habitat are bisected into smaller blocks, they become isolated from one another by dissimilar habitats and land uses. For example, a contiguous 100,000-acre block of sagebrush habitat is considered fragmented when a major highway is constructed within the habitat, thereby bisecting the block. If, in this example, the highway bisects the 100,000-acre block in half, the result of this fragmentation is two 50,000-acre blocks of sagebrush habitat bisected by a highway. As blocks of habitat are repeatedly bisected into smaller blocks, there can be adverse impacts, including isolation, to individual plant and animal species and communities occupying the habitat (Freddy et al. 1986; WGFD 2000). Impacts to biological resources from habitat fragmentation can occur on multiple scales.

Actions that result in habitat loss are exacerbated when fragmentation reduces the size and/or isolates remaining habitat patches below size thresholds necessary to support particular species. For example, some large birds in the Planning Area have large territorial requirements, while some smaller birds in the Planning Area favor habitat areas larger than their territory. These species are area-sensitive, and habitat loss and fragmentation that reduces or isolates their area thresholds likely affects their distribution and abundance in the Planning Area.

With the passage of the Homestead Acts in the 19th Century, early European American settlement of Wyoming introduced people, trails, livestock, agriculture, irrigation, and energy development to the Planning Area, all of which contributed to changes in land management and habitat fragmentation. Subsequent development of the region in the early to mid1900s included the railroad and a road network to connect population centers. In the late 1900s, ever-increasing rural development of homes and recreational properties further fragmented habitats in the Planning Area. Animal/vehicle collisions resulting from increased traffic in these areas and the risk to private property from wildfire are both consequences and reminders of existing habitat fragmentation conditions within the Planning Area.

Linear features, including roads, railroads, trails, irrigation systems, and ROWs, fragment Planning Area habitat. The network of state highways, county roads, local roads on private and public lands, and railroads dissect much of the Planning Area. The development of irrigation reservoirs and districts with their associated water-distribution systems also has contributed to habitat fragmentation in the Planning Area. Irrigation water also has supported the conversion of native plant communities to

hayfields, pasture, and cropland, thereby further fragmenting habitats. Fences can block migration routes for some wildlife species, such as pronghorn, consequently fragmenting their habitats. The conversion of large acreages of sagebrush to predominately grassland communities can fragment habitat for sagebrush-dependent species such as the greater sage-grouse.

Habitat fragmentation in the Planning Area is most prevalent along the linear features identified in the previous discussion; however, fragmentation also occurs at population centers, reservoirs, and other developments where humans live, recreate, and work. For example, the development of private parcels bordering BLM-administered lands has, in some cases, contributed to habitat fragmentation by the conversion to subdivisions or smaller ranchettes. This type of land conversion and habitat fragmentation primarily occurs near the wildland-urban interface. Buildings, roads, fences, and utility corridors associated with residential and commercial developments have all contributed to habitat fragmentation in the Planning Area.

In addition to the linear features and other types of development, conditions on BLM-administered land continue to be influenced by the management of resources and resource uses, including mineral resources; fire and fuels management; forests, woodlands, and forest products; and land resources. Refer to the appropriate sections in this document for additional details regarding existing conditions of these resources and resource uses.

In general, development and the associated construction and maintenance of roads, railroads, well pads, pipelines, and powerlines has fragmented habitat in the Planning Area. In addition, prescribed fires and wildfires have sometimes contributed to temporary habitat fragmentation. Intense and large area burns can temporarily isolate individual species and communities of plants and less mobile species of animals. A frequent fire return interval often associated with invasive species can effectively fragment habitat over the long run. Similar to fire, the habitat fragmenting effects of mechanical vegetative treatments have generally been temporary. Motorized-vehicle use also can contribute to habitat fragmentation through the transportation of invasive species seeds.

Biological Diversity

The Keystone Center defines four elements of biological diversity related to scale (Keystone Center 1991):

- Genetic diversity
- Species diversity
- Community or ecosystem diversity
- Landscape or regional diversity

Biological diversity is complex, and makes the measurement of existing conditions difficult. Species diversity is the most recognizable and easily understood element of biological diversity and for this RMP revision is defined as the variety of species found in the Planning Area. In other words, species diversity includes the numbers and distribution of all species. This includes common and plentiful species (e.g., mule deer, elk, and pronghorn) and other less common or rare species (e.g., burrowing owl, mountain plover, and bald eagle). Classifying rare species as sensitive, threatened, or endangered is one way of conserving biological diversity because these classifications heighten awareness and ensure consideration in management actions for conservation of rare species.

Spatial and temporal scales also are important considerations for conserving biological diversity. For example, nonmigratory populations of mammals are sometimes temporarily diminished following a harsh winter and limited food supply. In addition, migratory birds might return to breeding grounds

with diminished populations due to the stress factors associated with migration. In these cases, the lower number of individuals of wildlife populations does not necessarily equate to a reduction in biological diversity because the number of individuals ultimately (all else being equal) return to pre-winter levels. For purposes of this RMP and EIS, the BLM considers permanent reductions in the four elements of diversity listed above to be adverse impacts to biological diversity.

Counting the number and relative frequency of species occupying an area over time is one means of identifying reductions in species diversity; however, this approach can be overly simplistic and does not necessarily address the other three elements of diversity. At present, there is no single commonly accepted scientific protocol for measuring biological diversity. Nevertheless, it is generally accepted that "… reducing the number of biological entities in a system or making some of them less abundant reduces diversity" (Langner and Flather 1994).

Climatic factors (e.g., drought) and disease, fire regime, predation, competition, and population cycles all have contributed to the current natural variability in number and relative frequency of individuals, species, and communities of plants and animals in the Planning Area. Other factors include surface-disturbing activities (e.g., road and well pad construction), the physical and chemical environment (e.g., soil nutrients and water), adjacent area vegetation (e.g., croplands), historic vegetation, invasive species, herbivory (e.g., native ungulates and livestock), and the Planning Area's existing vegetation.

Existing conditions for biological diversity in the Planning Area are a function of physical factors (e.g., soils, geology, air, water, geography, and elevation), natural factors (e.g., climate, fire, drought, disease, and evolution), and human actions. In the context of these physical and natural factors, biological diversity evolved over time to produce the diversity present in the Planning Area prior to European-American settlement. Human actions during the subsequent 150 years changed the pattern, composition, structure, and function of plant and animal communities in the Planning Area. Management challenges for biological diversity include competing resources and resource uses. Management actions to address these challenges are incorporated in the alternatives for physical and biological resources and for fire and fuels management (see Chapter 2).

Vegetation Resources

Climate, geology, soils, elevations, precipitation patterns, and other physical and biological features associated with ecological setting influence the types and mixes of vegetation in the Planning Area. The types and mixes of vegetation in the area form the base for ecosystem processes and functions, such as water cycling, energy capture and cycling, and nutrient cycling, that produce the products and services local, regional, national, and international communities desire. Some of the desirable products and services vegetation supports include clean water, fish and wildlife habitat, livestock forage, recreation, carbon sequestration, and scenery.

As described in Section 3.1.3 *Soil*, the Planning Area lies within two MLRAs: the Northern Intermountain Desertic Basins – 32, (5- to 9-inch and 10- to 14-inch precipitation zones) and Central Rocky Mountains – 43B, (15- to 19-inch and 20+ inch precipitation zones) (USDA 2008). The following paragraphs described the land use, elevation and topography, climate, and water characteristics of these MLRAs.

Northern Intermountain Desertic Basins

Land use: More than half of this area is federal land; the remainder is a mixture of farms and ranches. Most of the land is used for livestock grazing. The range consists of desert shrubs and short grasses. About 5 percent of the area is irrigated. Most of the acreage is planted for alfalfa and other feed crops, but dry beans, malt barleys, sugar beets, and corn are also grown.

Elevation and topography: The elevation of the area ranges from 3,600 to 7,500 feet amsl. Piedmont plains and pediments slope from the mountains to the stream terraces of the Wind-Bighorn River system. In some places, the plains are eroded to the clay shale bedrock, and areas of badland.

Climate: Average annual precipitation in this area is 5 to 14 inches, with maximum precipitation in spring and fall. Average annual temperature is about 45°F and average freeze-free period is between 112 and 184 days per year.

Water: Low and erratic precipitation provides only a small amount of water to the area. The Wind-Bighorn River and its tributaries bring irrigation water into the area from the bordering mountains. Deep artesian wells provide water for irrigation on the eastern side of the Bighorn Basin.

Central Rocky Mountains

Land use: Almost all this area is federal land administered by the USFS, USDA, and the BLM. Forested areas are used as wildlife habitat, for recreation and watershed management, and for timber production. Meadows on the upper mountain slopes and crests above timberline provide summer grazing for livestock and big game animals. Less than 2 percent of the area is used for agriculture. Forage, grain, peas, and a few other crops are grown in some valleys.

Elevation and topography: The general elevation of the area ranges from 6,000 to 11,000 feet amsl. High mountains having steep slopes and sharp crests are cut by narrow valleys, most of which have steep gradients.

Climate: Average annual precipitation ranges from 15 to 20+ inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than years with more than normal precipitation. Temperatures vary widely between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Average annual temperature is 39°F. The average freeze-free period is 42 to 100 days.

Water: Moderate precipitation in the area and many perennial streams and lakes provide water. Streams and reservoirs supply water to adjoining MLRAs for irrigation and other uses. Springs and shallow wells in the valleys provide water for domestic use and for livestock. Elsewhere, groundwater supplies are small and mostly untapped (USDA 2008).

Table 3-25 summarizes the Wyoming Gap Analysis project of plant communities in the Planning Area. Map 36 shows these plant communities.

Table 3-25. Wyoming Gap Analysis Project Plant Communities within the Planning Area

Vegetation and Land Cover Type	BLM Surface (acres)	BLM Mineral Estate (acres)	Total (acres)[1]
Badlands/Rock Outcrop	71,333	75,693	86,079
Forest/Woodlands	298,390	470,123	603,046
Nonnative Annual Bromes	37,509	46,878	50,670
Open Water	684	2,934	16,119
Riparian/Wetlands	23,957	36,916	139,037
Grasslands and Sagebrush Shrublands	1,429,537	2,059,100	2,651,628
Salt Desert Shrub/Salt Bottom Shrub	1,297,954	1,406,645	1,568,051
Settlements/Agriculture	28,450	104,923	530,213

Source: USGS 2008c

[1]Total surface acres in the Planning Area, regardless of ownership.

BLM Bureau of Land Management

3.4.1 Vegetation – Forests, Woodlands, and Forest Products

Table 3-25 identifies forest and woodland acreages in the Planning Area. Approximately 9 percent of BLM-administered surface in the Planning Area is dominated by a combination forest and woodlands, which are comprised of juniper, limber pine, mixed conifer with aspen, and ponderosa pine.

The BLM is responsible for implementing management to achieve desired goals for forests and woodlands. The existing plans for the Planning Area are designed to restore and maintain forest health, and forest management activities are directed in accordance with sound silvicultural and multiple-use practices.

Forests in the Planning Area provide important habitat for flora and fauna, including several threatened or endangered species, such as Canada lynx, and species currently considered to be candidate or BLM-sensitive species. Forests also play an important role in the ecological processes and functions of ecosystems, such as energy flow, water, and nutrient cycling.

Forests and woodland communities in the Planning Area include aspen woodlands, Douglas-fir, juniper woodlands, lodgepole pine, limber pine, spruce-fir, whitebark pine, and ponderosa pine. Forestland is land capable of producing 20 cubic feet of wood fiber from commercial species per acre per year. Commercial forestland is land that has not been withdrawn from forest product harvest by law or statute. Woodlands are areas that are not capable of producing 20 cubic feet of wood fiber from commercial species per acre per year and have at least ten percent canopy cover. Woodlands range

from small uniform stands to larger mixed stands of aspen, limber pine, and Rocky Mountain juniper. Woodlands are ecologically important, especially as wildlife habitat.

The western slope of the Big Horn Mountains in the WFO includes substantial mixed-age stands of ponderosa pine. These stands are generally confined to dryer, poorer quality sites. Douglas-fir, Engelmann spruce, sub-alpine fir, and lodgepole pine grow on north-facing slopes in both the Big Horn and Absaroka Mountains. Forestlands also are found on Rattlesnake Mountain, the West Slope of the Big Horn Mountains, Carter Mountain, and on isolated public land parcels adjacent to Shoshone National Forest in the South and North Fork Shoshone River, and Wood River watersheds. Most forestland management occurs on Rattlesnake Mountain.

Forest and woodland areas in the Planning Area provide seasonal habitat for numerous songbirds, small mammals, predators, and big game, with concentrations of elk in winter (refer to Section 3.4.6 *Fish and Wildlife Resources – Wildlife* for additional information).

Stand productivity and vigor can be measured by the stand site index at a determined age, usually 100 years. Stand vigor is a general term that refers to the current growth and health of the stand; live crown ratio is a measure of stand vigor. For example, most stands with an average live crown ratio of 50 percent or more have vigorous growth; most stands with an average of less than 20 percent live crown ratio have poor vigor. Stand productivity can be measured by comparison to site index. If the site index is 75 feet at 100 years, but the stand averages 65 feet at 100 years, a factor such as high basal area or mistletoe might be decreasing stand productivity. Stocking can be measured by basal area for mature stands, and stems per acre for regeneration.

Indicators for forest and woodland health include endemic levels of native insects, disease, pathogens, and the levels of nonnative insects and disease. Numerous parts of the Planning Area have been affected by disease, insects, and pathogens. Bark beetle activity in the region generally increased from 2002 to 2011, with numerous incidences occurring across the Planning Area, but has since declined (USFS 2012). Approximately 320,015 acres of BLM-administered land in the Planning Area have been surveyed, with spruce beetle and mountain pine beetle identified as the primary damage causing agents (USFS 2014). A Douglas-fir bark beetle epidemic has affected several thousand forest acres on mixed ownership land in the Shell Canyon area; the spruce beetle has affected several thousand forest acres on mixed ownership land in the Carter Mountain area (BLM 2009a). Smaller outbreaks and infestations also are affecting conifers in the Absaroka and Big Horn Fronts, and on Rattlesnake Mountain. Most areas identified by the USFS as being at-risk for future back beetle infestations are located on the forested fringes of the Planning Area (USFS 2012).

Dwarf mistletoe, a parasitic seed plant commonly occurring in lodgepole pine, ponderosa pine, and Douglas-fir stands, can be found in forestlands throughout the Planning Area. Mistletoe causes growth loss, reduces vigor in trees, leaving them more susceptible to attack by insects, and can be difficult to treat due to inaccessible terrain in some parts of the Planning Area.

Prolonged drought in the Planning Area has weakened conifers and made them more susceptible to bark beetles, blister rust, and other stresses (BLM 2009a). Winters have been mild, exacerbating many of these biological stressors. Many of the mature conifer trees on public land have died or are dying. Many of the aspen woodlands, willow, and cottonwood forests found at mid to high elevations are declining as succession from deciduous to conifer (typically juniper/ponderosa pine) dominance proceeds. Conifer species are replacing cottonwood-dominated and some willow-dominated riparian areas. The loss of deciduous forestland vegetation is affecting watershed, riparian, and wetland function and stability and diversity of habitat. This loss is human influenced due to fire suppression and the introduction of nonnative invasive species. Throughout the interior west, aspen are declining

(Bartos 2001; Bartos and Campbell 1998; Rogers 2001). Older aspen stands are more susceptible to cankers, conks, and decays in the bole. Conifer succession is occurring in most aspen stands, which will likely result in further reductions in aspen presence. Barring any major surface disturbance (e.g., fire and mechanical treatment), conifers will eventually replace most of the aspen stands (Wyoming State Division of Forestry 2001).

Forest Communities

Douglas-fir

Douglas-fir stands vary in size from seedling-sapling stage to mature stands. Mixed and mature Douglas-fir stands vary in size from 1 to 20 inches in diameter at breast height (dbh), and from 1 to 120 feet in height. Trees with a dbh greater than 20 inches are an exception. Stand age ranges from 1 to 250 years. The Douglas-fir forest type ranges from healthy stands to those declining in vigor and productivity. Current age-class distribution is unbalanced toward mature stands, and there is a lack of late-successional Douglas-fir forests (BLM 2009b). Any future wildland fire disturbance in mature overstocked stands poses the risk of returning the entire forest type to an early-succession stage.

Spruce-fir

Spruce-fir stands vary in size from seedling-sapling stage to mature stands. Mixed and mature sub-alpine fir–Douglas-fir–Engelmann spruce stands vary in size from 1 to 20 inches in dbh, and from 1 to 140 feet in height. Trees with a dbh of more than 25 inches are an exception. Stand age ranges from 1 to 250 years. The spruce-fir forest type ranges from healthy stands to those declining in vigor and productivity. Current age-class distribution is unbalanced toward mature stands; there is a lack of late-successional spruce-fir forests (BLM 2009a). Any future wildland fire disturbance in mature overstocked stands poses the risk of returning the entire forest type to an early-succession stage.

Lodgepole Pine

Mixed and mature lodgepole stands vary in size from 1 to 20 inches in dbh. Trees with a dbh of more than 20 inches are an exception. Stand age ranges from 1 to 150 years. The lodgepole pine forest type ranges from healthy stands to those declining in vigor and productivity. Current age-class distribution is unbalanced toward mature stands, and there is a lack of late-successional lodgepole pine forests (BLM 2009a). Any future wildland fire disturbance in mature overstocked stands poses the risk of returning the entire forest type to an early-succession stage.

Woodland Communities

Limber Pine

Although not considered a commercial species, limber pine is an important food and cover source for birds and other wildlife. Blister rust has affected limber pine in the Planning Area. Blister rust can infect all five needle pines, of which limber pine is an example, and can kill both mature and sapling trees. Limber pine has experienced mortality throughout the Planning Area, especially in Ten Sleep Canyon and Grass Creek (BLM 2009a). There do appear to be some mature and sapling stage trees in these areas that are not infected, which might suggest some natural genetic resistance to the disease. These are apparently resistant trees in large infection zones.

Aspen Woodland

Aspen occupies a variety of sites ranging from steep, rocky slopes to lower, moister areas. Aspen reproduces rapidly after fire, regenerating primarily by suckering from underground rootstock. Fire control has led to a substantial drop in aspen regeneration and overall clone health. There are pure and mixed stands in and adjacent to the Big Horn and Absaroka Mountains, where conditions satisfy ecologic requirements for aspen. Aspen stands typically exhibit a diversity of understory vegetation, are used by wildlife and livestock, can serve as a natural fire break, and often occur as part of an important riparian/wetland component in the forest system. Due to past and present management practices, natural disturbances such as wildfire have not occurred in their historically cyclic way. As a result, most aspen stands in the Planning Area are remnant stands encroached upon by conifers (BLM 2009a). Aspen stands are generally overtaken by mixed conifer stands with a fire return interval of more than 100 years in this area. Most aspen stands have decreased in size and vigor over the past decades.

Juniper Woodland

Juniper woodlands are typically comprised of Utah juniper stands, sometimes mixed with Rocky Mountain juniper and limber pine, on steep slopes and ridge tops. After long periods without fire, juniper species encroach into and dominate sagebrush communities. The fire return interval in juniper woodlands depends on the terrain. In shallow, rocky soils, the fire return interval is more than 200 years (BLM 2009a). Juniper woodlands have increased in size over the past decades (BLM 2009a). Juniper invasion into rangeland sites in deeper soils is partly the result of a departure from the historic fire return interval. There are past studies and historic photos of Enos and Grass Creeks that quantify encroachment. Most juniper woodlands have vigorous growth and few insect pests or diseases limiting their growth.

Forest Products

Forest resources harvested in the Planning Area consist of small stands of ponderosa pine, Douglas-fir, lodgepole pine, aspen, and aspen/conifer mix. Wood products harvested in the Planning Area include saw timber, firewood, Christmas trees, posts and poles, and biomass used for fuel, paper, compost, and insulation. Juniper and limber pine species not traditionally used in commercial wood product markets dominate woodland areas.

Existing plans set forest management levels for the Planning Area. The annual allowable harvest level was set at 1,000 thousand board feet (mbf) for the WFO and 500 mbf for the CYFO (BLM 1988a; BLM 1990). The annual allowable harvest level is not specified for the Grass Creek planning area (BLM 1998a).

Most mature stands are on terrain inaccessible or too steep for equipment, not economically feasible to harvest, or are in areas administratively excluded from active forest management, such as WSAs or isolated tracts of BLM-administered land that have no legal access.

There is one commercial sawmill company presently operating near the Planning Area in Livingston, Montana. The sawmill in Cody, Wyoming, closed in 2006. There also are small, family operated businesses that engage in small, local sales for specialized products when available. There is a local market for firewood and post and poles.

Although there is regional demand for timber products from BLM-administered lands in the Planning Area, at present, forest productions from BLM-administered lands play a small role in the wood product industry. Engineered-wood product and biomass industries are currently insignificant in the region due

to lack of regional industry infrastructure, and the high costs of transporting products to distant manufacturing plants.

The combined sawlog volume for the Planning Area offered from 1993 through 2002 averaged 518 mbf per year. The sawlog volume offered from 2003 through 2009 increased to an average of 1,040 mbf per year (BLM 2009a; Neighbors 2010). The increase in volume offered was the result of aggressively treating and preventing the spread of bark beetles.

From 2003 through 2009, approximately 1,150 acres of noncommercial mechanical forest treatments were completed via combinations of service contracts, stewardship contracts, and seasonal fire and fuels crew labor (BLM 2009a; Neighbors 2010). These forest management treatments included precommercial thinning, ponderosa pine ladder fuels reduction, and aspen treatments. Many aspen treatments involve cutting conifers within aspen clones, lopping and scattering conifer slash to create a fuel bed, and prescribed burning. This is followed by monitoring the suckering response and constructing a temporary solar-powered electric fence if excessive browsing exceeds new growth.

Management Challenges

Management challenges for forests, woodlands, and forest products in the Planning Area include the lack of a natural fire interval and fuels management (see Section 3.3 *Fire and Fuels Management*); management of fragmented and isolated stands; encroachment of woodland species into other vegetation types; lack of a current forest inventory; declining or over-mature stands; and management of native and nonnative disease, insects, pathogens, and invasive species. The Healthy Forest Restoration Act of 2003 (102[e]) directs BLM field offices to identify management to protect old-growth trees and their equivalent associated with hazardous fuel reduction projects.

There are several insect and disease concerns that could compromise future forest health. Despite regional declines in bark beetle infestations, infestations could continue in areas where susceptible host trees remain, requiring further management. Often, infestations occur on isolated tracts that are inaccessible and are not documented unless they show up on aerial flights or adjacent landowners inform the BLM of the problem.

The wood product industry has diversified, and forest products from public lands could be used to fill niches such as chips, shavings for animal bedding, house logs, biomass for rehabilitating disturbed areas, bulk for landscaping, compost, possibly alternative fuels such as pellets, and the traditional logs, firewood, posts and poles. These industries are not present in the local area, but could enter the area in the future. The mill in Saratoga could resume operations in the future. However, the cost required for road construction, traditionally appraised in the stumpage value of the sale, could result in administrative costs more than proceeds from the forest.

Climate change could be playing a role in recently observed changes in forest health. Forest communities are resilient in responding to normal variations in weather and climate to which they are adapted. However, increases in forest insect infestations and tree mortality throughout the Planning Area might be partly due to climatic factors such as warmer and drier summer conditions and warmer winters, acting in combination with other variables such as long-term fire suppression, particularly in areas where stands are overstocked.

3.4.2 Vegetation – Grassland and Shrubland Communities

Approximately 86 percent of BLM-administered surface in the Planning Area is characterized as sagebrush shrublands and salt desert shrub/salt bottom shrub. Sagebrush shrublands in the Planning Area contain grassland components that are generally not large or contiguous enough to form distinct grassland communities at the landscape level; however, these grassland components increase habitat heterogeneity within localized areas.

Livestock grazing, fire, fire suppression, and to a lesser extent surface-disturbing activities, have influenced many grassland/shrub vegetative types in the Planning Area. Invasive species have encroached into many plant communities. Refer to Section 3.6.7 *Livestock Grazing Management*, Section 3.3 *Fire and Fuels Management*, and Section 3.4.4 *Invasive Species and Pest Management* for additional information.

The broad scale Wyoming GAP analysis data are used in this analysis, as this data is appropriate for regional and large area planning efforts. Actual on-the-ground management is conducted using ecological site descriptions developed by the Natural Resources Conservation Service (NRCS), of which there are more than 60 for the Planning Area.

Grasslands

Grassland components in the Planning Area are generally located in valley bottoms, uppermost south-facing slopes, and scattered patches on windswept ridges. Grasslands are split into four plant communities – mixed grass prairie, Great Basin foothills grassland, meadow tundra, and subalpine meadow – as described below. As stated above, on-the-ground habitat conditions suggest that grasslands are not present as distinct vegetation communities in the Planning Area, but do occur as components within shrubland communities that influence overall habitat character.

Mixed Grass Prairie

Mixed grass prairie contains a mixture of short grass and tall grass prairie species. Vegetation can contain or be dominated by silver sagebrush; trees and shrubs cannot occupy more than 25 percent of the total cover. Mixed grass prairie provides habitat for sensitive species such as the mountain plover, Baird's sparrow, long-billed curlew, black-footed ferret, white-tailed prairie dog, and various bat species. Typical ecological sites found in the mixed grass prairie plant community include Overland Flow 10- to 14-inch precipitation zone and Overland Flow 15- to 19-inch precipitation zone.

Great Basin Foothills Grassland

Great Basin foothills grassland is a mesic grass-forb mixture found in the foothills of northwestern Wyoming. There may be an important lupine or arrowleaf balsamroot component found in this type of grassland. This community provides habitat for sensitive species such as the mountain plover, Baird's sparrow, long-billed curlew, black-footed ferret, white-tailed prairie dog, and various bat species. Typical ecological sites found in the Great Basin foothill grassland plant community include Loamy 15- to 19-inch precipitation zone and Shallow Loamy 15- to 19-inch precipitation zone.

Meadow Tundra

Meadow tundra includes graminoid- and forb-dominated vegetation that occurs above the upper tree line (approximately 9,800 feet amsl) in the alpine zone. Common species in this vegetation type include bent grasses, sheep fescue, icegrass, and alpine mosses. This community provides habitat for sensitive species such as the greater sage-grouse and various species of migratory birds. Typical ecological sites in

the meadow tundra plant community include Course Upland 15- to 19-inch precipitation zone and Very Shallow 20+-inch precipitation zone.

Subalpine Meadow

Subalpine meadow occurs between an elevation of about 4,700 feet and 9,800 feet amsl. It is characterized and dominated by graminoids and forbs. Typical ecological sites in the subalpine meadow tundra plant community include Wetland 10- to 14-inch precipitation zone and Wetland 15- to 19-inch precipitation zone. This community provides habitat for sensitive species such as the greater sage-grouse and various species of migratory birds.

Shrublands

Shrublands dominate the Planning Area, representing approximately 2,727,491 acres of BLM-administered land and 3,465,745 acres of federal mineral estate (86 percent of all BLM-administered surface land or 83 percent of all federal mineral estate). These communities are generally diverse in plant composition and provide important forage and cover for wildlife and livestock. Shrublands are split into seven plant communities – mesic upland shrub, xeric upland shrub, mountain big sagebrush, Wyoming big sagebrush, desert shrub, saltbush fans and flats, and greasewood fans and flats – as described below.

Mesic Upland Shrub

This vegetation type includes a variety of shrub communities that grow in relatively mesic sites (often snow catchments or in ravines). Most often, Rocky Mountain maple, bigtooth maples, snowberry, wax currant, or chokecherry are the dominant shrub species. Typical ecological sites in the mesic upland shrub plant community include Course Upland 20+-inch precipitation zone.

Xeric Upland Shrub

Xeric upland shrub is a shrub cover dominated by species of curlleaf mountain mahogany. This community provides habitat for many species, including various bat, raptor, and mammal species. Typical ecological sites in the xeric upland shrub plant community include Steep Loamy 20+-inch precipitation zone.

Mountain Big Sagebrush

This shrub type is dominated by mountain big sagebrush often found mixed with grasses. This community provides habitat for sensitive species, including the greater sage-grouse and other sagebrush obligate species. Typical ecological sites in the mountain big sagebrush plant community include Loamy 10- to 14-inch precipitation zone, Shallow Loamy 10- to 14-inch precipitation zone, Sandy 10- to 14-inch precipitation zone, Shallow Sandy 10- to 14-inch precipitation zone, Clayey 10- to 14-inch precipitation zone, and Shallow Clayey 10- to 14-inch precipitation zone.

Wyoming Big Sagebrush

This vegetation type is a shrub steppe type dominated by Wyoming big sagebrush. This vegetation type can vary from dense, homogeneous Wyoming big sagebrush to sparsely vegetated arid areas where Wyoming big sagebrush is the dominant shrub. This community provides habitat for sensitive species, including the Brewer's sparrow, loggerhead shrike, sage thrasher, ferruginous hawk, and the greater sage-grouse. Typical ecological sites in the Wyoming big sagebrush plant community include Loamy 5- to 9-inch precipitation zone, Shallow Loamy 5- to 9-inch precipitation zone, Sandy 5- to 9-inch

precipitation zone, Shallow Sandy 5- to 9-inch precipitation zone, Clayey 5- to 9-inch precipitation zone, and Gravelly 5- to 9-inch precipitation zone.

Desert Shrub

This vegetation type consists of a mixture of shrubs occurring in dry, saline habitats. Shrubs in this vegetation type are often dominated by shadscale saltbush, but can also be a mixture of Gardner's saltbush, black greasewood, and desert cushion plants. This community provides habitat for sensitive species, including the greater sage-grouse, Brewer's sparrow, loggerhead shrike, sage thrasher, and ferruginous hawk. Typical ecological sites in the desert shrub plant community include Saline Upland 5- to 9-inch precipitation zone, Saline Upland 10- to 14-inch precipitation zone, Shale 5- to 9-inch precipitation zone, and Shale 10- to 14-inch precipitation zone.

Saltbush Fans and Flats

This vegetation type consists of areas where Gardner's saltbush comprise more than 75 percent of the vegetative cover. These relatively pure saltbush stands are often sparsely vegetated, with bare soil constituting most of the land surface. This community provides habitat for sensitive species, including mountain plover, greater sage-grouse, long-billed curlew, ferruginous hawk, loggerhead shrike, Brewer's sparrow, and burrowing owl. Typical ecological sites in the saltbush fans and flats community include Saline Upland 5- to 9-inch precipitation zone and Saline Upland 10- to 14-inch precipitation zone.

Greasewood Fans and Flats

This vegetation type consists of areas where greasewood comprises more than 75 percent of the total shrub cover and shrubs comprise more than 25 percent of the total vegetative cover. This community provides habitat for sensitive species, including Brewer's sparrow, loggerhead shrike, sage thrasher, and ferruginous hawk. Typical ecological sites in the greasewood fans and flats plant community include Saline Lowland 5- to 9-inch precipitation zone and Saline Lowland 10- to 14-inch precipitation zone.

Resource Condition

Common indicators of rangeland health include organic ground cover (live and dead), plant species composition and diversity, bare ground, litter, and the presence and density of noxious weed species. These indicators are associated with Standards 1, 3, and 4 of the *Wyoming Standards for Healthy Rangelands* (Appendix N).

The presence of noxious weeds and other invasive species might indicate a disturbance to the native plant community. Denser populations of invasive species are generally associated with areas that have been affected by surface-disturbing activities, wildfire, changes in water regime, or other major events. The presence and accelerating rate of spread of undesirable plants is a threat that could reduce the ability of vegetation to continue providing desired levels of products and services.

Indicators of rangeland health described in *Technical Reference 1734-6, Interpreting Indicators of Rangeland Health* include soil surface resistance to erosion and soil loss or degradation (including soil compaction); plant community composition and distribution in relation to infiltration and runoff; functional/structural groups; ratio of plant mortality/decadence to young or mature individuals in the community; amount of litter; annual production; invasive plants; and reproductive capability of perennial plants (BLM 2005c).

Fire suppression, historic livestock grazing practices, and road development have disrupted fire return intervals in the sagebrush/grassland plant communities. As a result, there has been an increase in juniper density with a corresponding decrease in perennial bunch grasses and forbs, and in some areas a

loss of age class and structural diversity. In recent years, invasive species, particularly nonnative bromes, have increased greatly in the Planning Area. Many areas in the sagebrush/grassland community that have experienced multiple wildfires have been converted to cheatgrass monocultures.

Since the completion of the Cody, Grass Creek, and Washakie RMPs, approximately 423 projects and 82,314 acres of vegetation treatments have been initiated in the Planning Area (see Section 3.6.7 *Livestock Grazing Management*) to address changes in vegetative condition (BLM 2009a). Vegetation treatments are currently implemented under the principles and methodology in Instruction Memorandum (IM) 2008-030 (BLM 2007c), which gives guidance to BLM field offices on implementing the Record of Decision (ROD) for the National Vegetation Treatments Final Programmatic EIS (BLM 2007b) and Programmatic Environmental Report.

Grassland and shrubland vegetative communities are subject to the influences of wildfire and prescribed fire. See Section 3.3 *Fire and Fuels Management* for more discussion on FRCC as it relates to vegetation.

In the Planning Area, the BLM is implementing the Wyoming Reclamation Policy (BLM 2012b), which identifies ten reclamation requirements, of which restoring a disturbed site to sound ecological health and controlling invasive species are priorities.

Management Challenges

Invasive plant species can dramatically affect native plant communities and disrupt the functions of native ecosystems. Nonnative bromes continue to expand their range throughout the Planning Area. If they are allowed to proliferate, invasive plant species and noxious weeds have the potential to negate any existing or future improvement in vegetation resources. If future circumstances result in a net loss of productive vegetation, the present supply of vegetation and kinds of goods and services vegetation provides society will not be sustainable (refer to Section 3.4.4 *Invasive Species and Pest Management*).

The loss of soil through wind and water erosion can remove valuable nutrients and organic matter from the ecosystem. When the rate of loss exceeds the rate of soil formation there is a net loss of soil. There is a threshold when the amount of soil loss starts to affect plant communities. This threshold varies with soil type. Once a threshold has been crossed, the plant community that could be supported on a site could change. See Section 3.1.3 *Soil* for more information.

3.4.3 Vegetation – Riparian/Wetland Resources

Riparian ecosystems occupy the transition between upland and water ecosystems and include flood plains, stream banks, lake shores, and wetlands. They are some of the most productive resources found on public or private lands. They comprise less than 2 percent of the western landscape, yet are prized by communities for their recreational, fish and wildlife, water supply, cultural, and historic values, and for their economic values, which stem from use in livestock production and forest management (Cooperative Riparian Restoration Montana 2006).

Riparian/wetland sites in the Planning Area are described as lentic or lotic. Lentic refers to standing water such as in lakes, springs, and bogs. Lotic refers to flowing water such as rivers and streams.

Documented riparian/wetland areas in the Planning Area range from cottonwood galleries along major rivers, to wet meadows and seeps and narrow ribbons of willow/water birch, sedge, rush, and/or grass that run along small streams. Some of the surface water features that support riparian/wetland areas can be dry for long periods and experience wide variations in the frequency and magnitude of flood events. Native cottonwood galleries along riparian corridors provide habitat for migratory birds and

owls and for white-tailed and mule deer. Many terrestrial wildlife species use more than one riparian habitat type, although some use only one or two.

Riparian/wetland areas in the Planning Area perform important ecological processes and functions such as water, energy, and nutrient cycling. Healthy riparian/wetland areas support stable banks and shorelines; flood plain maintenance; clean and stable water supplies; aquifer recharge; flood-energy dissipation and moderation; fish and wildlife habitat; livestock and wildlife forage; opportunities for recreation; carbon sequestration; and scenic values.

Riparian/Wetland Communities

Riparian/wetland communities in the Planning Area include forest-dominated riparian areas, shrub-dominated riparian areas, and graminoid/forb-dominated wetlands, as described below.

Forest-dominated Riparian Areas

Forest-dominated riparian areas are dominated by tree species. In the Planning Area, these are usually cottonwood species, but also can be aspen, boxelder, a variety of conifer species, and Russian olive (an introduced nonnative species considered to be a noxious weed). Trees must occupy more than 25 percent of the vegetative cover within a riparian zone to be classified as forest-dominated riparian. Diagnostic plant species include eastern cottonwood, narrowleaf cottonwood, quaking aspen, boxelder, and conifer species.

Shrub-dominated Riparian Areas

These riparian areas are characterized by areas where shrubs comprise more than 25 percent of the vegetative cover and where trees occupy less than 25 percent of the total vegetative cover. Shrubs often include willow species, sagebrush species, and greasewood. Other shrubs, including hawthorn, wild plum, birch, alder, shrubby cinquefoil, and Tamarisk (an introduced nonnative species considered to be a noxious weed) might also be present. Alpine riparian zones are generally dominated by willows or other shrubs.

Graminoid-/Forb-dominated Wetland Areas

These areas are characterized by grasses or forbs; trees or shrubs cannot occupy more than 25 percent of the total vegetative cover. This wetland type includes communities such as wet and moist meadow grasslands, marsh and swamp wetlands, cattail, bulrush- and sedge-dominated wetlands, and inland saltgrass/alkali sacaton-dominated wetlands, including both low- and high-salinity wetlands. Low-salinity wetlands are characterized by cattails, Baltic rush, sedges and rushes, and prairie cordgrass. High-salinity wetlands are characterized by alkali sacaton, alkali cordgrass, saltgrass, sea blight, and riparian wheatgrass.

Riparian/Wetland Inventory

Riparian/wetland areas in the Planning Area are inventoried to estimate their functional status using PFC assessment methodologies developed by the BLM, USFS, NRCS, and others (BLM 1998b; BLM 1999). These methodologies employ an interdisciplinary team that inspects and analyzes the attributes and processes associated with a riparian/wetland area's hydrology, vegetation, and soils to estimate its relative health. In the Planning Area, inventoried riparian/wetland areas include approximately 1,617 acres of lentic and 1,205 miles of lotic riparian/wetlands (BLM 2009j). Table 3-26 provides the results of the riparian/wetland PFC inventories for the Planning Area.

Table 3-26. Wetland Inventory Data

Functional Status	Wetlands (lentic features) (acres)	Riparian (lotic features) (miles)
Proper Functioning Condition	136	417
Functioning-at-Risk Upward Trend	155	225
Functioning-at-Risk Downward Trend	355	213
Functioning-at-Risk No apparent Trend	963	182
Non-Functioning	8	99
Unknown	0	69
Total	**1,617**	**1,205**

Sources: USFWS 2008; BLM 2009j.

PFC assessments seem to indicate that many riparian/wetland areas in the Planning Area have improved over the last 15 to 20 years in response to implemented changes in grazing and other management actions. During this time, livestock grazing schedules have been modified to reduce or eliminate growing and/or hot-season use and increase dormant and cool-season use and/or rest periods to provide plants with recovery time.

Vegetation in riparian areas is the first of the functional components to respond to changes in management. The establishment of species, such as sedges and rushes that capture sediment and stabilize stream banks, indicates an upward trend in functional status. The physical attributes of the streams (sinuosity and width to depth ratio, erosion and deposition, lateral and vertical stability) respond slower than vegetation, because their development and stability depends on healthy, vigorous riparian/wetland vegetation.

There are a number of indicators used to evaluate the condition of riparian/wetland areas, as described below.

Obligate Plant Species and Facultative Wetland Plant Species – Obligate plant species (plants that occur more than 99 percent of the time in wetlands) and Facultative Wetland plant species (plants that occur 67 to 99 percent of the time in wetlands) are used as riparian indicator plants. Some of the more common indicator plants in the Planning Area include, but are not limited to, Baltic rush, Nebraska sedge, common threesquare, willows, cottonwood, cattails, spikerush, and alkali bulrush.

Proper Functioning Condition – PFC is a riparian health assessment and communication tool that focuses on the attributes and processes associated with a riparian/wetland area's hydrology, vegetation, and soils instead of its values or uses. Indicators considered when assessing the functional state of lotic riparian/wetland areas include:

- Hydrologic Indicators
  - Flood plain above bankfull is inundated in "relatively frequent" events.
  - Where beaver dams are present, they are active and stable.
  - Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (landform, geology, and bioclimate region).
  - Riparian/wetland area is widening or has achieved potential extent.
  - Upland watershed is not contributing to riparian/wetland degradation.

- Vegetation Indicators
  - There is diverse age-class distribution of riparian/wetland vegetation (recruitment for maintenance/recovery).
  - There is a diverse composition of riparian/wetland vegetation (for maintenance/recovery).
  - Plant species present indicate maintenance of riparian/wetland soil moisture characteristics.
  - Stream bank vegetation is comprised of plants or plant communities with root masses capable of withstanding high streamflow events.
  - Riparian/wetland plants exhibit high vigor.
  - Adequate riparian/wetland vegetation is present to protect banks and dissipate energy during high flows.
  - Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery).
  - Erosion/Deposition (Soil) Indicators.
  - Flood plain and channel characteristics (rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy.
  - Point bars are revegetating with riparian/wetland vegetation.
  - Lateral stream movement is associated with natural sinuosity.
  - The system is vertically stable.
  - The stream is in balance, with the water and sediment being supplied by the watershed (no excessive erosion or deposition).

Indicators considered when assessing lentic riparian/wetland areas are similar to those used for flowing riparian/wetland areas, but they have been modified to address wave, wind, and/or overland flow energies instead of the high water flow energies experienced by flowing water systems.

Invasive Species – Invasive plant species displace native riparian/wetland plant species and can disrupt or degrade riparian/wetland areas to the point that they no longer function properly or provide habitat for riparian-dependent native flora and fauna. In the Planning Area, riparian invasive species include nonnative bromes, Russian olive, Tamarisk, and Russian knapweed.

Management Challenges

Although 2009 was an above-average precipitation year, precipitation has been below normal in 6 of the 9 years since 2000. Small streams and portions of larger streams have experienced minimal or no flows. The reduced amount of available water has resulted in lower flows in unregulated streams, and lower outflows from reservoirs in and around the Bighorn Basin. Reduced amounts of water due to drought have had an adverse impact on riparian/wetland habitat improvement. In general, the most common adverse impacts include a slowing in the rate of improvement in those areas where appropriate management has been implemented and an increase in the rate of decline where appropriate management has not yet been implemented. This has had a greater impact on fisheries than on riparian conditions. Thus, riparian conditions continue to improve while some fisheries appear to be declining (BLM 2009a).

Sixty-seven of the 252 livestock grazing allotments that have been evaluated for conformance with the *Wyoming Standards for Healthy Rangelands* failed riparian/wetland area standard #2 (Appendix N). Standard #2 states that "riparian and wetland vegetation has structural, age and species diversity characteristic of the stage of channel succession and is resilient and capable of recovering from natural

and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for groundwater recharge." Allotments can fail standard #2 for many reasons. If failure to meet the standard is attributable to existing livestock grazing management or utilization level, then the BLM must make management changes to correct the issue. If failure to meet the standard is attributable to other factors (e.g., encroaching juniper, recent wildfire, discontinued historic grazing patterns, or the presence of noxious weeds), then the BLM is not required to make changes to livestock grazing.

Proactive management practices such as prescribed fire, brush mowing/beating, successful reclamation of surface disturbance, applying BMPs and standard surface-disturbing guidelines, travel management, and implementing riparian/wetland compatible livestock grazing management can have a beneficial influence on associated riparian/wetland areas and their watersheds.

3.4.4 Invasive Species and Pest Management

Invasive and noxious plant species are common impediments to management objectives in the Planning Area. Invasive species are, for the most part, nonnative species whose introduction into an environment where they did not evolve causes, or is likely to cause, economic or ecological harm. These species make efficient use of local natural resources difficult and often interfere with achieving management objectives for the site. Noxious species are species designated by federal, state (State of Wyoming Noxious Weed List), or county government (Weed Control Districts) as injurious to public health (Tables 3-27 and 3-28). Although noxious weeds are almost always nonnative, this RMP and EIS makes a distinction because noxious weeds can include undesirable native plants. A pest can be any biological life form that poses a threat to human or ecological health and welfare.

Table 3-27. Wyoming Weed and Pest Control Act Designated List

Common Name	Common Name	Common Name	Common Name
Canada thistle	Field bindweed	Perennial sowthistle	Skeletonleaf bursage
Common burdock	Hoary cress (whitetop)	Plumeless thistle	Spotted knapweed
Common St. Johnswort	Houndstongue	Purple loosestrife	Tamarisk saltcedar
Common tansy	Leafy spurge	Quackgrass	Yellow toadflax
Diffuse knapweed	Musk thistle	Russian knapweed	-
Dalmatian toadflax	Oxeye daisy	Russian olive	-
Dyers woad	Perennial pepperweed (giant whitetop)	Scotch thistle	-

Source: Wyoming Weed and Pest Council 2012a

Table 3-28. Declared List of Weeds and Pests by Planning Area County, 2008

Common Name	Common Name	Common Name	Common Name
Big Horn County			
Baby's breath	Italian thistle	Redstem filaree	Tansy ragwort
Black henbane	Japanese knotweed	Rush skeletonweed	Teasel
Common crupina	Meadow knapweed	Scentless chamomile	Venice mallow
Distaff thistle	Medusahead	Scotch broom	Viper's bugloss
Field dodder	Orange hawkweed	Squarrose knapweed	Yellow hawkweed
Goatsrue	Poison hemlock	Swainsonpea	Yellow starthistle
Gorse	Puncturevine	Sulfur cinquefoil	-
Iberian starthistle	Purple starthistle	Syrian beancaper	-
Hot Springs County			
Puncturevine	Wild oats	-	-
Park County			
Black henbane	Chicory	Flixweed	Showy milkweed
Blue mustard	Common mullein	Lanceleaf sage	Wild four o'clock
Bull thistle	Dames rocket	Redstem filaree	-
Washakie County			
Absinth wormwood	Meadow knapweed	Scentless chamomile	Teasel
Black henbane	Medusahead	Scotch broom	Venice mallow
Common crupina	Orange hawkweed	Squarrose knapweed	Wild licorice
Common mullein	Puncturevine	Sulfur cinquefoil	Yellow hawkweed
Distaff thistle	Purple starthistle	Swainsonpea	Yellow starthistle
Iberian starthistle	Rush skeletonweed	Tansy ragwort	-
Italian thistle	Sandbur	Tall mountain larkspur	-

Source: Wyoming Weed and Pest Council 2012b

The CYFO and WFO control invasive species on BLM-administered lands through cooperative agreements with the Big Horn County, Hot Springs County, Park County, and Washakie County Weed and Pest Control Districts. In addition to the county weed and pest control districts, both field offices work in cooperation with the Wyoming Game and Fish Department (WGFD), State Lands Division, State Parks, local NRCS offices, and private landowners. Invasive species are an increasing problem in the Planning Area and are affecting water and other resources.

In 2004, there was an invasive species inventory of 40 percent of the Bighorn Basin. Based on the results of this inventory, it was estimated that there were approximately 60,000 acres infested with invasive species (BLM 2008a). There are an ever-expanding number of acres infested, especially with Russian knapweed, leafy spurge, perennial pepperweed, Russian olive, and Tamarisk along the Bighorn River and its tributaries. Additional new weed species such as cheatgrass are beginning to appear in other locations in the Bighorn Basin.

There has been an increase in weed occurrences in developed oil and gas fields, along roads and pipelines, and on public lands with increasing recreational use. The shrub component of the plant community often takes decades or more to establish, and even longer to reestablish after disturbance. Many reclamation efforts performed 20 or more years ago still do not have shrubs established and have not achieved reestablishment of wildlife habitat comparable to that before disturbances.

Two invasive species of special concern are Russian olive and Tamarisk, which deplete water and are replacing cottonwood and willow. Work has begun on controlling the two species; however, observations indicate that these invasive species are spreading within the boundaries of the Planning Area (BLM 2009a).

In 2009, the WFO estimated that approximately 57,000 acres in the field office were infested with nonnative annual bromes (primarily cheatgrass and Japanese brome) (BLM 2009a). These bromes appear to be invading grassland, sagebrush grassland, mixed grass prairie, desert shrub, and mountain shrub community types. Inventory information is available for only about 10 percent of the Bighorn Basin, so actual infested acreage might vary.

Both the CYFO and WFO are targeting plants that are designated on the State of Wyoming Noxious Weed List or declared on the county noxious weed lists (refer to Tables 3-27 and 3-28). The primary species targeted on public lands include cheatgrass, Russian knapweed, spotted knapweed, diffuse knapweed, leafy spurge, Dalmatian toadflax, Canada thistle, scotch thistle, musk thistle, houndstongue, hoary cress (whitetop), field bindweed, puncture vine, Russian olive, and Tamarisk. These plants are typically found in sagebrush/grassland, desert shrub, and riparian/wetland community types. The present goal is to contain and reduce densities of invasive species populations. Table 3-29 lists the number of acres of each species the BLM treats in the Planning Area.

The CYFO and WFO treat approximately 2,500 acres of invasive-species-infested areas annually. The BLM endeavors to acquire more inventory and monitoring data, but there still is not enough available data to determine the actual trends in invasive species establishment. Based on observations and reports from Weed and Pest Control Districts, treatment efforts appear to be keeping invasive plant species populations from continued rapid spread, but are not necessarily reducing existing populations.

Cooperative Management in Invasive Species and Pest Control

The BLM manages noxious and invasive weeds in the Planning Area pursuant to BLM goals described in *Partners Against Weeds, An Action Plan for the Bureau of Land Management* (BLM 1996). These goals include prevention and detection; education and awareness; inventory; planning; integrated weed management; coordination; and monitoring, evaluation, research and technology transfer.

Table 3-29. Treatment of Invasive Plant Species in the Planning Area

Species Treated	Acres of Treatment per year	Species Treated	Acres of Treatment per year
Absinth wormwood	0.20	Musk thistle	37
Black henbane	1.20	Oxeye daisy	1.80
Bull thistle	3.30	Perennial pepperweed	16.50
Canada thistle	630	Perennial sowthistle	1.80
Cheatgrass	1,000	Puncturevine	1
Common burdock	2.50	Purple loosestrife	3.80
Common mullein	1.18	Russian olive	76
Common tansy	0.62	Russian knapweed	535
Dalmatian toadflax	32.50	Scotch thistle	0.34
Diffuse knapweed	0.20	Spotted knapweed	25
Field bindweed	365	Sulphur cinquefoil	0.10
Houndstongue	27.50	Swainsonpea	3
Japanese knotweed	0.01	Tamarisk	50
Leafy spurge	10	Whitetop	300

Source: BLM 2007b

The BLM adheres to the concept of integrated pest management, or the use of a wide range of available tools and techniques to meet management objectives in site-specific situations. Vegetation treatments, including those for noxious weeds on public lands, are currently implemented under the principles and methodology outlined in IM No. 2008-030 (BLM 2007c), and instruction for implementing the ROD for the National Vegetation Treatments Final Programmatic EIS (BLM 2007b). In addition, IM WY-2012-032, Wyoming BLM Reclamation Policy (BLM 2012b), identifies 10 reclamation requirements, of which managing invasive plants is one, which must be addressed when developing reclamation proposals for all surface-disturbing activities.

The BLM manages invasive species in the Planning Area in nine weed management areas and two Coordinated Resource Management areas for weeds. Most of the species the BLM targets for management have not invaded BLM-administered lands in the Planning Area; however, invasive species that have invaded BLM-administered lands are expanding their range (BLM 2009a). The goal is to contain and reduce densities of known invasive species populations, though only limited portions of the Planning Area have been inventoried for invasive species.

Pest Management

In February 2003, the USDA Animal and Plant Health Inspection Service (APHIS) and the BLM signed an MOU detailing cooperative efforts to suppress grasshoppers and Mormon crickets on BLM-administered lands (APHIS AND BLM 2003). This MOU clarifies that APHIS will prepare and issue to the public site-specific environmental documents that evaluate potential impacts associated with proposed measures to suppress economically damaging grasshopper and Mormon cricket populations. The BLM must also

approve a Pesticide Use Proposal (Form FS-2100-2) for APHIS to treat infestations. APHIS would begin treatments after environmental review and BLM approval of the Pesticide Use Proposal.

Wyoming-designated pests under Wyoming Statute 11-5-102(a) (xii) include grasshoppers, Mormon crickets, prairie dogs, ground squirrels, mountain bark beetle, and beet leafhopper. The preferred method for treating grasshoppers and Mormon crickets is by Reduced Agent Area Treatments (RAAT). RAATs are a grasshopper suppression method in which the rate of insecticide is reduced from conventional levels, and treated swaths are alternated with swaths that are not directly treated. The RAAT strategy relies on the effects of an insecticide to suppress grasshoppers within treated areas while conserving grasshopper predators and parasites in areas not directly treated.

Fish and Wildlife Resources

The BLM is responsible for managing fisheries and wildlife habitats, and state and federal wildlife management agencies oversee BLM management activities. Fisheries habitat includes perennial and intermittent streams, lakes, and reservoirs that support fish through at least a portion of the year. See Section 3.1.4 *Water* for a description of drainages in the Planning Area that provide fisheries habitat, including the Bighorn River, Wind River, Clarks Fork of the Yellowstone River, and their associated tributaries, including the Nowood, Greybull and Shoshone rivers systems (Map 3). Aquatic habitat varies by vegetation type, water quality and quantity, land use, and landscape setting within these drainages and their tributaries. The U.S. Fish and Wildlife Service (USFWS) provides regulatory oversight for all species listed, proposed for listing, or candidates for listing under the ESA (see the *Special Status Species* section in this chapter). The USFWS also administers the Migratory Bird Treaty Act, which protects migratory bird species whether they are hunted (as with waterfowl) or not (as with songbirds).

3.4.5 Fish and Wildlife Resources – Fish

The BLM manages fish habitats according to laws, regulations, BLM policies, and principles of fisheries management within the BLM multiple-use mandate. State and federal game management agencies oversee aquatic species, to the extent they are directly managed. The WGFD is responsible for regulating the sport and commercial take of all fish in the Planning Area. The USFWS has oversight over federally threatened or endangered species. There are no federally listed fish species in the Bighorn Basin (refer to Section 3.4.8 *Special Status Species – Fish* for more detailed information). However, the BLM directly manages habitat that supports game and nongame fish species where there is such habitat on BLM-administered lands, and BLM management indirectly affects all aquatic species upstream and downstream of BLM-administered lands. The BLM manages wildlife habitat in the Planning Area according to a number of habitat management plans (HMP) (refer to Section 3.4.6 *Fish and Wildlife Resources – Wildlife*). Although there are no specific HMPs for fish species, actions in existing HMPs that improve riparian habitat often improve habitat for fish species.

Within the Planning Area, BLM-administered lands contain fisheries resources that include cold-water streams draining the Big Horn Mountains to the east and the Absaroka Range to the west; the tail-water trout fishery at Thermopolis; the cool-water fishery of the lower Bighorn, Shoshone, Greybull, and Nowood rivers; and the warm-water fisheries of several small lakes or ponds. There are no natural lakes or ponds in the Bighorn Basin that support fisheries.

Fisheries in the Bighorn Basin occur in the Bighorn River and Clarks Fork of the Yellowstone watersheds and include several major perennial tributaries – Owl Creek, Cottonwood Creek, Grass Creek, Gooseberry Creek, Greybull River, Wood River, Shoshone River, Kirby Creek, Nowater Creek, Nowood River, Shell Creek, Porcupine Creek, and Dry Creek. Most fish populations occur in the larger rivers and their tributaries, although there are several WGFD-stocked reservoirs and ponds.

Fish are typically classified as game or nongame; cold, cool, or warm water, and as native or nonnative. Species are adapted to a variety of stream habitats, from cold, rapid waters in higher elevations to slow, turbid waters of the high desert. According to the WGFD database, of the approximately 1,170 miles of streams on BLM-administered public lands in the Planning Area, approximately 395 miles support fisheries. The rest of the streams have no fish present or populations too low to adequately sample.

Fishing is an important component to the Bighorn Basin culture. The WGFD manages most cold-water streams for brook, brown, cutthroat, and rainbow trout. In addition, management on some streams is focused on mountain whitefish, and Yellowstone cutthroat trout. Many lower-elevation waters in the

Planning Area are managed for cool- and warm-water native game fish, such as sauger and channel catfish, along with the native nongame species, such as numerous minnow and sucker species that provide forage for sport-fish species. There are four nongame species on WGFD list of Species of Greatest Conservation Need in the Planning Area – sturgeon chub, mountain sucker, and plains and western silvery minnow. Habitat for these species is being diminished by anthropogenic factors such as alteration to stream channel morphology, and changes due to dam construction and increased sedimentation in the Shoshone and lower Bighorn River systems. There are approximately 40 fish species in the Planning Area (Table 3-30).

Table 3-30. Fish Species in the Planning Area

Common Name	Native to Wyoming	Native to the Planning Area	Game/ Nongame	Habitat
Black bullhead	Yes	No	Game	Warm/Lentic
Black crappie	No	No	Game	Warm/Lentic
Bonneville cutthroat trout	Yes	No	Game	Cold/Lentic and Lotic
Brook stickleback	No	No	Nongame	Cool-Warm
Brook trout	No	No	Game	Cold/Lentic and Lotic
Brown trout	No	No	Game	Cold/Lentic and Lotic
Burbot	Yes	Bighorn Drainage	Game	Cool-Warm/Lentic and Lotic
Carp	No	No	Nongame	Cool-Warm
Channel catfish	Yes	Bighorn Drainage	Game	Cool-Warm/Lentic and Lotic
Emerald shiner	No	No	Nongame	Cool-Warm
Fathead minnow	Yes	Bighorn Drainage	Nongame	Cool-Warm
Flathead chub	Yes	Bighorn Drainage	Nongame	Cool-Warm
Golden shiner	No	No	Nongame	Cool-Warm
Grayling	Yes	No	Game	Cold/Lentic and Lotic
Green sunfish	No	No	Game	Warm/Lentic
Lake chub	Yes	Bighorn Drainage	Nongame	Cool-Warm
Lake trout	No	No	Game	Cold/Lentic and Lotic
Largemouth bass	No	No	Game	Warm/Mostly Lentic
Longnose dace	Yes	Bighorn and Clarksfork Drainages	Nongame	Cool-Warm
Longnose sucker	Yes	Bighorn and Clarksfork Drainages	Nongame	Cool-Warm
Mountain sucker	Yes	Bighorn and Clarksfork Drainages	Nongame	Cool-Warm
Mountain whitefish	Yes	Bighorn and Clarksfork Drainages	Game	Cold/Lotic
Plains killifish	Yes	No	Nongame	Cool-Warm
Plains minnow	Yes	Bighorn Drainage	Nongame	Cool-Warm
Rainbow trout	No	No	Game	Cold/Lentic and Lotic
River carpsucker	Yes	Bighorn Drainage	Nongame	Cool-Warm
Sand shiner	Yes	Bighorn Drainage	Nongame	Cool-Warm
Sauger	Yes	Bighorn Drainage	Game	Cool-Warm/Lentic and Lotic

Table 3-30. Fish Species in the Planning Area (Continued)

Common Name	Native to Wyoming	Native to the Planning Area	Game/ Nongame	Habitat
Shorthead redhorse	Yes	Bighorn Drainage	Nongame	Cool-Warm
Shovelnose sturgeon	Yes	Bighorn Drainage	Game	Cool-Warm/Lentic and Lotic
Smallmouth bass	No	No	Game	Cool-Warm/Lotic and Lentic
Snake river cutthroat trout	Yes	No	Game	Cold/Lentic and Lotic
Stonecat	Yes	Bighorn Drainage	Game	Cool-Warm/Lentic and Lotic
Sturgeon chub	Yes	Bighorn Drainage	Nongame	Cool-Warm
Walleye	No	No	Game	Cool-Warm/Lentic and Lotic
Western silvery minnow	Yes	Bighorn Drainage	Nongame	Cool-Warm
White sucker	Yes	Bighorn Drainage	Nongame	Cool-Warm
Yellow perch	No	No	Game	Cool-Warm/Mostly Lentic
Yellowstone cutthroat trout	Yes	Bighorn and Clarksfork Drainages	Game	Cold/Lentic and Lotic

Source: WGFD 2008

Fishery habitat conditions are closely tied to riparian and watershed conditions and water quality. Riparian vegetation moderates water temperatures, increases bank stability, supports insects used as important food source, filters sediment, provides in stream habitat for fish, and provides organic material for aquatic insects. Indicators of the overall health of fish species include population numbers, water quality, water quantity, bank cover, insect/macroinvertebrate populations, habitat quality, gain or loss of important habitats, rangeland health standards, riparian PFC ratings, disease, and presence of aquatic invasive species including zebra mussels, New Zealand mud snails, Asian clams, Didymo, and Quagga mussels.

Historically, agriculture, vegetation management, fire management, development, surface-disturbing activities, motorized vehicle use, and recreation have influenced fisheries habitat in the Planning Area. With the long-term drought, the total amount of fisheries habitat has declined in some streams. Stream segments that previously had perennial flows have been dewatered for various periods (for example, the upper reaches of Kirby Creek and Nowater Creek). Most of these segments are small streams that supported nongame fish. Some streams that contained trout, such as Grass Creek or Enos Creek, have lost some or all of their trout populations.

Due to the recent drought conditions and increased demands for water in the Planning Area, rivers, streams, and reservoirs have experienced low flows and drawdowns. This directly affects fisheries habitat, spawning success, and survival of fish in both streams and reservoirs. Low streamflows have resulted in the siltation of pools in streams that are needed for fish to survive. Pools that have filled with sediment have not received the spring flushing flows necessary to remove it. These same high flows are also necessary to clean sediment-laden spawning gravels; therefore, fish recruitment rates have decreased. The effects of drought can be quickly reversed in streams with a return to more normal weather patterns; however, although higher streamflows may improve stream pool habitat, they will not remedy the continued siltation of reservoirs. If the drought continues and in turn causes an increase in plant mortality or wildfires, the present sedimentation rate of the reservoirs could increase.

Some activities in the Planning Area are improving fisheries habitat. The Conservation Districts in the Planning Area have had some success in improving water quality through programs encouraging

sprinkler irrigation systems over ditch irrigation systems, relocating corrals and feedlots away from rivers, and replacing septic systems. The net result has been a decrease in sediment from irrigation return flows and coliform bacteria contamination.

Management Challenges

Management challenges for fishery habitats include water depletion, drought, sedimentation, isolated populations, and barriers to migration. Water depletions, through consumptive uses and evaporative loss, are expected to continue to increase and could affect water quality and availability for fish, resulting in decreased population densities and a reduction in recreational fishing opportunities. Habitat improvements and enhancements could offset some of the decline in fisheries habitat, but such opportunities on BLM-administered lands are somewhat limited due to irregular land ownership patterns and an inability to influence water diversions and in-streamflows. The state of Wyoming is administratively responsible for issuing water rights and the maintenance and enforcement of water quality standards in the Planning Area (see Section 3.1.4 *Water*).

Improperly designed or installed culverts can prevent fish migration, disrupt habitat, and decrease spawning success. BLM Manual 9112 and Handbook H-9112, Bridges and Major Culverts, provide guidance on policies and procedures related to the design, construction, and maintenance of bridges and major culverts (BLM 2011e). BLM policy requires that all bridges and major culverts allow fish passage and that installations be coordinated with a BLM fisheries biologist. In designing bridges and culverts, primary consideration is given to the effect the structure would have on the passage of resident or anadromous fish, and in some cases may provide an opportunity to assist in stream management. The BLM designs culverts to promote fish passage on intermittent and ephemeral streams, with priority given to Wyoming DEQ streams that support a Class 1, 2A, 2B, 2AB, and 2C surface waters with designated uses as fisheries (Blue Ribbon and Red Ribbon streams). Lower priority is generally given to Class 3, 3B, and 4 surface waters that support other aquatic life.

Both climate change and short-term variation in weather patterns can contribute to changes in stream systems such as flow, temperature, and turbidity. Aquatic systems are never static, but constantly change in response to environmental variations such as summer heat and winter ice, droughts and floods, and longer-term climatic changes. Lotic systems depend on high-water events to create fish habitat such as scour pools for winter or low-water habitat, large woody debris and undercut banks to create overhead cover, and to clean sediment out of spawning gravels. Living in a dynamic environment, fish tolerate and even need such periodic disruptions to their stream habitats. Such disruptions, if they are too extreme or occur too frequently, can adversely affect fish habitat and can permanently reduce or eliminate fish populations from some stream reaches or stream systems. Many climate-change predictions include increased duration and frequency of droughts and an increase in extreme precipitation events (see Section 3.1.1 *Air Quality*).

In the Planning Area, many of the lotic fish populations survive in isolated systems. Such systems have limited or no ability to be repopulated from other systems if the present population is extirpated. These populations have survived many periodic droughts, but if climate change in the Planning Area results in droughts that are longer and more severe than historic patterns, fish populations and species numbers could be adversely affected.

3.4.6 Fish and Wildlife Resources – Wildlife

The BLM has grouped the wildlife species described in this RMP and EIS according to Wyoming Statutory Wildlife Categories. This section describes existing conditions and management challenges for habitat types and statutory wildlife groups in the Planning Area. Management actions are incorporated in the alternatives and described in more detail in Chapter 2. It is important to note that the management actions are based on wildlife seasonal ranges that change overtime, and the spatial habitat designations will be reviewed and modified as necessary. For purposes of this discussion, the terms habitat and vegetative types are used interchangeably.

Wildlife and Habitats in the Planning Area

There is a diversity of wildlife habitats in the Planning Area, primarily because of its location between three physiographic areas – the Northern Shortgrass Prairie to the north and east, the Central Rocky Mountains to the west, and the Wyoming Basin to the south of and including the Planning Area. Also, the Bighorn Basin is a basin bounded by mountains that affect floral and faunal distribution, which also defines the diversity of habitats and species in the Bighorn Basin.

Lands in the Planning Area contain a variety of habitats that possess the biological and physical attributes important in the life-cycles of many wildlife species. The diversity of habitats and landscapes provide important areas for breeding, birthing, foraging, wintering, and migration. Wildlife and their habitats are representative of Great Basin fauna and flora. Wildlife habitat is best characterized by vegetation types, water resources, geology, and topography. Vegetation types are characterized as successional stages, commonly influenced by disturbance regimes like fire, grazing, and drought. Just as a diversity of vegetation types is important to wildlife, so are these successional stages within types. Habitats in the Planning Area include sagebrush-steppe shrublands, coniferous forests, juniper woodlands, aspen stands, mountain shrub, canyons and rim rock, badlands, grasslands, and riparian/wetland areas. See the Vegetation sections in this chapter for more information about these habitat types in the Planning Area.

Factors such as fire, forestry, ROWs, livestock grazing management, motorized vehicle use, and OHV use and other types of recreation also influence the quality of habitat, as do management actions applied throughout BLM-administered lands. It also is noteworthy that many wildlife populations spend considerable time on non BLM-administered lands and these populations often depend to a great extent on, and are therefore affected by, management of these non BLM-administered lands. Most wildlife species utilize vegetation on the basis of its structure (height and spacing) and the growth form (gross morphology and growth aspect) of the predominant species. Therefore, mapping vegetation zones and successional stages characterizes wildlife habitat in general terms. The BLM manages wildlife habitat in the Planning Area according to a number of HMPs and habitat management recommendations provided through the WGFD *Strategic Habitat Plan* (WGFD 2009a); Table 3-31 lists these HMPs.

Table 3-31. Habitat Management Plans Applicable to the Planning Area

Plan	Year
Absaroka Front Habitat Management Plan (BLM 1986a)	1986
Bighorn River Habitat and Recreation Management Plan (BLM 1987)	1978 (updated 1986)
Grass Creek Resource Area Reservoir Habitat Management Plan (BLM 1983a)	1983
Grass Creek Resource Area Streams Habitat Management Plan (BLM 1984a)	1984
Washakie Resource Area Reservoir Habitat Management Plan (BLM 1994b)	1994
West Slope Habitat Management Plan (BLM 1984b)	1984

Source: BLM 2009a

Habitat in the Planning Area ranges from montane areas in the Absaroka, Owl Creek, and Big Horn Mountains to salt desert shrublands with extensive grassland and shrublands in between. See the *Vegetation* section in this chapter and Section 3.4.3 *Riparian/Wetland Resources* for descriptions of plant communities in the Bighorn Basin.

The Planning Area contains important crucial winter range for a variety of animals. Crucial winter range is often the determining factor in maintaining big game populations at objective levels.

Terrestrial vertebrate wildlife species present in the Bighorn Basin represent all major vertebrate classes–reptiles, amphibians, birds, and mammals. Management emphasis is primarily placed on birds and mammals because of interest in them by the hunting and recreating public. The following paragraphs describe terrestrial wildlife species in the Planning Area. The descriptions are based on WGFD statutory wildlife categories to facilitate discussion regarding these species. The *Special Status Species* section in this chapter addresses species of special concern (threatened, endangered, and sensitive species).

Big Game

Big game species in the Planning Area include pronghorn, deer (mule deer and white-tailed deer), elk, moose, bighorn sheep, and mountain goat. Boundaries of the herd unit areas are established to encompass all the seasonal ranges and habitats or special life-function areas (e.g., calving and lambing areas) utilized by a more or less discreet population or herd. Because there will always be some interchange of animals between adjacent populations, and portions of populations change important use patterns over time, these boundaries are well defined, but not permanent. They do, however, represent the best available data and identify population units consistent with the most recent biological and climatic conditions. Table 3-32 provides information about the relative size and amount of BLM-administered lands in Planning Area big game herd units.

Table 3-32. Relative Size and Amount of BLM-administered Lands Occupied by Big Game Herd Units

Big Game Species	Herd Unit Name	Total Herd Unit Acreage in Wyoming	Herd Unit Acreage in the Planning Area	Herd Unit Percentage in the Planning Area	Herd Unit Acreage on BLM-Administered Lands	Herd Unit Percentage on BLM-Administered Lands
Pronghorn	Badger Basin	885,696	745,721	84	239,812	27
	Big Horn	799,601	798,529	100	576,533	72
	Copper Mountain	1,456,204	1,336,902	92	764,453	53
	Fifteenmile	2,018,619	1,538,985	76	969,576	48
	Carter Mountain	1,342,601	1,158,807	86	625,025	47
	Upper Powder River	525,128	9,832	2	717	0
	Middle Fork	400,009	10,788	3	6,359	2
	Badwater	589,514	38,604	6	1,505	0
	Project	1,947,004	13	0	1	0
	North Natrona	926,307	531	0	302	0
	Total	**10,890,683**	**5,638,712**	**52**	**3,184,283**	**29**
Mule Deer	Paintrock	916,220	679,834	74	470,838	52
	Southwest Bighorns	1,885,331	1,220,337	65	652,523	35
	Basin	779,131	779,131	100	635,668	82
	Greybull River	533,765	533,765	100	362,687	68
	Clarks Fork	969,665	457,903	47	155,121	16
	Upper Shoshone	1,256,363	264,105	21	58,208	5
	Shoshone River	658,972	654,652	99	341,953	52
	Owl Creek/Meeteetse	1,298,422	724,587	56	280,195	22
	North Bighorn	1,583,972	305,456	19	220,830	14
	Upper Powder River	884,217	19,932	2	6,821	1
	North Natrona	926,307	531	0	302	0
	Total	**11,692,365**	**5,640,233**	**48**	**3,185,146**	**27**
White-Tailed Deer	Bighorn Basin	8,163,337	5,591,452	68	3,177,146	39
	Powder River	6,780,256	19,932	0	6,821	0
	Central	8,928,515	531	0	302	0
	Total	**23,872,108**	**5,611,915**	23	**3,184,269**	**13**

Table 3-32. Relative Size and Amount of BLM-administered Lands Occupied by Big Game Herd Units (Continued)

Big Game Species	Herd Unit Name	Total Herd Unit Acreage in Wyoming	Herd Unit Acreage in the Planning Area	Herd Unit Percentage in the Planning Area	Herd Unit Acreage on BLM-Administered Lands	Herd Unit Percentage on BLM-Administered Lands
Elk	Medicine Lodge	923,578	653,690	71	469,709	51
	Gooseberry	1,051,437	577,296	55	238,006	23
	Cody	2,650,742	1,604,469	61	984,440	37
	North Bighorn	1,537,061	305,456	20	220,830	14
	Clark's Fork	1,825,765	1,262,765	69	612,525	34
	South Bighorn	3,654,429	1,236,557	34	659,636	18
	Total	**11,643,012**	**5,640,233**	**48**	**3,185,146**	**27**
Moose	Bighorn Moose	2,661,310	841,547	32	582,891	22
	Absaroka	3,227,185	1,149,359	35	387,397	12
	Total	**5,888,495**	**1,990,906**	**34**	**970,288**	**16**
Bighorn Sheep	Absaroka	4,033,291	1,139,215	28	385,971	10
	Devils Canyon	145,387	94,347	65	70,865	49
	Total	**4,178,678**	**1,233,562**	**29**	**456,836**	**11**
Mountain Goat	Beartooth	956,057	194,644	20	63,799	7
	Total	**956,057**	**194,644**	**20**	**63,799**	**7**

Sources: BLM 1990; BLM 2013a; WGFD 2014.

BLM Bureau of Land Management

The Planning Area contains 2,484,330 acres of crucial winter range for big game, 1,324,371 acres of which is on BLM-administered lands (BLM 2013a) (Map 44). Winter is a crucial and stressful time for big game; therefore, crucial winter range is often the focus of management and a criterion for analyzing the impacts to big game from resource management. There are no feed grounds on BLM-administered lands in the Planning Area. The Planning Area contains all or part of 35 herd units (10 pronghorn, 11 mule deer, 3 white-tailed deer, 6 elk, 2 moose, 2 bighorn sheep, and 1 mountain goat). Appendix K shows the location of WGFD herd units. Specific information about population trends is available through the WGFD via the agency's Job Completion Reports (http://gf.state.wy.us/wildlife/index.asp).

Pronghorn

Pronghorn are a unique animal of the western plains and are the only living species in their taxonomic family (*Antilocapridae*). Wyoming is the center of the pronghorn's range. Pronghorn inhabit a wide variety of open rangeland habitat types throughout the Planning Area and forage primarily on shrubs, especially sage species.

Population projections for pronghorn generally have been below objectives for several years. This is partly due to adverse effects on the quality of the shrub component of their pronghorn habitat in many ranges. Habitat condition of many of the Wyoming big sagebrush communities associated with pronghorn winter ranges is declining due to poor productivity, plant recruitment, old age, and

cheatgrass invasion that has out-competed native herbaceous and sagebrush species. Declines in habitat quality also have affected the reproduction and survival rates for pronghorn. Lower reproduction and lower recruitment of young into populations has inhibited the ability of herd populations to recover from declining numbers.

Deer

Both mule deer and white-tailed deer occur in the Planning Area, although mule deer are by far the more abundant species. Mule deer generally prefer habitat types in the early to mid-stages of plant succession with numerous shrubs. They use the woody riparian, shrublands, juniper woodland, and aspen woodland habitat types extensively during spring, summer, and fall. These habitat types provide adequate forage areas with succulent vegetation for lactating females and adequate cover for security and fawning. During winter, mule deer move to lower elevations to avoid deep snow that covers their forage. They are often found in juniper and limber pine woodlands, big sagebrush/rabbitbrush, sagebrush steppe, and riparian habitat types. Mule deer success is linked to the amount and quality of habitat required to meet their needs to reproduce successfully and to survive. Habitats used by deer are changing (Gill 1999). Mule deer are generally declining in numbers due to a decline in habitat quality and quantity. Mule deer populations are generally below WGFD-objective numbers throughout the Planning Area (see link above to WGFD Job Completion Reports).

White-tailed deer use woody riparian habitats (willow and cottonwood) along major creeks and rivers for both forage and cover. They are found mainly on private lands in the Planning Area. White-tailed deer are expanding into new areas, but it is not clear if the population is actually increasing or whether it is spreading into expanded habitat types. White-tailed deer have been affected by periodic disease outbreaks that have caused short-term, localized population declines, but overall have shown population increases.

Elk

Elk are distributed throughout the Planning Area, especially adjacent to and in areas of higher elevation that have forest or woodland cover. In summer, elk use aspen and conifer woodlands for security and thermal cover, ranging out into upland meadows, sagebrush/mixed grass, and mountain shrub habitat types to forage. In winter, elk move to lower elevations, foraging especially in sagebrush/mixed grass, and mountain shrub habitat types, and in windswept areas where snow is less deep. Elk depend on these habitats in designated crucial winter ranges to maintain populations at objective levels. For calving, elk move into areas that provide particularly good hiding cover and succulent forage.

Elk numbers have been generally at or over objective for most herd units in the Bighorn Basin for the past two decades. Elk have possibly fared better because they are more generalist feeders than species like deer and pronghorn.

Moose

Moose are distributed in low densities throughout the Absaroka, Owl Creek, and Big Horn Mountains in the Planning Area, especially along the river and stream corridors adjacent to these mountains and in areas of higher elevation that have forest or woodland cover. In summer and fall, moose use willow, aspen, and mixed conifer forests for forage and security. Moose are primarily browsers and feed on woody species like willow, aspen, and some young conifer species. In winter, moose in the Big Horn Mountains seem to concentrate primarily in riparian corridors and mixed conifer habitats, while in the Absaroka Mountains they tend to move up in elevation to forage in mixed conifer and spruce/fir forest habitat types. Occasionally, severe winter snows push moose to lower elevations. Moose populations are generally below WGFD-objective numbers.

Bighorn Sheep

Bighorn sheep are present predominantly in the Absaroka Mountains, Owl Creek Mountains, and the Devil's Canyon and Shell Canyon areas of the Big Horn Mountains. Populations in the Pryor Mountains across the border in Montana occasionally move into the Planning Area.

Bighorn sheep prefer open grassy ridges, slopes, or benches close to escape cover in the form of rocky outcrops, precipitous cliffs, or steep rocky slopes. They most commonly prefer herbaceous forage and typically use alpine meadows and mountain shrub habitat types, primarily foraging on forbs and grasses and converting to browsing on shrubs when snow depths dictate.

Bighorn sheep also are known to be susceptible to *Pasteurella sp.* bacteria commonly carried within the nasal cavities of domestic sheep and domestic goats. *Pasteurella*, when transferred, usually through nose to nose contact, causes sickness and death, and has caused the decline of numerous bighorn sheep populations.

The Wyoming Statewide Bighorn/Domestic Sheep Interactions Working Group has designated areas of Wyoming as bighorn sheep native core areas, cooperative review areas, and non-emphasis areas. The western edge of the Bighorn Basin is generally considered a core area and the eastern edge is a non-emphasis area.

Bighorn sheep populations in the Planning Area have increased due to the establishment of native core areas in occupied bighorn sheep habitat and because of habitat augmentation and improvement through burning and livestock permit changes.

Mountain Goat

There are mountain goats on BLM-administered lands near Clarks Fork of the Yellowstone River canyon, predominantly in high, steep and rocky habitat. This habitat provides escape cover and shelter from the wind and storms coming off the Beartooth Plateau. It also is lower in elevation than predominantly spring and summer habitat that is higher on the Beartooth Plateau.

Mountain goat populations are stable in the Planning Area. There is one herd unit in the Planning Area, which has been hunted, and harvests are adjusted to maintain a stable, local population.

Management Challenges

Management challenges for big game species include poor habitat conditions, wildfires, drought, increased development and urbanization, habitat fragmentation, motorized vehicle misuse, disease, hunter access, and the impacts of improper livestock grazing management on the frequency, quality, and composition of key forage species. The WGFD monitors disease in big game species. The BLM and the WGFD continually coordinate and evaluate actions affecting herd units and habitat conditions to determine the appropriate management direction.

Big game species that depend on woody plant communities (e.g., pronghorn, mule deer, and moose) are generally declining in numbers due to a decline in habitat quality and quantity (see Section 3.4.1 *Vegetation – Forests, Woodlands, and Woodland Products*). Species that depend on herbaceous plants (e.g., elk and bighorn sheep) generally have stable or increasing populations.

Trophy Game

The WGFD classifies cougar, black bear, grizzly bear, and gray wolves as trophy animals. Cougars are typically found in remote areas with dense cover and rocky, rugged terrain. They are found in most

habitats where deer, their primary prey base, are present. Black bear are found throughout both the foothills and mountains of the Absaroka front and the Big Horn Mountains, with occasional occurrences along riparian corridors such as the Greybull, Bighorn, and Nowood rivers. They are typically associated with forested and riparian habitats in higher precipitation zones. Grizzly bear are found in the Absaroka and Beartooth mountain areas and have been observed along the western part of the Owl Creek Mountains. Section 3.4.9 *Special Status Species – Wildlife* addresses the grizzly bear and gray wolf.

In the Planning Area, there are management areas for cougar (throughout) and black bear (Absaroka, Owl Creek, and Big Horn Mountains). These represent areas where populations of these species are sufficient to support hunting and to warrant hunting management. Black bear populations are fairly stable and cougars appear to be expanding into a few new areas. However, due to the reclusive nature of black bears and cougars, it is difficult to estimate population. For additional information on trophy game, refer to the WGFD website, http://gf.state.wy.us/.

Furbearing Animals

Badger, beaver, bobcat, marten, mink, muskrat, and weasel are classified as furbearing animals and are found throughout the Bighorn Basin. Population figures for furbearing animals are available only on a statewide basis. Trapping seasons apply to most furbearers; badgers are taken year-round, while others are typically trapped in early winter (bobcat, muskrat, mink, and weasel). Trapping dates vary for beaver and marten.

Beaver, mink, and muskrat populations have likely declined across much of the Planning Area due to drought conditions. Water volumes have decreased in many riparian systems from a loss of water storage capability and from a lack of precipitation. The distribution of mink and muskrat populations has shrunk due to a loss of water in some riparian systems. Beaver depend on aspen, willow, and cottonwood trees to build and maintain their dams and lodges. Conifer trees have invaded many riparian areas adjacent to streams due to drying of these sites from a drop in the water table. Conifers take up available water and space, both surface and subsurface, choking out aspen, willow, and cottonwood communities.

Predatory Animals

According to Wyoming statute, predatory animals include jackrabbit, porcupine, coyote, gray wolf, red fox, raccoon, and skunk. Section 3.4.9 *Special Status Species – Wildlife* addresses the gray wolf. All of these species can be found in the Planning Area. From the standpoint of BLM management, most management efforts and attention focus on coyote, red fox, and skunk damage-control activities. The BLM does not conduct any habitat management activities for predatory animals.

USDA APHIS-Wildlife Services performs predatory animal damage-control activities on public lands, and performs these activities in response to requests from individuals, organizations, and agencies experiencing damage caused by wildlife. Animal damage-control activities primarily include mechanical (trapping, shooting, and denning), chemical (poison), and nonlethal methods (e.g., noise devices and aversive conditioning). Through the Animal Damage Management Board, the state of Wyoming also performs animal damage-control activities, particularly actions involving rabies and other diseases.

Management challenges for animal damage-control activities are to implement a program that responds to predation problems and remains socially acceptable and safe in accordance with applicable laws and regulations. Predator populations typically follow prey populations, particularly when the relationship is prey specific.

Small Game

Small game includes cottontail rabbits, snowshoe hare and fox, and gray and red squirrels. Cottontails, snowshoe hares, and squirrels are found throughout the Planning Area and are hunted from early to mid-winter. Snowshoe hare are found in transition areas adjacent to conifer forest and are indicator species for Canada lynx habitat. Cottontail and white-tailed jackrabbits occur in many habitat types and are broadly distributed in the Bighorn Basin. Red squirrels are found in conifer and mixed forest habitats, generally at higher elevations. There are no available estimates of population size, mortality, and natality rates for these species.

Rabbit and squirrel populations are cyclic, so trends are difficult to determine, however, populations appear to be generally stable. Information regarding hunter days and harvest are available from the WGFD. Snowshoe hare are present in wetter forests, which occur in limited BLM-administered areas. This prey species is important for Canada lynx reproduction and survival.

Game Birds

Game bird management direction for the BLM is identified in the BLM *Fish and Wildlife 2000: Upland Game Bird Habitat Management* (BLM 1992a). All game bird species in Wyoming are managed for recreational use such as hunting and bird watching.

Upland game birds in the Planning Area include pheasant, chukar, gray partridge, blue grouse, ruffed grouse, greater sage-grouse, and turkeys. Section 3.4.9 *Special Status Species – Wildlife* discusses the greater sage-grouse. The forest-woodland edges adjacent to Bighorn and Shoshone National Forests support appreciable stands of preferred habitat that supports populations of blue and ruffed grouse. Chukar and gray partridges are found in hilly and rolling terrain along mountain foothills and to some extent in badland topography in lower elevations of the Bighorn Basin; the best chukar partridge habitat is along the west slope of the Big Horn Mountains in the canyons and foothills. Gray partridge are found in similar foothills and badlands habitat types in the Bighorn Basin. Pheasants are found primarily in habitat associated with riparian areas or corridors, and near or along agricultural fields.

Waterfowl

Ducks and geese occur in aquatic areas throughout the Bighorn Basin. A small number of species breed, winter, or remain yearlong in the state, while larger numbers pass through during spring or fall migration. The entire Bighorn Basin is within the Central Flyway (east of the continental divide). The various sources of water, natural lakes, streams, and manmade reservoirs are important resting areas for a variety of ducks, geese and shorebirds. Waterfowl species include ducks, geese, coots, snipe, and rails. Scattered aquatic resources found throughout the Bighorn Basin support various waterfowl species during nesting periods, and private agricultural lands provide important foraging habitat where grains and hay are grown. Most of these species depend on wetlands or open water that is sufficiently shallow to support rooted vegetation, and they feed on the biotic communities in such habitats.

One important waterfowl habitat is the Bighorn River, primarily because the southern reaches of this river remain open during winter. Many small ponds and reservoirs that have stable water levels have wetlands along their shores. In addition, pools in the numerous streams and their tributaries throughout the Planning Area provide important habitat. Only some of these aquatic resources are on BLM-administered public lands.

As a result of livestock grazing management practices, some riparian zones on public land adjacent to streams, small reservoirs, and ponds have been degraded. This results in the removal of nesting cover

for waterfowl and shorebird species that could nest in these riparian zones. There are several large wetland areas in the Bighorn Basin with large amounts of BLM-administered public land that are protected from or have controlled livestock grazing. These include the Yellowtail Wildlife Habitat Management Area (WHMA), Bighorn River tracts, Wardell and Harrington Reservoirs, Loch Katrine, Renner Habitat Management Area, and several smaller fenced reservoirs that provide good nesting habitat for waterfowl and shorebirds.

Nongame Species

Nongame species include raptors, migratory birds, mammals, and reptiles and amphibians. Such species are numerous and diverse, especially given the diversity of habitats present in the Planning Area. This section addresses only a few of these species or groups. Many nongame species are on the BLM Wyoming State Director's Sensitive Species List; Section 3.4.9 *Special Status Species – Wildlife* addresses those species. The hundreds of additional bird species that inhabit the Bighorn Basin for all or part of their life-cycles are important components of the ecosystem and an important focus of the large segment of recreationists who enjoy bird-watching.

Raptors

Raptor species (eagles, hawks, owls, falcons, and vultures) in the Bighorn Basin include osprey, red-tailed hawk, Swainson's hawk, ferruginous hawk, northern harrier, goshawk, Cooper's hawk, sharp-shinned hawk, rough-legged hawk, golden eagle, bald eagle, merlin, kestrel, peregrine falcon, American kestrel, prairie falcon, great-horned owl, long-eared owl, short-eared owl, great gray owl, and burrowing owl. Some raptors are sensitive to disturbance and occupy an ecological position at the top of the food chain; thus, they can act as biological indicators of environmental quality. Section 3.4.9 *Special Status Species – Wildlife* further discusses several of these species. Raptors are present in habitats throughout the Planning Area.

Most species have specific nest-site requirements, which are key factors in nest-site selection and in reproductive success. These generally include nesting strata, available prey base, and nest-site disturbance. Nests can occur in a myriad of habitats, including on steep cliffs and rock ledges, in trees, and on the ground. Raptors also use manmade structures such as barns, utility poles, and tanks for nesting. The nesting-reproductive season is considered the most critical period in the raptor life-cycle because it determines population productivity.

Many raptors concentrate their nests along a cliff and use this stratum for nesting year after year. These high-use/high-density raptor nesting sites are called raptor concentration areas. Golden eagles and prairie falcons usually build their nests on steep cliffs and rock ledges, and often, red-tailed hawks, great-horned owls, and American kestrels build on these sites.

Numerous raptors in the Planning Area typically nest in trees. Cooper's hawks and sharp-shinned hawks usually nest in lodge pole, mixed conifer forests, or aspen woodlands. Swainson's hawks prefer the more open plains area and usually nest in trees along drainage courses. Most nests in the Bighorn Basin, including most documented red-tailed hawk nests, are in cottonwood trees. Large cottonwood trees along major river corridors also are important nest sites for bald eagles. Northern harriers are ground nesters, but are generally associated with riparian/wetland sites and nest in marsh habitats.

At present, there is no population data for raptor populations; however, the golden eagle population and osprey sightings and nests appear to be increasing throughout the Planning Area.

Raptor habitat protection has been directed toward long-term nest-site protection and minimizing habitat disturbance around nesting sites during the critical nesting period. Raptor nesting stipulations have been applied to surface-disturbing activities such as ROWs and oil and gas leasing. Current stipulations consist of buffer zones around nests, season restrictions on human activities, and "raptor proofing" electrical transmission facilities to prevent electrocution of raptors.

Sensitivity to disturbance varies among individual pairs and species. Nesting pairs that choose to nest near an existing disturbance are probably less apt to abandon the nest than a pair disturbed by new activity.

Migratory Birds

This category includes shorebirds, water birds, and songbirds. A myriad of these species are found throughout the Bighorn Basin. Every plant community type in the Planning Area supports migratory bird species. Riparian/wetland communities typically have the most diverse array of species.

There are no population estimates for most avian species; however, the USFWS has been organizing and conducting breeding bird surveys that provide some data on species occurrence and trend. In addition, the BLM has some observation and occurrence data for some species. In general, habitat-specific information related to migratory birds is incomplete or unknown and population status is undetermined. Degradation, fragmentation, and loss of native sagebrush landscapes have caused relatively large migratory bird declines in the important sagebrush habitat type across the West (Knick et al. 2003).

Sagebrush obligate species populations have been declining, as indicated by the presence of these species on the BLM Sensitive Species List (BLM 2010b) and WGFD Species of Greatest Conservation Need List (WGFD 2005a). Juniper obligate species have stable to upward trends due to the increase in juniper communities.

Mammals

Nongame mammals include species such as mice, rats, voles, ground squirrels, shrews, bats, and prairie dogs. These species are found in habitats throughout the Bighorn Basin. White-tailed prairie dog surveys from 2001 to 2005 in the northern portion of the Bighorn Basin found a 37 percent decrease in the number of towns (105 to 66) and a 71 percent decrease in occupied area (164 acres to 74 acres) from 1980 to 1989 surveys. The black-tailed prairie dog population increased slightly over the same time period but may be vulnerable due to its small size and isolation from the rest of the species' range (Harrell and Marks 2009). There have been bat surveys in suitable caves, mines, and shafts in the Planning Area. There are several known maternity roosts and hibernacula identified in the Planning Area, primarily natural caves that are common in limestone karst areas along the Big Horn Mountains. There is one complex of black-tailed prairie dogs in the Planning Area, and this group of animals is isolated from other populations outside the area. Black-tailed prairie dogs and special status bat species are discussed further in Section 3.4.9 *Special Status Species – Wildlife*.

Reptiles and Amphibians

There is little documentation regarding native reptiles and amphibians in the Bighorn Basin. No estimates of population size are available for any of these species. Some of the reptile species encountered in the Bighorn Basin include greater short-horned lizard, northern sagebrush lizard, eastern yellow-bellied racer, bullsnake, rubber boa, intermountain wandering gartersnake, and prairie

rattlesnake. Amphibian species include tiger salamander, plains spadefoot toad, great basin spadefoot toad, boreal toad, northern leopard frog, spotted frog, and boreal chorus frog. Several species are on the Wyoming BLM Sensitive Species List due to an historical reduction in suitable riparian/wetland habitat and various other factors related to the ongoing general global decline in amphibians (refer to Section 3.4.9 *Special Status Species – Wildlife*).

It is estimated that the trend for reptiles is downward, but this is difficult to confirm because there are no population estimates for these species in the Planning Area. Due to the number of species that are on the Wyoming BLM Sensitive Species List and on the WGFD Species of Greatest Conservation Need List, and the declining condition of suitable habitat on public lands, the BLM assumes that amphibians are generally on a downward trend.

Special Status Species

Several policies and agreements guide management of special status species and their habitat in the Planning Area. In March 1990, the WGFD and the BLM signed an MOU (WGFD and BLM 1990), the purpose of which is to strengthen the agencies' cooperative approach to managing wildlife and wildlife habitat on public land and to encourage the agencies to work together to develop, enhance, maintain, and manage wildlife resources, including planning and sharing data concerning biological resources.

The BLM Wyoming Sensitive Species Policy and List is prepared to focus species management efforts on maintaining habitats for these species (BLM 2010b). The goals of this policy include:

- Maintaining vulnerable species and habitat components in functional BLM ecosystems.
- Ensuring sensitive species are considered in land-management decisions.
- Preventing a need for species listing under the ESA.
- Prioritizing needed conservation work with an emphasis on habitat.

Special status wildlife species are governed under BLM Manual 6840 states that BLM sensitive species will be managed consistent with species and habitat management objectives in land use and implementation plans to promote their conservation and to minimize the likelihood and need for listing under the ESA (BLM 2008e). In addition, management actions for federally listed species are often derived through the consultation process (i.e., Section 7 of the ESA).

The USFWS provides regulatory oversight for all species that are listed, proposed for listing, or are candidates for listing under the ESA. The USFWS also administers designation of critical habitat for listed species and the Migratory Bird Treaty Act, which protects migratory bird species whether they are hunted (e.g., waterfowl) or not (e.g., songbirds). The USFWS oversees management of federally listed species and the designation of critical habitats in accordance with the ESA. Formal consultation is required on any action a federal agency proposes that (1) may adversely affect a federally listed species or (2) will result in jeopardy or adverse modification of critical habitats. Informal consultation is required on any action a federal agency proposes that (1) may affect – not likely to adversely affect or (2) may affect – may have beneficial effects. Special status species discussed in this section include those species listed as threatened or endangered, those that are proposed for listing, those that are candidates for listing, and those the BLM State Director has designated as sensitive.

The BLM is responsible for managing habitat; state and federal wildlife management agencies oversee the management of special status wildlife and fish species. The WGFD manages resident special status fisheries and wildlife populations and waterfowl in the Planning Area.

3.4.7 Special Status Species – Plants

In the Bighorn Basin, the BLM determines the presence of special status plant species through inventory within likely habitats during site-specific project-level analysis. Restrictions in areas with known populations of special status plants are also determined during site-specific project-level analysis. The Wyoming Natural Diversity Database maintains a list of Wyoming plant species of special concern and provides information on global and state abundance, legal status, and state distribution. Species in Wyoming are considered to be of special concern if (1) the species is vulnerable to extinction at the global or state level due to inherent rarity, (2) the species has experienced a substantial loss of habitat, or (3) the species is sensitive to human-caused mortality or habitat disturbances.

The BLM is responsible for managing habitat and populations of special status plant species. Special status species considered in this analysis are those listed as threatened or endangered under the ESA, those proposed for listing or that are candidates for listing under the provisions of the ESA, and those the BLM State Director or the state of Wyoming have designated as sensitive.

One threatened species, Ute ladies'-tresses, could occur in the Planning Area; 11 BLM sensitive species are known to occur. Of the 11 BLM sensitive species, eight are also Wyoming plant species of concern and one is a Wyoming plant species of potential concern. In addition, the following plants are Wyoming species of concern that are not threatened or endangered and do not appear on the BLM Sensitive Species List: Big Horn fleabane, Cary's beardtongue, hairy prince's plume, and Hapemans' coolwart. These species are listed in the Natural Diversity Database, which the University of Wyoming maintains, and are not further discussed in this section.

Special status plant species are found in a variety of habitats in the Planning Area. The landscape in the area exhibits diverse climates, topography, and soils. Table 3-33 lists habitat associations for special status plants that are known to occur or may be found on BLM-administered land in the Planning Area.

Table 3-33. Special Status Plant Species Habitat in the Planning Area

Common Name	Habitat	Status
Ute ladies'-tresses	Mesic to wet riparian meadows, marshes, stream banks between 4,300 and 5,900 feet amsl.	Threatened
Absaroka beardtongue	Sparsely vegetated openings on steep slopes of loose volcanic rubble or outcrops of dry andesitic volcanic rock at 5,920 to 10,000 feet amsl.	Wyoming Plant Species of Concern BLM Sensitive Plant Species
Dubois milkvetch	Barren shale, badlands, limestone, and redbed slopes and ridges at 6,900 to 8,800 feet amsl.	Wyoming Plant Species of Concern BLM Sensitive Plant Species
Evert's wafer-parsnip	Coarse volcanic soils or sandstone outcrops dominated by cushion plants or sparse shrublands in openings within Rocky Mountain juniper or limber pine woodlands at 5,900 to 10,900 feet amsl.	Wyoming Plant Species of Concern BLM Sensitive Plant Species
Hyattville milkvetch	Sparsely vegetated stony ridges and barren red clay slopes 4,900 to 5,900 feet amsl.	Wyoming Plant Species of Concern BLM Sensitive Plant Species
Limber pine	Timberline and at lower elevation with sagebrush.	BLM Sensitive Plant Species
Persistent sepal yellowcress	Riverbanks and shorelines, usually on sandy soils near high water line.	Wyoming Plant Species of Potential Concern BLM Sensitive Plant Species
Rocky Mountain twinpod	Sparsely vegetated rocky slopes of limestone, sandstone or clay 5,600 to 8,300 feet amsl.	Wyoming Plant Species of Potential Concern BLM Sensitive Plant Species
Shoshonea	Shallow, stony calcareous soils of exposed limestone outcrops, ridgetops, and talus slopes 5,900 to 9,200 feet amsl.	Wyoming Plant Species of Concern BLM Sensitive Plant Species
Whitebark pine	Montane forests and on thin, rocky, cold soils at or near timberline at 4,265 to 12,139 feet amsl.	Candidate for Listing BLM Sensitive Plant Species
William's wafer-parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides 6,000 to 8,300 feet amsl.	Wyoming Plant Species of Concern BLM Sensitive Plant Species
Wyoming tansymustard	Sparsely vegetated sandy slopes at base of cliffs of volcanic breccias or sandstone 8,300 to 10,000 feet amsl.	Wyoming Plant Species of Concern BLM Sensitive Plant Species

Sources: USFWS 2013b; BLM 2010b; BLM 1998b; BLM 1999.

amsl above mean sea level
BLM Bureau of Land Management

Most of the trends and activities that affect other plant species in the Planning Area also affect special status species. These include habitat degradation and fragmentation, grazing practices and management, invasive species, motor vehicles, and climate. These plants are on the BLM Sensitive Species List to ensure actions on BLM-administered lands consider the welfare of these species and minimize the likelihood and need for listing of any other special status species under the provisions of the ESA. The following paragraphs briefly describe each of the 12 special status plant species. Unless otherwise noted, specific information on trends and occurrences for each of the species is not available.

Ute Ladies'-tresses

Ute ladies'-tresses is a federally threatened plant species. This species occurs in mesic to wet riparian meadows, marshes, and stream banks between 4,300 and 5,900 feet amsl. Typical settings for Ute ladies'-tresses can include gravel bars, wet meadow terraces, oxbows, seeps, springs, fens, lakes, and potentially ditches and quarries (Heidel 2007).

Absaroka Beardtongue

The Absaroka beardtongue is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs in sparsely vegetated openings on steep slopes of loose volcanic rubble or outcrops of dry andesitic volcanic rock at 5,920 to 10,000 feet amsl. Typical settings for Absaroka beardtongue include very barren, steep slopes with little competition from other vegetation (Mills and Fertig 2000a). Absaroka beardtongue is known to occur in the Absaroka Range of northwest Wyoming (Mills and Fertig 2000a).

Dubois Milkvetch

Dubois milkvetch is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs in barren shale, badlands, limestone, and redbed slopes and ridges at 6,900 to 8,800 feet amsl. Typical settings for Dubois milkvetch include mid to upper slopes near the crest of badland ridges or low knolls (Fertig 2000a).

Evert's Wafer-parsnip

Evert's wafer-parsnip is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs in coarse volcanic soils or sandstone outcrops dominated by cushion plants or shaded rock outcrops and ridges adjacent to Rocky Mountain juniper or limber pine woodlands at 5,900 to 10,900 feet amsl (Fertig 2000b).

Hyattville Milkvetch

Hyattville milkvetch is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs in sparsely vegetated stony ridges and barren red clay slopes at 4,900 to 5,900 feet amsl. Hyattville milkvetch is mostly found on outcrops of the Goose Egg and Chugwater formations with some beds of Ten Sleep Sandstone; plants are usually absent from gypsum-rich deposits (Fertig 2001). Hyattville milkvetch is found on the eastern rim of the Bighorn Basin and western foothills of the Big Horn Range near Hyattville, Wyoming (Fertig 2001).

Limber Pine

Limber pine is a BLM sensitive plant species. This species occurs in high montane forests, often at timberline (Flora of North America 1993a). It occurs at elevations of 4,900 to 11,000 feet amsl (Flora of North America 1993a). Species associated with limber pine include Rocky Mountain lodgepole pine, Engelmann spruce, whitebark pine, Rocky Mountain Douglas-fir, subalpine fir, Rocky Mountain juniper, mountain mahogany, and common juniper.

Persistent Sepal Yellowcress

Persistent sepal yellowcress is a BLM sensitive plant species and a Wyoming plant species of potential concern. This species occurs on moist, sandy to muddy riverbanks and shorelines, usually near the high water line (Handley and Heidel 2008).

Rocky Mountain Twinpod

Rocky Mountain twinpod is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs on sparsely vegetated rocky slopes of limestone, sandstone or clay at 5,600 to 8,300 feet amsl. Rocky Mountain twinpod is endemic to the Bighorn Basin and Absaroka Range (Mills and Fertig 2000b).

Shoshonea

Shoshonea is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs in shallow, stony calcareous soils of exposed limestone outcrops, ridgetops, and talus slopes at 5,900 to 9,200 feet amsl. Shoshonea is associated with other low-growing forbs and cushion plants on sites with sparse cover (Fertig and Mills 2000). Shoshonea is known to occur in the eastern Absaroka and Owl Creek Mountains (Fertig and Mills 2000).

Whitebark Pine

Whitebark pine is a candidate species for listing of protection under the ESA and a BLM sensitive plant species. This species occurs on thin, rocky, cold soils at or near timberline in montane forests (Flora of North America 1993b).

William's Wafer-parsnip

William's wafer-parsnip is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs on open ridgetops and upper slopes with exposed limestone outcrops or rockslides at 6,000 to 8,300 feet amsl. Soils tend to be thin and sandy, and often restricted to small cracks in the limestone bedrock (Fertig 2000c). William's wafer-parsnip is restricted to the Big Horn Mountains (Fertig 2000c).

Wyoming Tansymustard

Wyoming tansymustard is a BLM sensitive plant species and a Wyoming plant species of concern. This species occurs in sandy soil at the base of cliffs composed of volcanic breccias or sandstone (Fertig 2000d) at elevations of 8,300 to 10,000 feet amsl.

Management Challenges

Management challenges for special status plant species in the Planning Area include preventing declining population trends for select species; occurrence of drought; spread; not maintaining PFC for riparian/wetland habitats; vegetation treatment with prescribed fire or herbicides; lack of periodic disturbance events (e.g., fire, flood, and grazing); physical trampling (e.g., from OHV use); loss of habitat resulting from altered hydrology; and challenges presented by special status plant populations occurring over multiple land ownerships. While threats to some species might remain low due to remote habitat, threats to other species might increase despite distance or restricted access. For example, special status plant species that depend on groundwater levels could be affected by upstream depletions of groundwater far removed from affected plant populations. In addition, early successional special status

plant species protected from habitat alteration could still be adversely affected by natural succession and the lack of fire, flooding, or other disturbance factors necessary to retain early successional habitat.

3.4.8 Special Status Species – Fish

Fisheries habitats in the Planning Area include perennial and intermittent streams that support fish through at least a portion of the year. See Section 3.1.4 *Water* for a description of surface-waterbodies in the Planning Area.

Special status fish species are listed as endangered or threatened, or are proposed or candidate species for listing under the ESA. Special status fish species also include those designated as BLM sensitive species or state of Wyoming species of concern. No federally listed fish species are known to occur in the Bighorn Basin; however, the Bighorn River and the Clarks Fork of the Yellowstone River both drain into the Yellowstone River, which supports listed species downstream. See Section 3.4.5 *Fish and Wildlife Resources – Fish* for more information on fishery resources in the Planning Area.

The Yellowstone cutthroat trout is the only BLM sensitive fish species and only native trout found in the Planning Area. There is Yellowstone cutthroat trout habitat in the Wind/Bighorn and Yellowstone drainage. This species is found in many headwater streams of the Bighorn, Greybull, Shoshone, and Clarks Fork of the Yellowstone river drainages.

Three other game species of concern are known to occur in the Planning Area – the burbot, sauger, and shovelnose sturgeon. Burbot and sauger are found in Boysen Reservoir and downstream in Bighorn River to Yellowtail Reservoir. In the 1990s, the shovelnose sturgeon was reintroduced to the Bighorn and Greybull rivers, part of its historic range (WGFD 2005b).

Management Challenges

Threats to special status fish species are similar to those for other fish species and can include water depletion, barriers to migration, drought, and degraded habitat conditions. See Section 3.4.5 *Fish and Wildlife Resources – Fish* for more information regarding management challenges and objectives.

Water depletions upstream can change the velocity, volume, and timing of downstream river water flows. Historically, water development projects (i.e., dams, reservoirs, water and sediment control basins, irrigation diversions, sand and gravel mining, and wetland creation) have altered historic surface water hydrographs (i.e., water flow timing, volume, and velocity) in the Missouri River ecosystem through consumption, evaporation, or by altering the timing of water flows.

3.4.9 Special Status Species – Wildlife

Special status species are those listed as threatened, endangered, proposed, or candidates for listing under the provisions of the ESA and those the BLM State Director designates as sensitive. Special status wildlife species in the Planning Area inhabit a variety of habitat types, including sagebrush shrublands, grasslands, and riparian/wetland habitats. Comprehensive data on population numbers and distribution within the Planning Area are not available for most special status species.

One endangered wildlife species (black-footed ferret), two threatened wildlife species (grizzly bear and Canada lynx), one proposed species (North American wolverine), one candidate species (greater sage-grouse), and one experimental nonessential species (gray wolf) have been or are known to occur in the Planning Area. Twenty-six BLM sensitive species are known to occur or have potential habitat in the

Planning Area. Table 3-34 and the discussion of special status wildlife species in this section are organized by the applicable Wyoming statutory categories (see Section 3.4.6 *Fish and Wildlife Resources – Wildlife*). Table 3-34 identifies all special status wildlife species that (1) occur in, (2) have potential habitat in, or (3) could be influenced by activities in the Planning Area. Table 3-34 also summarizes status and general habitat for each special status wildlife species. The BLM uses HMPs to focus habitat management for special status and other species in the Planning Area. There is no critical habitat in the Planning Area.

Most of the trends that affect other species of wildlife in the Planning Area also affect special status species. These include habitat degradation and fragmentation; livestock, wildlife, and ungulate grazing and browsing; invasive species; motor vehicles; and climate.

Table 3-34. Special Status Wildlife Species Habitat in the Planning Area

Common Name	Habitat	Status
Trophy Game		
Grizzly bear	Woodlands, forests and alpine.	Threatened
Game Birds		
Greater sage-grouse	Sagebrush habitats.	Candidate for listing
Nongame Raptors		
Bald eagle	Large bodies of open water such as lakes, marshes, and rivers where there is an abundance of fish and tall trees to roost.	BLM sensitive species
Burrowing owl	Open, dry grasslands, agricultural lands, rangelands, and desert habitats often associated with burrowing animals.	BLM sensitive species
Ferruginous hawk	Arid and semiarid grassland regions with open, level, or rolling prairies. Foothills or middle elevation plateaus largely devoid of trees, and cultivated shelterbelts or riparian corridors.	BLM sensitive species
Northern goshawk	Forested areas and open areas near forested areas.	BLM sensitive species
Peregrine falcon	Found in a variety of habitats, most with cliffs for nesting and open areas for foraging.	BLM sensitive species
Nongame Migratory Birds		
Baird's sparrow	Native mixed-grass and fescue prairie.	BLM sensitive species
Brewer's sparrow	Northern Rocky Mountains including sagebrush and alpine meadows.	BLM sensitive species
Loggerhead shrike	Grasslands interspersed with scattered trees and shrubs that provide nesting and perching sites.	BLM sensitive species
Long-billed curlew	Plains, grasslands, and prairies.	BLM sensitive species
Mountain plover	Short-grass prairie dominated by the blue grama (*Bouteloua gracilis*). Also can be found in taller grasses that have been grazed or associated with prairie dog colonies.	BLM sensitive species
Sage sparrow	Sagebrush flats, alkaline flats with saltbush, and semi-desert shrublands in the lowlands.	BLM sensitive species

Table 3-34. Special Status Wildlife Species Habitat in the Planning Area (Continued)

Common Name	Habitat	Status
Sage thrasher	Open, shrub-steppe country dominated by sagebrush or bitterbrush, with native grasses intermixed, generally avoiding cheatgrass-dominated landscapes.	BLM sensitive species
Trumpeter swan	Ice-free water in estuaries and sheltered coastlines. Rocky Mountain flock concentrate in the Greater Yellowstone Ecosystem, where geothermal activity prevents freezing.	BLM sensitive species
White-faced ibis	Shallow lake waters, muddy ground of wet meadows, marshes, ponds, lakes, rivers, flooded fields, and estuaries.	BLM sensitive species
Yellow-billed cuckoo	Woodlands with clearings and dense scrubby vegetation, often along water.	BLM sensitive species
Nongame Mammals		
Black-footed ferret	Shortgrass and midgrass prairies in close association with prairie dog colonies.	Endangered
Canada lynx	Coniferous forests at higher elevation, with substantial winter snow accumulations.	Threatened
Gray wolf	The gray wolf has thrived in many different environments, but primarily forested areas.	BLM sensitive species
North American wolverine	Rocky Mountain subalpine and alpine habitats.	Proposed for listing
Long-eared myotis	Coniferous forests in mountain areas. Roosts in small colonies in caves, buildings, and under tree bark.	BLM sensitive species
Spotted bat	Prominent rock features in extreme, low desert habitats to high elevation forests.	BLM sensitive species
Townsend's big-eared bat	Mines, caves, and structures in woodlands and forests to elevations above 9,500 feet amsl.	BLM sensitive species
White-tailed prairie dog	Altitudes ranging between 4,000 to 8,000 feet amsl in desert grasslands and shrub grasslands.	BLM sensitive species
Black-tailed prairie dog	Inhabits dry, flat, open, shortgrass and mixed-grass grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle.	BLM sensitive species
Nongame Amphibians		
Boreal toad	Marshes, springs, creeks, small lakes, meadows, woodlands, forests, and desert riparian areas.	BLM sensitive species
Columbia spotted frog	Marshes, springs, creeks, small lakes, and meadows.	BLM sensitive species
Great basin spadefoot toad	Arid or semiarid regions usually with open habitats such as desert brush and grasslands.	BLM sensitive species
Northern leopard frog	Permanent ponds, swamps, marshes, and slow-moving streams throughout forest, open, and urban areas. Waterbodies with abundant aquatic vegetation.	BLM sensitive species

Source: BLM 2010b

amsl above mean sea level
BLM Bureau of Land Management

Trophy Game

The grizzly bear, a BLM threatened species, is the only trophy game special status species in the Planning Area. Grizzly bears are found in the Absaroka and Beartooth mountain areas and have been observed along the western part of the Owl Creek Mountains. Along the Absaroka Front there has been an expansion of grizzly bear range, primarily in the spring and fall, due to increased federal protection, and in some cases forage shortages (pine nuts, moths, Yellowstone cutthroat trout, and berries) during drought years. There has also been an expansion of grizzly bear range due to a steadily growing and expanding Greater Yellowstone bear population during the past 20 years. Grizzly bears have ranged to new areas (including BLM-administered lands) outside of the core population centered in Yellowstone National Park, because protected status has allowed population growth and expansion.

Furbearing Animals

There are no known furbearing special status species in the Planning Area.

Predatory Animals

The gray wolf is a Wyoming BLM sensitive species currently listed as a predatory animal for most of the Planning Area with the exception of that portion of the Cody FO west of Highway 120, where it is classified as trophy game. The USFWS lists the gray wolf as experimental, nonessential. Wolves were reintroduced to the Greater Yellowstone region in winter 1994/1995. Reintroduction has been successful in establishing a wide-ranging population with many packs in northwestern Wyoming. Recovery numbers indicate a recovered population that will be managed by state wildlife agencies as long as the USFWS and the courts accept the Wyoming Wolf Management Plan. Gray wolves were classified as both predators and trophy game animals after the August 2012 delisting from the ESA. The WGFD manages wolves as a trophy game animal along the western side of the Bighorn Basin and as a predator that will be allowed only temporary or limited occupation in conflict-identified areas of the central and eastern Bighorn Basin.

If gray wolves went unmanaged, there would be an upward population trend for years until unoccupied habitat was occupied. This species was managed as an experimental, nonessential endangered species in the Planning Area; however, this designation was removed from this reintroduced population. As of 2012, population and distribution recovery goals for the gray wolf have been exceeded for 10 consecutive years.

Small Game

There are no known small game special status species in the Planning Area.

Game Birds (Greater Sage-Grouse)

Greater sage-grouse populations have declined across North America and the species is a candidate for listing under provisions of the ESA (USFWS 2010). In March 2010, the USFWS published its listing decision for the species as "Warranted but Precluded" and cited inadequacy of regulatory mechanisms as a major threat to the protection of greater sage-grouse populations (USFWS 2010; Manier et al. 2013; BLM 2013a). The USFWS identified conservation measures in RMPs as the BLM's principal mechanism for protecting greater sage-grouse. BLM's Wyoming field offices must incorporate objectives and

conservation measures into RMPs in an effort to avoid the potential listing of greater sage-grouse as a threatened or endangered species under the ESA (BLM 2013a).

In 2012, the Director of the USFWS asked the Conservation Objectives Team (COT), consisting of state and USFWS representatives, to produce recommendations regarding the degree to which the threats need to be reduced or ameliorated to conserve greater sage-grouse so that it would no longer be in danger of extinction or likely to become in danger of extinction in the foreseeable future. The COT Report (USFWS 2013a) provides objectives based upon the best scientific and commercial data available at the time of its release. The highest level objective identified in the COT Report is identified as to meet the objectives of the 2006 Western Association of Fish and Wildlife Agencies' (WAFWA) Greater Sage-grouse Comprehensive Strategy (Stiver et al. 2006) of "reversing negative population trends and achieving a neutral or positive population trend." The COT Report provides a Management Zone and Population Risk Assessment and identifies localized threats from sagebrush elimination, fire, conifer encroachment, weed and annual grass invasion, mining, free-roaming equids, and urbanization and widespread threats from energy development, infrastructure, grazing, and recreation.

The North American range of the greater sage-grouse has been divided into seven management zones based on populations within floristic provinces (Stiver et al. 2006). Each floristic province is comprised of areas with similar environmental factors influencing desired plant communities (Knick and Connelly 2011). The Planning Area falls within portions of two greater sage-grouse management zones: the Great Plains Management Zone (MZ I) and the Wyoming Basin Management Zone (MZ II). The majority of the Planning Area lies within MZ II, and the majority of the sage-grouse habitat managed by the BLM in the Planning Area also lies within MZ II. MZ II contains the largest population in the species' range, covers approximately two-thirds of the State of Wyoming, and is separated from adjacent populations by distance and topography (USFWS 2013a). Sage-grouse habitats are expansive and relatively intact outside of areas of energy development. Despite the long-term declines in populations, implementation of the Wyoming Governor's Executive Orders (EOs) for sage-grouse may help alleviate these declines. The primary threats to this portion of the population are energy development and transfer, including both renewable and nonrenewable resources, long-term drought, and brush eradication programs (USFWS 2013a).

The Wyoming basins are one of the remaining strongholds of the sagebrush ecosystem and like most sagebrush habitats, threats to the region are numerous (USFWS 2013a; Hanser et al. 2011). Greater sage-grouse in the Bighorn Basin are recognized as a distinct sub-population (Connelly et al. 2004), but suitable habitat in the Copper Mountain, Owl Creek Mountains, and southern Big Horn Mountains that provide travel corridors enable interchange with other greater sage-grouse populations (Easterly 2012).

Fire is one of the primary factors linked to loss of sagebrush-steppe habitat (USFWS 2013a). Wildfire frequency in some sagebrush ecosystems has also increased due to the incursion of nonnative grasses, resulting in a cycle of more frequent fires that precludes the re-establishment of sagebrush (USFWS 2013a; BLM 2013a). Greater sage-grouse habitat is also threatened by the encroachment of native conifers, notably limber pine (*Pinus flexilis*) and juniper (*Juniperus spp.*), into some sagebrush ecosystems mainly due to changes in fire return intervals and the historic overstocking of domestic livestock (USFWS 2013a). In addition, nonrenewable development activities can significantly reduce, and in some cases locally extirpate, sage-grouse populations, even with the implementation of mitigation measures (USFWS 2013a).

Oil and gas developments and the widespread conversion of nearly 60 percent of greater sage-grouse habitat to agriculture have been the primary sources of decline of greater sage-grouse populations within MZ I (Samson et al. 2004; BLM 2013a). Trends in land cover and land use predominately associated with nonrenewable and renewable energy extraction, along with livestock grazing, prolonged

drought, and programs for brush eradication, have been the primary contributors to population declines in MZ II (Manier et al. 2013; USFWS 2013a; BLM 2013a). Residential development has also been identified as a threat (USFWS 2013a).

Although there is currently little scientific data investigating the effects of livestock grazing practices on greater sage-grouse population levels (Connelly et al. 2004), existing research suggests that grazing may be compatible with, or even beneficial to, greater sage-grouse habitat under certain circumstances. Specifically, light to moderate livestock grazing outside of greater sage-grouse breeding and nesting season has been shown to be generally compatible with the use of these habitats by greater sage-grouse (Crawford et al. 2004), and may result in beneficial impacts through the creation of openings in large sagebrush stands that increase the availability of forbs (Call and Maser 1985; Beck and Mitchell 2000) and by reducing fuel accumulation and fire severity in sagebrush habitat (Peters and Bunting 1994; Davies et al. 2010). In contrast, poor grazing management practices, such as subjecting areas to heavy grazing without rest or rotation, especially during the spring, has been shown to cause degradation of sagebrush ecosystems (DOI and BLM 2002). For more information on the potential impacts of livestock management on greater sage-grouse, see the Literature Synthesis of Livestock Grazing Management Literature Addressing Grazing Management for Greater Sage-Grouse Habitat in the Wyoming Basin – Southern Rocky Mountains Ecoregions (BLM and the National Biological Information Infrastructure Great Basin Information Project no date).

Declines of sage-grouse near oil and gas fields in this area have been well documented (USFWS 2013a). However, recent conservation actions, including the Wyoming Governor's EOs designating protective stipulations for Core Habitat Areas and the implementation of conservation easements within these areas have reduced the threat risk to populations in the Wyoming portion of the Wyoming Basin Management Zone (USFWS 2013a). Designated state Core Habitat Areas adequately capture redundancy and representation for the Wyoming portion of the Wyoming Basin MZ population. Due to the large size of this population, the presence of large, contiguous habitats, and regulatory measures providing habitat protection, this population is considered low risk (USFWS 2013a).

Within the Planning Area, greater sage-grouse are distributed in habitat that has not been rendered unsuitable due to fragmentation and degradation. In spring, males congregate in areas known as leks to engage in competitive courtship displays. There are approximately 252 occupied greater sage-grouse leks in the Planning Area (171 of which are located on BLM-administered lands), generally located at mid-elevation sagebrush habitat. Sage-grouse often return to the same lekking grounds year after year. Nesting and brood-rearing habitat is sometimes associated with the lek and sometimes found at a distance from the lek in sagebrush habitat. These remaining suitable sagebrush habitat areas could be productive for greater sage-grouse; however, fragmentation and degradation sometimes limits the distribution and abundance of greater sage-grouse in these areas.

The Wyoming Game and Fish Department (WGFD) has identified Core Habitat Areas that represent relatively productive areas, and has suggested special management for these areas (Wyoming Office of the Governor 2008). On June 29, 2010, the State of Wyoming issued revised boundaries for its sage-grouse Core Habitat Areas (Version 3) from the previous version (Core Habitat Areas Version 2). As shown on Map 42, the Planning Area contains approximately 1,787,109 acres of Core Habitat Areas (Version 3). Patches of Core Habitat Areas are present throughout most of the Planning Area with the exception of the north-central and east-central portions. Of the 252 occupied leks in the Planning Area, 209 are located in Core Habitat Areas.

The BLM identified Key Habitat Areas for greater sage-grouse, which largely coincide with WGFD Core Habitat Areas, but include additional productive habitats identified as important to greater sage-grouse in the Planning Area by the BLM, such as the Little Mountain Mexican Hills area. Map 40 identifies the

current BLM Key Habitat Areas for greater sage-grouse, which include 1,857,485 acres in the Planning Area. The BLM referenced Core Habitat Areas Version 2 in the delineation of Key Habitat Areas.

The BLM reviewed Core Habitat Areas Version 3 to determine if and how BLM's Key Habitat Areas should be modified for consistency with the revised Core Habitat Area boundaries. Greater sage-grouse priority habitats, as defined in the National Technical Team report (Sage-Grouse NTT 2011) are areas that have the highest conservation value to maintaining or increasing greater sage-grouse populations. These areas include breeding, late brood-rearing, winter concentration areas, and where known, migration corridors. Core Habitat Areas are referred to as "Priority Habitat Management Areas (PHMAs)" hereafter. General greater sage-grouse habitat is occupied (seasonal or year-round) habitat outside of PHMAs and is referred to as "General Habitat Management Areas (GHMAs)" hereafter. These areas have been identified by the BLM in coordination with respective state wildlife agencies and are shown on Map 42a.

Preliminary winter concentration areas have been mapped by WGFD and BLM personnel and will be further refined and delineated as more data are collected (Easterly 2012). There are currently 210,229 acres of greater sage-grouse winter concentration areas mapped in the Planning Area, which are located predominately within PHMAs.

A 2012 report investigating greater sage-grouse populations in the Bighorn Basin identified the following trends (Easterly 2012):

- The number of male sage-grouse observed at leks in the Bighorn Basin declined from 2010 to 2012; however, these declines may be the result of natural fluctuations in sage-grouse population cycles.
- From 2002 to 2011, hunters averaged 0.7 birds per hunter and 2.3 days per hunter. In 2011, individual harvest rates decreased despite an increase in hunter effort in comparison to the 10-year average.
- Greater sage-grouse populations in the Bighorn Basin remain stable and are not in danger of foreseeable extinction, but are currently at a low in the population cycle and are faced with a number of threats.

There are many sources of habitat alteration, all of which may affect greater sage-grouse. Industrial and urban development, livestock and wildlife grazing, mining, gravel pit operations, oil and gas activity, land exchanges and disposal, vegetation manipulation, fuel reduction projects, and other activities may introduce artificial components into a natural habitats. Structures such as powerlines and towers and industrial disruptive activities may cause avoidance and abandonment of habitat. Livestock grazing, fuels treatments, and weed infestations are factors that may cause habitat degradation depending upon severity, intensity, and design. West Nile virus, which recently has had lethal effects on greater sage-grouse in parts of Wyoming, could become an important factor in the long-term survival of the greater sage-grouse species. To date, there has been little research to document the presence of the virus and its effect on greater sage-grouse in the Bighorn Basin. In some circumstances, predators may play a significant role in sage-grouse mortality. Large numbers of raptors migrate to the Bighorn Basin during the winter months, and corvids, which have a propensity for egg predation, appear to be increasing in the Planning Area (BHBLWG 2007). However, actual sage-grouse mortality rates in the Bighorn Basin resulting from predation are currently unknown and are subject to ongoing research (BHBLWG 2007).

Greater sage-grouse have been declining across the western United States, which has prompted several petitions to list them as threatened under the ESA, including a recent petition that led to the March 2010 finding by the USFWS of warranted for listing but precluded (USFWS 2010). Population levels

throughout the Planning Area declined during the mid-1990s. However, population levels have remained stable or slightly increased since 2004. Well-timed precipitation events are suspected as a major factor in this resurgence (WGFD 2000; WGFD 2004). These precipitation events promoted forage growth, which aided the survival of young. Population growth has varied throughout the Planning Area based on specific local conditions, with some areas showing little change; other areas have had a recent increase in lek count numbers. With more favorable spring and summer conditions for greater sage-grouse in many parts of the Bighorn Basin in recent years, there are some greater sage-grouse leks that have become active again after many years of non-use. Even so, population modeling suggests that declines will continue over the long-term (USFWS 2013a). Winter conditions generally are not a limiting factor in the Bighorn Basin because snow depths are not as severe as in other parts of Wyoming.

Wyoming Governor's Executive Order 2011-5 sets forth a collaborative strategy for the protection of Core Areas (PHMAs) between state and federal agencies, local governments, and private landowners (Wyoming Office of the Governor 2011). This guidance is supplemented by Executive Order 2013-3, which requires that the BLM collaborate with appropriate federal agencies and the State of Wyoming to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework (Wyoming Office of the Governor 2013).

Migratory Game Birds (Waterfowl)

There are no known migratory game bird special status species in the Planning Area.

Nongame Birds (Raptors)

There are five nongame special status raptor species in the Planning Area – bald eagle, burrowing owl, ferruginous hawk, northern goshawk, and peregrine falcon – all BLM sensitive species. Raptor populations in the Planning Area are generally increasing due to current protection measures. Map 39 shows the locations of special status raptor species nests in the Planning Area.

Management challenges for special status raptor species include habitat degradation and fragmentation, collision and electrocution from powerlines, and incompatible land use practices (e.g., land conversion, clear-cutting, snag removal, industrial activities, intensive recreational activities, and removal of burrowing mammals). Other challenges include impacts from contaminants and human disturbance during sensitive periods.

Bald Eagle

The Bighorn Basin, because of climate and food sources, is predominantly a wintering area for bald eagles, with as many as 200 to 300 observed during the mid-winter eagle count. Bald eagles nest in trees near large bodies of water such as lakes, reservoirs, and large rivers. Bald eagles feed mainly on fish, although they will also consume waterfowl and carrion. Bald eagles are being observed more frequently moving through the Planning Area, and as indicated by mid-winter surveys, it is assumed their population numbers are continuing upward. New nesting sites have been reestablished along larger river systems in the Bighorn Basin over the last 20 years. There are approximately 14 known bald eagle nests in the Planning Area.

Burrowing Owl

The burrowing owl is a mid-sized owl closely associated with prairie dog colonies. Burrowing owls nest in abandoned prairie dog burrows and feed on prairie dogs and other rodents.

Ferruginous Hawk

Ferruginous hawks usually nest on rock outcrops, promontories, tall sagebrush, or in junipers where numerous small mammals provide abundant prey base. Ferruginous hawks are not common in the Bighorn Basin. Many previously active ferruginous hawk nest sites are inactive, so populations might be declining.

Northern Goshawk

Northern goshawks occur in coniferous and deciduous forests (BLM 2010b). Due to dense canopy cover in these areas, nests are difficult to find and inventories for these species are limited to areas identified for habitat alterations.

Peregrine Falcon

Peregrine falcons usually build their nests on steep cliffs and rock ledges. Peregrine falcons are now established in several areas of the Bighorn Basin as a result of reintroduction efforts.

Nongame Birds (Migratory Birds)

There are ten BLM sensitive migratory birds in the Planning Area – Baird's sparrow, Brewer's sparrow, loggerhead shrike, long-billed curlew, yellow-billed cuckoo, sage sparrow, sage thrasher, trumpeter swan, white-faced ibis, and mountain plover. These species occur throughout a variety of habitats in the Planning Area (see Table 3-34). The BLM has little abundance or occurrence data for these species.

Management challenges for migratory birds include habitat fragmentation and degradation, land conversion, incompatible land uses (e.g., industrial activities, human disturbance, contaminants, and agricultural practices), water quantity and quality, collision with powerlines, and interspecific competition for nest sites.

The sage thrasher, loggerhead shrike, Baird's sparrow, Brewer's sparrow, sage sparrow, and long-billed curlew depend somewhat on sagebrush and some are considered sagebrush obligates. Threats to this habitat type include fragmentation and degradation. Sagebrush habitats in the Planning Area are important breeding areas for these migratory species (Birds of North America Online 2008). These migratory birds occupy habitats that are at risk or in decline; therefore, populations might be declining.

Baird's Sparrow

This species occupies grasslands and nests in depressions. The Baird's sparrow forages on insects or seeds.

Brewer's Sparrow

The Brewer's sparrow is a sagebrush obligate bird that requires intact sagebrush habitats for almost all its nesting and foraging needs.

Loggerhead Shrike

Shrublands are the preferred habitats for the loggerhead shrike. This species typically nests in deciduous trees or tall shrubs and feeds on insects, small vertebrates, and carrion.

Long-Billed Curlew

The long-billed curlew is an upland shorebird occupying grasslands and wet meadows. Typical nest sites are on the ground near water with a supply of insects and aquatic macroinvertebrates.

Mountain Plover

The mountain plover inhabits shortgrass prairies and shrub-steppe habitats, both for breeding and wintering. This species prefers areas with little vegetative cover for nesting, particularly prairie dog towns. In the Bighorn Basin, there is an abundance of naturally sparse habitats for mountain plover nesting.

Sage Sparrow

The sage sparrow is a sagebrush obligate bird that requires intact sagebrush habitats for almost all its nesting and foraging needs.

Sage Thrasher

Similar to the sage sparrow, the sage thrasher is a sagebrush obligate bird that requires intact sagebrush habitats for almost all its nesting and foraging needs.

Trumpeter Swan

The trumpeter swan can occupy still-water areas such as lakes, ponds, and marshes, and can use these areas for nesting or migration. The trumpeter swan population might be increasing in the Planning Area. This riparian associated species and its habitat are threatened by invasive species such as Tamarisk, Russian olive, and knapweed, which degrade its habitat. Pesticide use and collision with anthropogenic features also cause direct mortality and reduce habitat suitability.

White-faced Ibis

The white-faced ibis can occupy still-water areas such as lakes, ponds, and marshes, and can use these areas for nesting or migration. The white-faced ibis population might be increasing due to breeding-range expansion in the last 2 decades, due in part to improved nesting habitat management in federal and state refuges (Birds of North America Online 2008). Similar to other riparian-associated species and their habitats, the white-faced ibis is threatened by invasive species such as Tamarisk, Russian olive, and knapweed, which degrade its habitat. Pesticide use and collision with anthropogenic features also cause direct mortality and reduce habitat suitability.

Yellow-billed Cuckoo

The yellow-billed cuckoo can occupy still-water areas such as lakes, ponds, and marshes, and can use these areas for nesting or migration. Yellow-billed cuckoo can occupy the river corridors and any associated riparian areas nearby. They have been shown to prefer open cottonwood galleries with a low-profile shrub component. The yellow-billed cuckoo is on the decline throughout its range. The yellow-billed cuckoo and its habitat are threatened by invasive species, pesticide use, and the threats other riparian associated species face.

Nongame Mammals

Nine nongame special status mammal species occur in the Planning Area – black-footed ferret (endangered), Canada lynx (threatened), North American wolverine (proposed), Townsend's big-eared bat (BLM sensitive), long-eared myotis (BLM sensitive), spotted bat (BLM sensitive), white-tailed prairie

dog (BLM sensitive), and black-tailed prairie dog (BLM sensitive). Management challenges for special status mammals include habitat fragmentation and degradation, land conversion, incompatible land uses (e.g., industrial activities, human disturbance, use of contaminants, abandoned mine lands [AMLs] and cave closures, and animal damage-control practices), lack of cottonwood and willow regeneration, collision with wind turbines (bats), and snag removal in preferred habitats. Management actions are intended to maintain and enhance the presence of nongame mammals and the habitats upon which they depend.

Black-footed Ferret

Thought to be extinct for many years, the black-footed ferret was rediscovered in 1981 northwest of Meeteetse in a large white-tailed prairie dog colony in the Planning Area. The species was taken into captivity and is now successfully being bred, raised, and reintroduced into historical habitats. The black-footed ferret has not been documented elsewhere in the Planning Area or any other locations since its rediscovery. Loss of habitat is the primary reason black-footed ferrets remain listed as endangered. Conversion of grasslands to agricultural uses, widespread prairie dog eradication programs, and incidences of the plague have reduced ferret habitat to less than 2 percent of its historic range. Remaining habitat is now fragmented, with prairie dog towns separated by great expanses of cropland and human development. Since the black-footed ferret was found, researched in the mid-1980s, and subsequently removed for species preservation at breeding facilities, there have been no known and confirmed occurrences in the Planning Area.

Canada Lynx

Canada lynx generally occur in dense coniferous forests at high elevations. Canada lynx have not been documented on BLM-administered land in the Planning Area; however, there are four Lynx Analysis Units that encompass BLM-administered lands and adjacent larger tracts of USFS-managed land along the western and northeastern boundaries of the Planning Area. Lynx habitat does overlap BLM-administered lands. Lynx population information is difficult to obtain due to their reclusive nature. It might be possible that lynx occupy suitable habitat on BLM-administered lands but are not observed. Canada lynx critical habitat has been identified in Wyoming; however, there is no critical habitat designated in the Planning Area, and there have been no confirmed or known occurrences on BLM-administered land. There is no known population trend.

North American Wolverine

In February 2013, the USFWS proposed to list wolverine as threatened under the ESA. Wolverine occurrence in the Planning Area is unknown, but the species could be found in boreal forest and/or alpine habitats along the western edge of the basin where there are limited areas of BLM-administered lands with elevations above 9,500 feet in the Absaroka and Owl Creek mountain ranges. In North America, wolverines occur within a wide variety of habitats, primarily boreal forests, tundra, and western mountains throughout Alaska, Canada, and south to the contiguous United States. Currently, wolverines are found in the North Cascades in Washington and the northern Rocky Mountains in Idaho, Montana, Oregon (Wallowa Range), and Wyoming. Wolverines are opportunistic feeders and consume a variety of foods depending on availability. They primarily scavenge carrion, but also prey on small animals and birds, and eat fruits, berries, and insects. Wolverines have an excellent sense of smell that enables them to find food beneath deep snow.

Bat Species

There are three BLM sensitive bat species in the Planning Area – Townsend's big-eared bat, long-eared myotis, and spotted bat. These bat species are associated with riparian, upland range, forested, and

karst habitat and are susceptible to disturbance and degradation of these habitats. Maternity, hibernacula, and day-roost sites are important to these species and could be disturbed by recreation activities associated with caving. Sometimes these disturbances can cause habitats to become unsuitable for critical life history requirements. There is little population data for bat species, so a trend cannot be determined.

White-tailed Prairie Dog

The white-tailed prairie dog is associated with desert grasslands and shrub grasslands. A long-term study of white-tailed prairie dogs in the Planning Area indicated that there has been a decline in abundance and distribution of this species.

Black-tailed Prairie Dog

There is one known black-tailed prairie dog colony in the Planning Area, which is typically associated with the short grass prairie north and east of the Bighorn Basin.

Nongame Amphibians

Special status amphibians in the Planning Area include the boreal toad, Columbia spotted frog, northern leopard frog, and Great Basin spadefoot toad, all of which are BLM sensitive species. These species are associated with riparian/wetland, woodland, and forested habitat and are susceptible to disturbance from habit degradation and fragmentation, pollution, modified hydrology, and other factors related to the current global decline in amphibian populations.

Management challenges for amphibian species include habitat degradation, land conversion, incompatible land uses (e.g., contaminants and conversion or degradation of aquatic habitats) and degradation of water quantity and quality. Amphibian populations in the Planning Area are thought to be declining because of these issues and other factors related to the general global decline in amphibians.

3.4.10 Wild Horses

The BLM is responsible for protecting, managing, and controlling wild horses on public lands in the Planning Area. The BLM collects data about the animals and their habitat and prescribes management actions to ensure that free-roaming populations are in balance with other uses. In addition, the BLM ensures that the productive capability of wild-horse habitat and a thriving natural ecological balance is achieved and maintained. Wild horses are of interest to some members of the public and are classified as a resource value rather than a land use.

Existing wild horse herds originated from animals released during early European-American exploration and settlement in the region in the 1800s. Current populations incorporate genetic traits from a wide variety of breeds historically used in the region.

The BLM manages wild horses in the Planning Area in two Wild Horse Herd Management Areas (HMA) (Map 45) – the McCullough Peaks HMA and the Fifteenmile HMA. Each HMA has a Herd Management Area Plan that establishes appropriate management levels. Each HMA is located within the boundaries of a larger Herd Area of the same name (Table 3-35); portions of these Herd Areas outside of the HMA boundaries are not managed for wild horses. In addition, there are five Herd Areas in the Planning Area that are not currently managed for wild horses but remain Herd Areas in perpetuity. Analysis for previous decisions determined that managing wild horses in these Herd Areas resulted in management

issues or conflicts (e.g., competition with livestock for water sources or forage, and adjacent landowner complaints), that were most appropriately resolved by the removal of wild horses. Previous decisions also determined that management of wild horses within the original Herd Area boundaries would result in issues or conflicts. Table 3-35 lists acreages and appropriate management levels for the two HMAs and seven Herd Areas, as well as the reason horses were removed from the Herd Areas not managed for wild horses and the decision document or other documentation related to these removals. The wild horse population in 2009 in the HMAs was 199 (see Table 3-35). The BLM collects annual monitoring data to evaluate progress toward meeting management objectives.

Table 3-35. Wild Horse Herd Management and Herd Areas

Herd Management Areas and Herd Areas	BLM-Administered Land (acres)	BOR, State, and Private Land (acres)	Appropriate Management Level (total head)	Estimated Number of Horses (2009)	Herd Area Horse Closure Decision Document and Date	Reason for Herd Area Horse Closure
McCullough Peaks Herd Management Area	103,866	5,999	70-140	110	N/A	N/A
McCullough Peaks Herd Area	138,580	39,283	N/A	Likely same as McCullough Peaks HMA, but not monitored.	N/A	N/A
Fifteenmile Herd Management Area	70,527	10,583	70-160	89	N/A	N/A
Fifteenmile Herd Area	221,018	40,850	N/A	N/A	N/A	N/A
Foster Gulch Herd Area	134,219	7,081	0	0	Environmental Analysis, McCullough Peaks Wild Horse Management Plan. (BLM 1985)	Better control and management; resource conflicts with trespass branded horses (i.e., unfenced boundaries) had occurred; water not owned or controlled by BLM and/or not available within the Herd Area.

Table 3-35. Wild Horse Herd Management Areas and Herd Areas (Continued)

Herd Management Areas and Herd Areas	BLM-Administered Land (acres)	BOR, State, and Private Land (acres)	Appropriate Management Level (total head)	Estimated Number of Horses (2009)	Herd Area Horse Closure Decision Document and Date	Reason for Herd Area Horse Closure
North Shoshone Herd Area	19,231	3,395g.	0	0	Environmental Analysis Record, Horse Roundup-North Shoshone Area (BLM 1976); wild horse count reported absent in 1980. (BLM 1980)	Unauthorized horses, potentially claimed/ removed by a local individual. Horses removed by unknown means. (BLM 1980)
Zimmerman Springs Herd Area	11,518	759	0	0	Washakie Resource Management Plan. (BLM 1988a)	Competition for forage with livestock; water not owned or controlled by BLM and/or not available within the Herd Area.
Alkali Spring Creek Herd Area	2,600	2,583	0	0	Environmental Analysis, Spring Creek Wild Horse Removal. (BLM 1981)	Private landowner requests.
Sand Draw Herd Area	13,743	1,559	0	0	Grass Creek Grazing Environmental Impact Statement. (BLM 1983b)	Competition for forage and water with livestock.

Sources: BLM 2013a; BLM 2009a; BLM 2009k; BLM 1990; BLM 1988a; BLM 1983b; BLM 1981; BLM 1976.

BLM Bureau of Land Management
BOR Bureau of Reclamation
N/A Not Applicable

The wild horse program receives a high level of public interest and scrutiny. For a variety of purposes and reasons, multiple public organizations closely monitor the health, nutrition, and general well-being of wild horse herds. These groups present unique opportunities for cooperative and collaborative partnerships, and for controversy. Such groups in the Planning Area have provided monitoring assistance and publicity for the wild horse program.

The Pryor Mountain Horse Range is physically located in the northern portion of the Planning Area and in Montana and is administered by the Billings BLM Field Office. This RMP revision project does not address the Pryor Mountain Area.

McCullough Peaks HMA

Before the passage of the Wild Free-Roaming Horses and Burros Act of 1971, wild horses were already prominent in the area from what were known as U.S. Cavalry remounts, which included Clydesdale stock, Percheron and Thoroughbred crosses, and most notably, the Cleveland Bay breed. This resulted in the present-day configuration and distribution of wild horses in the McCullough Peaks HMA. The historic water sources at various springs, Shoshone River, and Dry Creek, along with the development of water sources in the 1950s through 1970s, influenced the horses' selection of this area as its home range.

Existing boundary and division fences associated with management of the allotments did not affect horse movement in the late 1980s and 1990s. However, with the increase in public presence in the 2000s, fences have increasingly prevented horse movement and have created a physical barrier that is sometimes harmful to the horses.

Since 1990, much of the exterior boundary of the approximately 110,000-acre HMA has been fenced. An interior fence was also constructed, forming pasture and allotment boundaries to improve management of livestock grazing. The combination of the exterior and interior fences has limited the mobility of the wild horses. Increases in other human activities in the Red Point area, primarily recreational viewing and Special Recreation Permit (SRP) viewing, have resulted in keeping 80 percent of the herd within 20 percent of the HMA.

Horse management planning documents call for the HMA to support 70 to 140 total head of wild horses (1,050 to 2,100 animal unit months [AUMs]) in an attempt to maintain an average of 100 adult wild horses in the HMA (1,500 AUMs). An AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month; however, as determined in the 1985 McCullough Peaks Wild Horse Herd Area Management Plan (BLM 1985) and the NRCS National Range and Pasture Handbook (NRCS 2003) the BLM bases its appropriate management level calculations on 1.25 AUMs per horse per month. Once herd levels surpass 140 head, or after approximately 4 years, the BLM gathers and removes enough horses to leave 70 head, for an overall average of 100 adult horses. This method is more cost-efficient than annual roundups and has resulted in less capture-induced stress on the horses. There were gathers in 1983 (215 removed), 1987 (152 removed), 1992 (225 removed), 1995 (170 removed), 1999 (188 removed), 2004 (362 removed), 2009 (94 removed), and 2013 (27 removed).

The McCullough Peaks HMA is approximately 12 miles east of Cody, extending an additional 15 miles east, with U.S. Highway 14-16-20 forming the southern boundary. It is bounded on the north by BOR-withdrawn lands controlled by the Willwood Irrigation District. McCullough Peaks and State Highway 32 comprise the western and eastern boundaries. The HMA encompasses approximately 109,856 acres, of which 103,866 acres are on BLM-administered land; the remaining 5,993 acres is scattered parcels of state and private lands. In the third quarter of 2009, the herd had approximately 110 horses.

Vegetation in the McCullough Peaks HMA consists primarily of salt desert shrub and Wyoming big sagebrush communities (BLM 2009a). Big sagebrush, Nuttalls saltbush, greasewood, bluebunch wheatgrass, western wheatgrass, needle-n-thread, Indian ricegrass, blue grama, Sandberg bluegrass, and saltgrass are the major plant species in the area. Average annual precipitation is approximately 5 to 7 inches, with 40 percent occurring from April through June.

There are five grazing allotments in the HMA, and livestock use within these allotments is authorized during spring, summer, fall, and winter depending on the specific allotment and its specified rotational grazing strategy. Each allotment has a built-in rest period during the growing season at least once every 3 years. Water development benefits wild horses, livestock, and wildlife.

At present, the wild horses in the McCullough Peaks HMA are considered to be in good health. Most horses are of ample body condition and forage conditions range from poor to good, with some areas considered in excellent condition. However, the drought of the late 1990s through 2008 adversely affected rangeland health.

Approximately 12,445 acres of the McCullough Peaks HMA is classified as a WSA and is managed in accordance with BLM Manual 6330 (BLM 2012a). Horses are regularly observed in the WSA, and their use is considered compatible with the management objectives and values associated with the WSA.

McCullough Peaks HMA is popular among visitors for its easily photographed horses, easy access, and year-round availability. The BLM issues SRPs for wild horse viewing activity twice daily from May through October. The SRP has a cap of 2,000 visitor-use days with one primary active SRP holder. There has been continued interest from additional "outfitters" or guide services to obtain additional visitor-use days for viewing wild horses. These 2,000 visitor-use days do not include the general public in the calculation. Over the last 8 years, more and more members of the general public have viewed wild horses. However, because of frequent exposure to people, more than 80 percent of the horses have become approachable and do not display the wild and unique characteristics for which they were once known.

Fifteenmile HMA

Wild and free roaming horses have been reported in the Fifteenmile area since the late 1880s. Historically, the horse herd ranged over approximately 330,000 acres between Worland and Meeteetse, and the Greybull River and Gooseberry Creek. After the ranching community arrived, it was common practice to cull the horses periodically and to occasionally introduce new horses to the population. The horses were then gathered as needed. In the 1930s and 1940s, many horses were shot and others were captured and sold. In the 1950s, almost all the horses (approximately 600) were captured and sold. Some wild horses were periodically gathered by local residents until the practice was prohibited in 1971 by the passage of the Wild Free-Roaming Horses and Burros Act.

The wild horse population in 1971 was estimated to be between 150 and 175 head. The first intensive inventory of the population took place in 1974, when 245 horses were counted. In 1978, wild horse numbers had increased to approximately 334 head, and due to drought conditions, the BLM removed 186. The BLM removed another 360 horses in 1984. The Fifteenmile Wild Horse Herd Management Area Plan was approved in 1985. This plan established the current HMA boundary, and specified that the wild horse herd would be managed within a range of 70 to 160 mature horses. The plan also specified that following gathers, the horses remaining on the range would be managed in a ratio of 60 males to 40 females to help slow population growth. Since 1985, there have been periodic (every 4 to 6 years) gathers to reduce the population. These gathers occurred in 1991 (129 horses removed), 1994 (141 horses removed), 2000 (161 horses removed), 2004 (115 horses removed), and 2009 (301 removed).

The Fifteenmile Wild Horse HMA is approximately 35 miles northwest of Worland. The HMA encompasses approximately 81,107 acres, with portions in Big Horn, Park, and Washakie counties, of which approximately 10,383 acres, or about 13 percent, are privately owned. The HMA can support a wild horse population of 70 to 160 mature horses over 1 year of age, or 100 to 240 total horses. However, rangelands in the HMA cannot sustain both the wild horse population and the full permitted livestock grazing use level. In the third quarter of 2009, the herd had approximately 89 horses.

Rangelands in the Fifteenmile HMA are in conformance with the *Wyoming Standards for Healthy Rangelands* (Appendix N). Annual precipitation in the Fifteenmile HMA ranges from 4 to 12 inches per

year, with an average of approximately 7 inches per year. About half of the precipitation falls during the growing season from April through June, with the remainder falling in high intensity summer thunderstorms. Much of the precipitation occurs during summer thunderstorms as runoff to numerous drainages. Some of this water is captured in reservoirs or pits and is the primary source of water for wild horses, livestock, and wildlife. Due to the erosive nature of the soils, these reservoirs and pits quickly fill with sediment, thereby reducing their capacity to hold water. Evaporation rates are high due to the hot, dry weather during summer. In some parts of the HMA that receive little wild horse use, vegetative cover and litter have increased to the point that storm runoff is not sufficient to fill some reservoirs and pits. Because of these factors, water availability is a concern in the HMA.

There are five unfenced livestock grazing allotments in the HMA, and the total permitted livestock grazing on these allotments is 7,925 AUMs, based on the original forage adjudication. An AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. This use is limited to winter sheep use from November through March. Most of this permitted grazing use has been in voluntary non-use for several years, largely because permittees do not run sheep, but permittees could activate grazing use at any time. The overall recommended stocking level for both livestock and wild horses in the HMA, based on rangeland vegetation inventory and suitability data, is approximately 5,670 AUMs. The Grass Creek RMP allocated a total of 2,300 AUMs of forage for wild horses, which is the amount of forage required to sustain the wild horse population at the upper range of the appropriate management level, and 3,370 AUMs of forage for domestic livestock.

The wild horses in and around the HMA are considered to be healthy and in good physical condition. Genetic testing has indicated that the herd exhibits a high degree of genetic variability. Some of the horses frequently travel outside the HMA onto adjacent livestock grazing allotments. There is a small band of horses outside the HMA, approximately 10 to 20 wild horses, in the Fivemile Creek area. There is no known interaction between these horses and the horses in the Fifteenmile HMA. Over the last 20 years, the BLM has attempted several times to remove these horses, but due largely to the remoteness of the area and rugged topography, a few horses have always evaded capture.

Management Challenges

Management challenges for wild horses include controlling herd populations to maintain herd and rangeland health and habitat, forage, and water for native wildlife. Since 1973, when the horse and burro adoption program began, the two legal means of disposing of surplus, gathered animals has been through public adoptions and euthanasia. Some animals, especially older studs, lack the physical appeal and disposition that attract adopters. Ultimately, when these animals are perceived as unadoptable, they are returned to holding facilities or released back onto public lands. Euthanasia is currently the subject of heated public debate. The BLM no longer euthanizes horses to control populations, and the BLM has no current plans to resume the practice in the Planning Area.

From 1988 to 2004 congressional appropriations did not allow public funds for euthanasia as a method of population control. In the fall of 2004, Congress amended the Wild Free-Roaming Horses and Burros Act of 1971 to facilitate the sale of animals 10 years of age and those that have been offered unsuccessfully for adoption at least three times. In fiscal year 2010, congressional appropriations once again did not allow for public funds for euthanasia for population control.

McCullough Peaks Herd Management Area

Although monitoring data indicate horses have localized impacts on vegetation in areas near water in relation to drought, current management of the horse herd should not affect these plant communities. There could be impacts to rangeland resources if herd numbers are allowed to grow beyond appropriate management levels. Continuing to implement fertility control during gathers will help maintain and improve rangeland resources. Managing horse distribution and grazing use will impact the long-term success of a healthy watershed and healthy horses.

With the administration of fertility control methods, the horse population is expected to increase at a rate of 15 percent annually, slower than in the past (BLM 2008a). In 2004, 36 mares were treated with a revised immune-contraceptive vaccine. A single injection will provide up to 2 years of contraception at approximately 94 percent efficiency (BLM 2009l). Contraceptives will become a more common tool in limiting the growth of the horse herd. Scheduled, periodic small gathers will continue so as to maintain population numbers in the targeted range of the appropriate management level.

Fifteenmile Herd Management Area

At present, the wild horses in the Fifteenmile HMA are considered to be in good health. Most horses are of ample body condition and forage conditions range from poor to good, with some areas considered in excellent condition. However, the long-term drought has adversely affected rangeland health. There could be impacts to rangeland resources if herd numbers are allowed to grow beyond appropriate management levels. Managing horse distribution and grazing use will impact the long-term success of maintaining healthy watersheds and wild horse populations.

3.5 Heritage and Visual Resources

This section includes the individual resources of cultural, paleontological, and visual resources. The following sections describe the resource, its existing condition, and management challenges. Section 3.7.3 *National Historic Landmarks* describes the Heart Mountain Relocation Center and Section 3.7.4 *National Historic Trails and Other Historic Trails* describes historic trails in the Planning Area.

3.5.1 Cultural Resources

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. Cultural resources include archeological resources, historic architectural and engineering resources, and traditional resources. Archeological resources are areas where prehistoric or historic activity measurably altered the earth or where deposits of physical remains (e.g., projectile points, pottery, or bottles) are discovered. Architectural and engineering resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic value. Traditional resources can include archeological resources, structures, topographic features, habitats, plants, wildlife, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

3.5.1.1 Identified Cultural Resources

History of Cultural Resource Investigations in the Planning Area

Site identification and recording in the Planning Area dates to the mid-20th Century, when, in 1946, the Smithsonian Institution sponsored work as part of the River Basin Surveys for projects such as Anchor Reservoir in the Absaroka Mountain Slope and Owl Creek subregions and the Oregon Basin Reservoir in the Bighorn Basin subregion. Since the early 1970s, there have been extensive modern cultural resources investigations in the Planning Area. Most investigations have been accomplished in compliance with Section 106 of the National Historic Preservation Act (NHPA) and provisions of National Environmental Policy Act (NEPA), both of which require federal agencies to consider the potential effects of federally assisted or permitted projects on important cultural resources. The BLM has performed cultural resources investigations in the Planning Area pursuant to the BLM stewardship responsibilities under NHPA Section 110, which requires federal land management agencies to identify and preserve important cultural resources on lands those agencies administer.

Cultural Subregions in the Planning Area

There appears to be a pattern of human use of the landscape that changes based on vegetation and other resource availability. The use of areas with less than 10 inches of annual precipitation appears to vary from the use of areas with more precipitation. Identified cultural subregions in the Planning Area include:

- *North Slope of the Bridger Mountains*: Areas with vegetation patterns that indicate average annual precipitation of more than 10 inches along the northern margin of the Bridger Mountains.
- *North Slope Owl Creek Mountains*: Areas with vegetation patterns that indicate average annual precipitation of more than 10 inches along the northern margin of the Owl Creek Mountains.
- *West Slope of the Big Horn Mountains*: Areas with vegetation patterns that indicate average annual precipitation of more than 10 inches along the eastern margin of the Bighorn Basin.

- *East Slope of the Absaroka Mountains*: Areas with vegetation patterns that indicate average annual precipitation of more than 10 inches along the western margin of the Bighorn Basin.
- *Bighorn Basin*: Areas with vegetation patterns that indicate average annual precipitation of less than 10 inches.
- *Clarks Fork Basin*: Areas within the Clarks Fork of the Yellowstone River drainage, which are included in the Yellowstone watershed, with vegetation patterns that indicate average precipitation of less than 10 inches. These areas are differentiated from the Bighorn Basin and surrounding East Slope of the Absaroka Mountains subregions.

Number of Cultural Resource Sites Recorded in the Planning Area

Cultural resources investigations in the Planning Area have recorded approximately 8,340 prehistoric and historic cultural resources (Table 3-36).

Table 3-36. Cultural Resources Inventories, Sites, and Site Density in the Planning Area

Subregion	Number of Surveys	Total Area Surveyed (acres)[1]	Recorded Prehistoric Sites	Per Acre Occurrence of Prehistoric Sites	Recorded Historic Sites	Per Acre Occurrence of Historic Sites[2]	All Recorded Sites	Per Acre Occurrence of All Sites	Overall Site Density[3]
North Slope of the Bridger Mountains	317	8,989	116	0.013	38	0.004	154	0.017	1 site in 58 acres
North Slope Owl Creek Mountains	259	2,646	52	0.02	73	0.028	125	0.047	1 site in 21 acres
West Slope of the Big Horn Mountains	960	43,401	509	0.012	58	0.001	567	0.013	1 site in 77 acres
East Slope of the Absaroka Mountains	1,509	66,375	381	0.006	186	0.003	567	0.009	1 site in 117 acres
Bighorn Basin	2,776	252,161	5,470	0.022	1,335	0.005	6,805	0.027	1 site in 37 acres
Clarks Fork Basin	259	3,262	96	0.029	26	0.008	122	0.037	1 site in 27 acres
Planning Area Totals[4]	**6,080**	**376,834**	**6,624**	**0.018**	**1,716**	**0.005**	**8,340**	**0.0222**	**1 site in 45 acres**

Source: Wyoming SHPO 2009

[1]May include some areas that have been resurveyed.
[2]Total corrected for sites that have both historic and prehistoric components.
[3]Rounded to nearest acre.
[4]Wyoming Cultural Records Office database information current as of January 2009.

Types of Cultural Resources Recorded in the Planning Area

Prehistoric cultural resources are materials deposited or left behind prior to the entry of non-American Indian (European) explorers and settlers into an area. Protohistoric refers to the variable transition period from prehistoric to historic. The latter is the time after Europeans established a presence. The Prehistoric Period, subdivided into a number of subperiods (e.g., Paleoindian Period, Archaic Period, Late Prehistoric Period), began with the entry of human beings into North America sometime about 12,000 to 15,000 years ago, or perhaps much earlier, according to recent data (BLM 2009a). The Protohistoric Period in northwestern Wyoming was initiated in the early 19th Century with the entry of fur trappers and explorers, although early French and British trappers might have passed through the general area in the early to mid-18th Century (BLM 2009a). The establishment of trading centers at Fort William (present-day Fort Laramie) and other trading forts on the Yellowstone and upper Missouri rivers in the early 1830s ushered in the Historic Period, because these were the first permanent European settlements in the region.

Most recorded prehistoric sites in the Planning Area consist of lithic scatters, campsites or habitations of various kinds, stone circles, and stone cairns. Other prehistoric site types include burials, ceremonial stone alignments, rock art, rock shelters, ceramic sites, quarries and secondary lithic procurement sites, hunting blinds, structures, and bison kill and butchering sites. Recorded historic cultural resources in the Planning Area include trails, freight wagon and stagecoach trails, an historic highway, early ranches and farms, stockherding camps, irrigation systems, mines, early oil fields and associated camps, railroads, bridges, and urban buildings. Some locations are noted, but not formally recorded, including utility lines, pipelines, stock dams, survey markers, carbanks or abandoned vehicles and appliances, rip-rap, fencing, recent trash, well and hole markers, culverts, bear baiting sites, unnamed two-track roads, and small-capacity irrigation canals with no historic association.

Native American Site Types in the Planning Area

Native American prehistoric sites are listed in the Wyoming Cultural Records Office (WYCRO) database under 198 site types or characteristics. These can be grouped into 15 generalized or composite site types that are the most commonly occurring types in the Planning Area and the surrounding region, as follows:

- Burials – physical human remains, deliberately interred or not.
- Cairns – piles of stones deposited by prehistoric people for a variety of reasons and purposes, including stockpiling of lithic source materials, marking burials or other ceremonial events, or as locational markers for trails, water sources, or other resources.
- Campsites – locations that contain evidence of at least short-term occupation by prehistoric people.
- Ceramic sites – sites of any other type that contain prehistoric pottery.
- Lodge sites/prehistoric structures/house pits – habitations or occupations that can include features such as stone and wood elements.
- Hunting blinds or traps – structures built by prehistoric people to aid in hunting of big game such as bison, pronghorn, and possibly birds, and that these people might have used for ceremonial purposes.
- Kill sites or butchering/processing sites – locations that contain extensive bone or other evidence of the killing and processing of big game by prehistoric, protohistoric, or early historic aboriginal people.

- Lithic scatters – assemblages of flakes, tested or worked stone cores, roughly shaped pre-forms for tools, and sometimes finished tools that are the products of reduction of stone material into useable tools.
- Quarries – primary procurement sources for lithic materials used by prehistoric people.
- Rock art – includes pictographs or petroglyphs on rock faces or individual rocks.
- Rock shelters or caves – naturally occurring recesses or overhangs that afforded prehistoric people protection from the elements.
- Secondary lithic procurement sites – locations where glacial or stream actions have deposited lithic materials or where lithic materials have otherwise eroded from primary geological contexts.
- Stone alignments and effigies – usually interpreted to be associated with ceremonial or spiritual activities, but some alignments could have been associated with big game hunting or possibly have been locational landmarks.
- Stone circles – rings of rocks that might represent former locations of tipis or other structures, or might represent prehistoric ceremonial activities.
- Other unknown – sites that have limited or no data that can be properly categorized. This category contains a small percentage (about 1 percent) of the recorded sites in the entire Planning Area.

Historic Era Resources in the Planning Area

Historic period resource types are also categorized according to descriptive types. Certain broad categories are commonly used, particularly for emigrant trails and expansion era roads. Most of the 123 site type or characteristic categories in the WYCRO database for the Planning Area can be grouped into 11 thematic or site type groups, as follows:

- Burials and cemeteries – in the historic context, deliberately established burials, interments, and burial groupings such as cemeteries.
- Historic debris – refuse scatters that cannot be directly associated with another category.
- Homesteads/ranches – residences and outbuildings, fields and facilities associated with operation of a farm or ranch or, on occasion, with recreation or the tourism industry.
- Irrigation-related sites – ditches, canals, pumps, or other debris or features directly related to irrigation projects.
- Military sites – forts, camps, and battlefields, and transportation or communications features that can be directly related to military activities.
- Mineral exploration and extraction – oil, gas, coal, and other mining location and associated features.
- Stockherding – typically camps that are not principal ranches or farm headquarters and cairns that cannot be ascribed to some prehistoric or aboriginal activity.
- Timber sites – typically service roads and structures associated with the timber industry. Specific buildings include sawmills.
- Transportation/communications sites – trails, expansion era stagecoach and freight wagon roads, military roads, railroads, bridges, telephone and telegraph lines, and in some cases, powerlines.

- Urban buildings – historic buildings in cities, towns, or villages not directly associated with other categories.
- Other – a large number of historic sites for which the WYCRO database does not provide enough information to allow the sites to be assigned to another category. This category constitutes more than 25 percent of the historic site type representations for the Planning Area.

National Historic Landmarks, Landscapes, and Archeological District in the Planning Area

There are several areas designated as National Historic Landmarks, Archeological Landscape Districts, or Archeological Districts in the Planning Area.

The Paint Rock Canyon Archeological Landscape District includes an extensive archeological record of Native American use of this well-defined location. In addition to the research value of the archeological sites spanning thousands of years of use, the landscape contributes to the resource's integrity and forms an essential part of the resource's cultural value. The steep nature of the canyon limited human use of the area while providing access to lithic materials for tool manufacture and rock shelters for short-term habitation.

The Black Mountain Archeological District is another NRHP-listed grouping of exceptional cultural resources values, spanning from Paleoindian occupation to the Late Prehistoric.

Refer to Section 3.7.3 *National Historic Landmarks*, which addresses the Heart Mountain Relocation Center.

3.5.1.2 Sites of Specific Concern to Native Americans

Native American Traditional Resources Possibly Present in the Planning Area, including Traditional Cultural Properties

There are no traditional cultural properties (TCPs), as defined by National Park Service Bulletin 38 (Parker and King 1998), in the Planning Area. No specific traditional gathering areas have been identified in the Planning Area. This does not mean that Native American tribes do not have resources of concern or TCPs in the Planning Area that have not been formally recognized. Certain site types are likely to be of interest to tribal groups, whether or not they are designated as TCPs or receive other recognition.

Individual Burials and Massacre/Battle Sites

Most Native American tribes believe that burials and burial sites are sacred and should not be disturbed. In addition, there are two battle sites in the Bighorn Basin – Bates Battle in the Bridger Mountains, and a recorded battle site in the Clarks Fork subregion, which is considered important to tribes in the region.

Observatories, Calendar Sites, and Petroglyphs

In general, the medicine wheel site type is considered to be a sacred site type and potentially represents a calendar associated with the seasonal variation in the region. One of the most well-known and sacred medicine wheel sites in North America is the Bighorn Medicine Wheel. This TCP is in the Big Horn Mountains in northern Wyoming, outside of the Planning Area. This site is believed to be aligned with the summer solstice and the summer stars. This medicine wheel has been modified over time, and its preservation is important to the tribes in the region. The complex also is considered sacred as it relates to vision quests and other religious activities (Eagle Bear 2009; Fisher 2009).

Petroglyphs and pictographs, stone alignments, and effigies also have sacred and special meaning to the tribes in the region. Although not entirely understood by archeologists, the symbolism represented is to be protected and preserved whenever possible (McCleary 2008; Keyser and Klassen 2001).

Trails and Trail Markers

Beyond the historically documented trails such as the Bridger Trail, Bad Pass Trail, and the Nez Perce NHT in the Bighorn Basin, cairns are often considered trail markers and are important to local tribes. Three unnamed trails in the south and west portions of the Planning Area have been identified as associated with the Eastern Shoshone (Shimkin 1947).

Geographic Features

The Bighorn Basin is considered an important geologic and geographic feature by many tribes in the region. Its horseshoe shape and towering mountain peaks are discussed in the oral traditions of the Crow and the Sioux, and the region in general has substantial meaning to these groups (Eagle Bear 2009). Specific geographic features such as mountain peaks, rivers, and landforms, including place names associated with the Planning Area, are specifically important to the Crow and the Eastern Shoshone.

3.5.1.3 Current Resource Management

BLM's Responsibilities, Policies, Acts, and Protocols Related to the Management of Cultural Resources

The BLM is legally mandated to identify, evaluate, and manage cultural resources under at least 10 federal laws and four presidential Executive Orders, most prominently the Antiquities Act of 1906, the NHPA of 1966, the NEPA of 1969, and the FLPMA of 1976, as amended, and Executive Order 11593. BLM Manuals 8100, 8110, 8120, and 8130 outline BLM policy and cultural resource program guidance. The BLM detailed its approach to managing National Historic Trails (NHTs) in the 1986 Oregon/Mormon Pioneer NHTs Management Plan. Although the Oregon/Mormon Pioneer NHT does not pass through the Planning Area, the plan (BLM 1986b) addresses overall concerns and management issues common to all NHTs. All viewsheds associated with NHTs and cultural resource locations will only be managed for those sites where integrity of setting is an important element of its eligibility for the National Register of Historic Places, which is limited to some of those eligible under 36 CFR 60.4 (a), (b), or (c), and criterion (d) in instances where setting is a factor for the site eligibility. The BLM intends to revise the plan to meet current preservation needs.

In 2012, the BLM developed an agreement addressing means of complying with NHPA, expressed in the Programmatic Agreement Among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act (BLM, ACHP, and National Conference of SHPO 2012). Pursuant to this national Programmatic Agreement, the BLM Wyoming State Office developed a specific process by which NHPA compliance is accomplished, detailed in the State Protocol between the Wyoming BLM State Director and the Wyoming State Historic Preservation Officer (BLM and Wyoming SHPO 2014). Apart from certain considerations derived from specific cultural resource statutes, management of cultural resources on public lands is primarily based on FLPMA, and is fully subject to the same multiple use principles and the same planning and decision making processes followed in managing other public land resources.

BLM Manual 8130, Planning for Uses of Cultural Resources (BLM 2004c) (incorporating Information Bulletin No. 2002-101, Cultural Resource Considerations in Resource Management Plans), expresses specific objectives for cultural resource management and provides minimum goals for cultural resource management in all RMPs.

Issues Addressed by Management Actions

Almost all the compliance investigations of prehistoric cultural resources in the Planning Area during the past 30 years have been associated with proposed development projects. Exceptions include a Class II inventory performed by the Worland District in the late 1970s that included the Planning Area. Smaller studies have sampled specific areas, such as rockshelters along the Big Horn Mountain Slope (for example, see Fenner and Kornfeld 2006).

Research concerning historic cultural resources in the Planning Area and surrounding region has included extensive attention to the major historic trails; thematic research and fieldwork concerning ranching and homesteading; recent preparation of an historic overview of one of the early automobile routes to Yellowstone National Park; historical overviews and documentation of early major oilfields and oilfield camps; historical overviews and evaluation of at least two railroads; and building surveys performed by Certified Local Governments (primarily in urban settings). Trails, abandoned railroad lines, oil field development, and stockherding campsites are often found on public lands. Other historic cultural resource types are more often found on private property or in urban settings. Outstanding rural historic resources in the Planning Area include Heart Mountain Relocation/Internment Camp, the Bridger and Bad Pass Trails, and associated sites. Funding limitations and the immediate need to comply with Section 106 in advance of development, particularly development for extractive industries, means that current research activities are generally conducted in reaction to potential impacts to specific prehistoric resources.

Use Categories

BLM Manual 8110, Identifying Cultural Resources, defines six use categories – scientific use; conservation for future use; traditional use; public use; experimental use; and discharged from management. As noted in the manual, "A cultural property may be allocated to more than one use category … Allocations should be reevaluated and revised, as needed, when circumstances change or new data become available" (BLM 2004d).

The Planning Area contains outstanding prehistoric and historic cultural resources. There are 83 resources listed on the NRHP within Planning Area boundaries. Notable among these is the Hanson Site, which could be eligible for designation as a "World Heritage" site. Other notable resources include Medicine Lodge Creek, the Legend Rock Petroglyph site, Horner Paleoindian site, Black Mountain Archeological District, Paint Rock Canyon Archeological Landscape, Heart Mountain Relocation Historic District, and a number of rock shelters. Most historic-era resources are within town limits, with notable exceptions of Bates Battlefield, Bad Pass Trail, and Mason-Lovell, T E, and Worland Ranches. In addition to the cultural resources listed on the NRHP, 864 historic properties have been formally determined to be eligible for nomination to the NRHP.

Of the approximately 8,400 recorded cultural resources in the Planning Area, more than 6,400 recorded properties (or about 76 percent) have been evaluated for eligibility for nomination to the NRHP. These evaluations include sites that have been listed on the NRHP, sites for which the Wyoming State Historic Preservation Office (SHPO) has concurred with the evaluation, and others for which the evaluation is still in process. SHPO concurrence on NRHP evaluation is desirable, and while concurrence is not a foregone conclusion, in most cases SHPO will concur with agency determinations of eligibility. Eligibility for

nomination to the NRHP is a major threshold for management consideration of the sites, as discussed below. Cultural resource properties that have been formally evaluated can be assigned to one or more of the BLM resource use classifications, but the more than 1,850 cultural resources that have not been formally evaluated for NRHP eligibility can only be assigned to use classifications in a general or categorical sense, as described below.

Scientific Use

"Scientific Use" implies that the value (or a value) of the property lies in information that can be extracted from the property. This use category usually corresponds to NRHP Criterion D, which recognizes the value to society of properties that can yield or have yielded information important in expanding understanding of history or prehistory. Archeological sites are generally evaluated under this criterion, although other kinds of cultural resources might rarely also be evaluated under this criterion. The regulatory threshold for management of a cultural resource for its scientific values is eligibility for the NRHP under Criterion D. Management opportunities include in-place preservation and protection, or extraction of the scientific information by means of excavation and analysis. In the latter case, the physical cultural resource is at least partially destroyed, and the management requirement shifts to analysis and preservation of the information extracted from the site.

This use category applies to archeological resources that have been determined to be eligible for the NRHP under Criterion D, but it also applies to all archeological resources that have not yet been evaluated for NRHP eligibility. This use category could also apply to historic archeological sites or the archeological components of building complexes or examples of extractive industry. Because BLM Manual 8110 defines scientific use as "study that would result in the property's physical alternation or destruction," this use category does not apply to sites that are not altered or destroyed through study, such as emigrant trails, railroads or historic roads, most buildings and other structures, historic graves, or sites of primarily commemorative value, including rock art sites, medicine wheels, possibly other stone alignments, and TCPs.

Conservation for Future Use

Manual 8110 (BLM 2004d) defines this category as "reserved for any unusual cultural property which, because of scarcity, a research potential that surpasses the current state of the art, singular historic importance, cultural importance, architectural interest, or comparable reasons, is not currently available for consideration as the subject of scientific or historical study that would result in its physical alteration." This use category pertains to all cultural resources regardless of age or thematic associations, unless the resources have been formally determined to be ineligible for the NRHP under all of the NRHP Criteria for Evaluation. Sites that could be of scientific value, but are not immediate candidates for study under the "Scientific Use" category, will be managed under the "Conservation for Future Use" category. Because it is not feasible for the CYFO and the WFO to test all archeological sites and otherwise evaluate the NRHP eligibility of all of the recorded cultural resources in the Planning Area, conservation for future use effectively resolves into monitoring of other public land uses, evaluating specific proposed activities that might disturb specific cultural resources, controlling erosion of the resources, and actively stabilizing the resources as appropriate.

The Bighorn Basin includes a wealth of rock art sites that fit this category, particularly in terms of research potential and singular cultural importance. With a few exceptional cases where other uses have been explicitly identified (e.g., Legend Rock and Medicine Lodge Creek), rock art should be managed for conservation. Similarly, rock shelter sites also should be managed for conservation because of their potential to preserve exceptional chronological data in cultural deposits, and the possibility of including unique artifact types.

Traditional Use

Traditional use of cultural resources is interpreted to mean use of the cultural resource by a specific social and/or cultural group that perceives the resource as important to its heritage. Cultural resources can include TCPs, which are properties critical to a living community's beliefs, customs, and practices. TCPs can be topographical features; stone alignments, rock art, or other physical artifacts; sources of plants or other materials; or areas without obvious physical manifestation of the site's cultural significance. The regulatory threshold for management of a property as a TCP is eligibility for listing on the NRHP under any of the Criteria for Evaluation, although Criterion A is most commonly appropriate for representation of an event or broad pattern in history. No resource has been specifically identified in the Planning Area as a TCP as defined in National Register Bulletin 38 (Parker and King 1998).

TCPs in Wyoming are most commonly associated with Native Americans. Because the tribes of the area were removed to reservations outside the Planning Area in the 1860s, the ensuing discontinuity of occupation and use of the Planning Area since then is likely to have resulted in loss of areas of critical importance to some living Native American communities. Rock art localities throughout the Bighorn Basin are likely candidates for the traditional use category (McCleary 2008). Protection and access limitations are recommended for most of these, with efforts made to direct public interest toward groupings that are already well known (e.g., Medicine Lodge Creek) or slated for interpretive development (e.g., Legend Rock).

Public Use

Long-term preservation and onsite interpretation are most appropriate for cultural resources that have visually obvious manifestations of the site's historical or archeological importance. This resource type is well represented by the extensive examples of rock art in the Planning Area. Although the type of onsite interpretation that invites public access to the site is usually not appropriate for cultural resources that can be easily vandalized or degraded, including most archeological sites that might be important for their scientific values, some sites are already well known and thus vulnerable to damage. The intent of interpretive efforts is that education will help preserve the site and similar examples.

All BLM-administered lands are managed for public uses of one kind or another, and there is no distinct regulatory threshold for managing cultural resources through long-term preservation and onsite interpretation. Considerations for management in this manner are (1) the relative significance of the resource within historical, archeological, or other cultural context(s), (2) the sensitivity of the cultural resource to loss or degradation as a result of increased public access, and (3) the ability of the BLM to install and maintain interpretive features and support facilities while protecting the cultural values of the site. Management under this use category is therefore likely to be driven more by practical considerations than by regulatory requirements. Onsite interpretation also is not appropriate for most Native American TCPs, because of the possible degrading effects of public presence on the setting and feeling of these locations.

Experimental Use

Experimental use is rarely appropriate for cultural resources because of the singular, nonrenewable, and typically fragile nature of the resource. However, certain archeological sites, particularly rockshelters that contain well-defined stratified deposits might be appropriate for management under this use category. Also, an archeological site where there has been past excavation or where looting has already adversely affected the integrity of part of the site, could be a candidate for experimental use. Certain lithic sources, particularly a primary source, could provide samples useful in identifying sources and possibly ages of lithic materials found in archeological sites over a wide region. The regulatory threshold

for managing cultural resources for experimental use is likely to be eligibility under NRHP Criterion D, which involves the likelihood of yielding information important to expanding knowledge of history or prehistory. Archeological sites that could be adversely affected by development or other factors could also be candidates for experimental use as mitigation for the adverse effect. The BLM remains responsible for analyzing and protecting information obtained during mitigation of potential adverse effects to cultural resources.

Discharged from Management

This use category applies to any cultural resource the BLM and the Wyoming SHPO have determined to be ineligible for nomination to the NRHP. The Planning Area contains approximately 4,950 recorded cultural resources that have been determined to be ineligible for nomination to the NRHP, have been determined to be non-contributing elements of eligible properties, or have been destroyed. Sites placed in this use category "remain in the inventory, but they are removed from further management attention and do not constrain other land uses" (BLM 2004d).

Management Challenges

The BLM's primary challenge is to achieve a balance between protecting valuable cultural resources and simultaneously making other resources available within the context of multiple use. Pressures on cultural resources will likely increase from continued mineral resource development and direct, indirect, and cumulative impacts will continue to degrade a percentage of the cultural landscape. Case-by-case inventory will prevent harm to individual sites, but the lack of comprehensive inventory coverage will continue to hamper broad-scale interpretation and assessment of cumulative effects. Inventories would probably continue at roughly 100 or more projects per year, with inventories covering approximately 10,000 acres per year. Impacts to resources for which mitigation measures could not be developed through consultation could be expected to occur once every 5 to 10 years. However, as oil and gas exploration and development increase, the potential conflicts related to cultural resources also will increase.

The demand for consumptive use of cultural resources through tourism and archeological research projects is low but is anticipated to increase through time. This reflects an increasing interest in history and recognition of the fragile nature of the resource. Historic trails, particularly those in the NHT system, could see increased visitation. Maintaining the historic setting is critical to providing a quality experience for visitors. The setting is an essential component in determining whether a particular trail segment contributes to the trail's overall significance, and preservation of the viewshed through a setting consideration zone is a management goal. Setting is also an essential aspect of NRHP eligibility for other cultural resource types such as rock art and Native American sensitive sites and potential TCPs. However, it is not as important for some types of linear sites, such as canals and some roads. For example, preservation of viewshed through setting consideration zone is not necessary for the Black and Yellow or Park to Park highways.

American Indian concerns are becoming increasingly important as development pressures and awareness of four main issues increase. First, the Native American Graves Protection and Repatriation Act charges the BLM with establishing the cultural identity of human remains and returning them to the appropriate tribal group or reburying them according to their wishes; implementation of the Native American Graves Protection and Repatriation Act requires the BLM to consult with a broad spectrum of tribal authorities to determine the tribe to which the remains and materials should be repatriated. Second, American Indian religious concerns must be addressed through consultation with various tribes who have or historically had a presence in the area. While certain types of these cultural resources are

recognizable by their physical characteristics, others can only be identified by the practitioners of the culture to which they are relevant through the consultation process and on-the-ground site visits. The third area of concern is the identification of areas where Indian Traditional Practitioners collect plants or minerals. The final issue is assurance of access to areas of traditional importance, as provided for by American Indian Religious Freedom Act. In some cases these resource areas might also be eligible TCPs requiring full compliance with NHPA Section 106.

3.5.2 Paleontological Resources

Paleontological resources are defined as any fossilized remains, traces, or imprints of organisms, preserved in or on the Earth's crust, that are of paleontological interest and that provide information about the history of life on Earth. Paleontological resources (or fossils) can be the remains of plants or animals (body fossils), or reflect their actions (trace fossils). Paleontological resources are typically preserved in sedimentary rocks or, in a few unique situations, igneous and metamorphic rocks. They can be microscopic, as in single-celled animals (bacteria) or pollen; or macroscopic, such as fossils of leaves, petrified wood, shells of invertebrate animals, bones, teeth, tracks, feeding traces, coprolites, and burrows. Typical public conceptions of fossils are those of animals, especially dinosaur bones or teeth, or petrified wood.

BLM Management and Protection of Paleontological Resources

Paleontological resources on public lands are managed and preserved using scientific principles and expertise. BLM policy defines important fossils as including all vertebrate fossil remains, and plant and invertebrate fossils determined, on a case-by-case basis, to be scientifically unique. Abundance of these resources varies, with some geologic formations containing few or no important fossils and other formations known to commonly produce important fossils throughout the formation. The BLM does not allow commercial collecting of fossils from public lands, except petrified wood which is managed as a mineral material and is salable under the Mineral Materials Act (43 CFR 3600); unless it is determined that it is a paleontological resource because of its paleontological interest.

Congress passed the Paleontological Resources Preservation Act (PRPA) in March 2009. This Act supplements existing laws and guidance regarding paleontological resources on BLM-administered lands (e.g., FLPMA, BLM Manual 8270, and BLM Handbook H-8270-1). To address requirements in the PRPA, the BLM issued two IMs ("Casual Collecting of Common Invertebrate and Plant Paleontological Resources under the Paleontological Resources Preservation Act of 2009," April 24, 2009 and "Confidentiality of Paleontological Locality Information under the Omnibus Public Lands Act of 2009," June 5, 2009) (BLM 2009m; BLM 2009n).

Active Paleontology Permits, Monitoring, and Mitigation Efforts

Under current policy and continuing under PRPA, the BLM allows the collection of fossils with some restrictions, depending on the significance of the fossils. The BLM allows the public to collect common invertebrate or plant fossils in reasonable quantities for personal use, making negligible disturbance using only hand tools (casual-use or hobby collecting). Vertebrate and any administratively designated plant or invertebrate fossils may be collected only under certain conditions outlined in permits the BLM issues to qualified researchers. All fossils collected under a permit remain public property and must be curated in an approved repository.

The basic permit is the "Paleontological Resources Use Permit." Any research on paleontological resources, whether fossils are collected or not, requires a permit. The BLM issues a "Survey and Limited Collection Permit" for any research, survey, and collection of surface finds, and limits surface disturbance to 1 square meter or less. If the disturbance will be more than 1 square meter or require mechanized equipment, the researcher must apply for an excavation permit. Before it can issue an excavation permit, the BLM must prepare an Environmental Assessment for the proposed location. All fossils collected under a permit remain public property and must be curated in an approved repository.

As of early 2014, the BLM Wyoming State Office has issued between 100-120 separate active paleontological resources permits involving research and/or consulting in the Planning Area (BLM 2014b).

Potential Fossil Yield Classification

The BLM utilizes the Potential Fossil Yield Classification (PFYC) system to classify the potential to discover or affect important paleontological resources. The PFYC system is intended to help determine proper mitigation approaches for surface-disturbing activities, disposal or acquisition actions, recreation possibilities or limitations, and other BLM-approved activities. The PFYC system also highlights areas likely to be a focus of paleontological research efforts or illegal collecting. There are five classes of potential fossil yield, ranging from Class 1, "No Potential," to Class 5, "Very High Potential," for vertebrate or scientifically important paleontological resources. The *Glossary* includes a complete description of PFYC system classifications. Although granite and other igneous or metamorphic rock types are usually considered to be devoid of fossils, outcrops of these rocks can have fissure fillings, cave-like structures, sinkholes, and other features that could preserve important paleontological resources or information, so the potential is not zero; therefore, the BLM applies Class 1 to these rock types usually considered not to contain fossil resources.

As shown in Map 46, approximately 79 percent of the Planning Area is classified as Class 3 or 5 geologic formations, indicating a "Moderate" to "Very High" potential for vertebrate or scientifically important paleontological resources.

Identified Paleontological Resources

The Planning Area is one of the most important areas in the northern hemisphere for the paleoecological study of global climate change. Recent and current scientific research is focused on the Paleocene-Eocene Thermal Maximum (PETM) stratigraphic zone, which provides important data about paleoclimate in the basin. This important geologic contact between the Fort Union and Willwood formations in the Bighorn Basin and adjacent strata is an internationally known marker for data on paleoclimate, carbon isotopes, past global warming, and mammalian evolution. This important geologic zone is found in several locations throughout the Planning Area, including in the Clarks Fork Basin and Polecat Bench areas, south of McCullough Peaks, the Foster Gulch area, and several areas in the southern part of the basin. Research interest focusing on these areas is expected to increase over the next planning cycle.

The Planning Area is one of the principal areas in the U.S. for paleontological research on plants, dinosaurs, dinosaur tracksites, early mammal evolution, and paleoenvironments, with a long history of producing many important dinosaur, mammal, and plant specimens.

The Brown/Howe Dinosaur Area ACEC, which includes the Big Al Quarry, includes extensive outcrops of the famous Jurassic Morrison Formation, a well-known dinosaur-fossil bearing deposit (refer to Section 3.7.1 *Areas of Critical Environmental Concern*). Coyote Basin, and other areas north of Shell, Wyoming, are large areas of exposed dinosaur-rich fossil strata on public lands. The Red Gulch Tracksite ACEC contains a world-class exposure of Jurassic dinosaur tracks exposed in the lowermost Sundance Formation. Scientists have expressed interest in building a geoscience museum in nearby Shell that would focus on the paleontological values of the area. The Big Cedar Ridge ACEC contains outcrops of Cretaceous Meeteetse Formation that produce extremely well preserved plant fossils in a 72-million-year-old mudflow of volcanic ash. Natural Trap Cave, in the Little Mountain ACEC, is famous for producing fossils of Pleistocene-age mammals and other animals that fell into the cave and were preserved.

Important Fossil-bearing Strata in the Planning Area

Known fossil deposits in the Planning Area represent the past 543 million years, including the Paleozoic Era, virtually all of the Mesozoic Era (Age of Reptiles), and a major portion of the Cenozoic Era (Age of Mammals). Table 3-37 lists important fossil-bearing strata in the Planning Area, including some of the types of fossils within each strata, by decreasing geologic age. Only a few of the many different types of invertebrate and vertebrate fossils found in the formations are listed in the table and the list is not all inclusive.

The Jurassic Period Morrison Formation is known for its rich dinosaurian fauna (e.g., bones, teeth, skin impressions, eggshells, and trace fossils), and the Sundance Formation is important for its marine reptiles, trace fossils, and important invertebrate fossils.

Cretaceous strata in the Bighorn Basin have yielded important paleontological finds. In particular, outcrops of the Cloverly, Meeteetse, and Lance Formations produce dinosaur bones, while outcrops of the Thermopolis Shale and Mowry Shale produce the fossil bones of marine reptiles. The Meeteetse Formation has produced hadrosaur (duckbill dinosaur) bones and skin impressions in the Elk Basin area, and hadrosaur bones near Meeteetse. Fossil bones and teeth of the dinosaurs *Deinonychus* and *Tenontosaurus* have been found in many localities from the Cloverly Formation. The Paleocene/Eocene Willwood Formation occurs throughout the Bighorn Basin and is considered a world-class fossil resource in the field of mammalian paleontology and paleoclimate. These geologic zones are found in various locations throughout the Planning Area. Research interest focusing on these areas is expected to increase (BLM 2008f; Breithaupt 1996; Druckenmiller 2002; Eicher 1962; Love and Christiansen 1985).

Table 3-37. Geologic Age of Fossil-Bearing Strata in the Bighorn Basin

Formation or Deposit	Era	Period	Fossils Found within Unit
Cottonwood Canyon Member of Madison Limestone	Paleozoic	Devonian/Mississippian	Fossil Fish
Gypsum Spring Formation	Mesozoic	Jurassic	Vertebrate/Trace Fossils/Tracks
Sundance Formation	Mesozoic	Jurassic	Vertebrate/Invertebrate/Trace Fossils
Morrison Formation	Mesozoic	Jurassic	Vertebrate/Dinosaurian Fossils, Microvertebrates
Cloverly Formation	Mesozoic	Cretaceous	Vertebrate/Dinosaurian Fossils
Thermopolis, Mowry, Frontier, Cody shales	Mesozoic	Cretaceous	Vertebrate/Marine Reptiles and Fish Fossils
Meeteetse Formation	Mesozoic	Cretaceous	Vertebrate/Dinosaurian Fossils, Plant Fossils
Lance Formation	Mesozoic	Cretaceous	Vertebrate/Dinosaurian Fossils
Fort Union Formation	Cenozoic	Paleocene	Vertebrate/Mammalian Fossils, Plant Fossils
Willwood Formation	Cenozoic	Eocene	Vertebrate/Mammalian Fossils, Plant Fossils
Tatman Formation	Cenozoic	Eocene	Vertebrate/Mammalian Fossils, Plant Fossils
Wiggins Formation	Cenozoic	Eocene	Vertebrate Fossils
Terrace, colluvial, alluvial, glacial, eolian or cave deposits	Cenozoic	Quaternary/Pleistocene	Vertebrate Fossils

Sources: BLM 2008f; Breithaupt 1996; Druckenmiller 2002; Eicher 1962; Love and Christiansen 1985.

Paleontological Resources Management

Special Management Designations for Paleontological Resources

Four existing ACECs in the Planning Area have been identified for their paleontological values – Big Cedar Ridge, Red Gulch Dinosaur Tracksite, Brown/Howe Dinosaur Area, and Little Mountain. In addition to these existing ACECs, four areas have been nominated as new ACECs based on their paleontological values – the Clarks Fork Basin/Polecat Bench West Paleontological Area, the McCullough Peaks South Paleontological Area, the Foster Gulch Paleontological Area, and the Rainbow Canyon Area. Refer to Section 3.7.1 *Areas of Critical Environmental Concern* for information on these existing and proposed ACECs.

Management Challenges

The BLM manages paleontological resources for the overall benefit of the public, which can include research, preservation, interpretation and museum display, and recreation. While implementing regulations under the PRPA have not been issued at this time, the BLM is required to "manage and protect paleontological resources on federal land using scientific principles and expertise." Until the implementing regulations are issued, the BLM will continue to follow the policy and guidelines discussed above under *BLM Management and Protection of Paleontological Resources*.

Scientific Use

Balancing the needs of scientific research and public recreation (including hobby collecting and onsite interpretation and development) against preservation of the resource presents a challenge for the BLM. The primary resource indicator for paleontological resources is whether there is a loss of characteristics that make the fossil locality or feature important for scientific use or public education and enjoyment. Natural or accelerated erosion, decay, improper collection, and vandalism can remove, alter, or damage characteristics that make the paleontological resource scientifically important or enjoyable to the public.

The BLM management of research efforts is relatively indirect and limited, primarily responding to requests from scientific researchers for paleontological use permits. At present, there are more than 100 active permits for the Planning Area, and the number of requests for use permits is expected to increase in the future.

Public Use: Recreational Visits and Hobby Collecting

The BLM allows hobby collecting of common varieties of invertebrate or plant fossils and petrified wood throughout the Planning Area. Invertebrate fossils can only be collected in reasonable quantities for personal use while making a negligible disturbance and using only hand tools; unrestricted collecting is not allowed. Petrified wood can be collected for personal use in quantities of up to 25 pounds per day, but is limited to no more than 250 pounds per year. Because of a lack of information, at this time it is not possible to identify specific areas where unsupervised hobby collecting could occur; further study might determine that there are such areas and that collecting activities can occur in those areas. Concentrating people at a developed site often increases adverse impacts to that site and the resource through increased vehicle and foot traffic and exposure to vandalism.

Regional Population Growth

Increasing visitation to public lands due to increased population could result in both intentional and unintentional damage to paleontological resources as a result of collection, vandalism, surface disturbance, and other depreciative behavior. Remote areas once protected by their distance from populated areas, are now within reach of hikers, OHV users, and nearby residents. In addition, paleontological resources in the Western United States, including sites where dinosaur bones have been found, are attracting visitors from all over the world to areas where they could adversely affect fragile resources through overuse.

Vandalism and Looting

Throughout the decades, public lands have been an easy target for thieves and looters, and the plundering and destruction of paleontological resources has become a highly lucrative business involving a network of looters and buyers in the United States and elsewhere. Most fossils taken from public lands are difficult to track to their place of origin.

Localities known to contain commercially valuable fossils are the primary targets of looters, although objective estimates of the extent of damage and destruction to such places are hard to develop.

3.5.3 Visual Resources

The BLM has a basic stewardship responsibility to identify and protect visual values on public lands (BLM 1986c). To accomplish this, visual values are systematically identified and evaluated to determine appropriate management objectives. BLM policy guidance for Visual Resource Management (VRM) of BLM-administered public lands has not changed or been updated since the early 1980s. The following paragraphs describe the VRM system and visual resource inventory (VRI) process.

Visual Resource Inventory

As mandated by Section 201 of the FLPMA, the BLM prepares and maintains visual resource inventories to identify visual values for all public lands (BLM 1986c). The CYFO completed a new visual resource inventory in January 2009. The WFO reviewed and updated its visual resource inventory for all lands south of the Greybull River in winter and early spring 2009. This RMP and EIS incorporate the updated visual resource inventory information. See Appendix X for additional information on the visual resource inventory.

The VRI process uses three primary components to determine visual values within the Planning Area: Scenic Quality Evaluation, Sensitivity Level Determination, and Delineation of Distance Zones. Scenic Quality is evaluated based on an area's landform, vegetation, color, adjacent scenery, scarcity, and the level of human modification. The BLM rates the Scenic Quality of an area as an A, B, or C; A areas are the most scenic, and C are the least. Sensitivity Level is determined based on the type of users of a given area, the amount of use, public interest in the area, adjacent land uses, and any special designation (such as WSA) in the area. Based on these factors, the BLM rates an area's visual resources as having either high, medium, or low sensitivity levels. Landscapes are also divided into three Distance Zones based on their visibility from travel routes or Key Observation Points: foreground-middleground, background, and seldom seen areas. The foreground-middleground zone includes areas seen from highways, rivers, or other viewing locations which are less than 3 to 5 miles away. Seen areas beyond the foreground-middleground zone, but usually less than 15 miles away, are in the background zone. Areas not seen as foreground-middleground or background (i.e., hidden from view) are in the seldom-seen zone. Because of the dense travel network within the Bighorn Basin, no areas were classified as background, or seldom seen; the only Distance Zone classification in the Planning Area is foreground-middleground.

Based on Scenic Quality, Visual Sensitivity, and Distance Zone, BLM-administered lands are placed into one of four VRI classes. These inventory classes represent the relative value of the visual resources and are informational in nature. Classes I and II are the most valued, Class III represents a somewhat lesser value, and Class IV represents the least value (due to low scenic quality or substantial development). Changes in sensitivity levels and scenic quality in the Planning Area have resulted in changes to the VRI. Some areas moved from Class II and III to IV, and other areas from III and IV to II. Special Areas, such as WSAs, are automatically rated as visual resource inventory Class I. Table 3-38 provides an illustration of the basis for determining VRI classes based on the components of Scenic Quality, Visual Sensitivity, and Distance Zones.

Table 3-38. Visual Resource Inventory Classes

		Visual Sensitivity Levels						
		High			***Medium***			***Low***
Special Areas		I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II
	B	II	III	III[1]	III	IV	IV	IV
				IV[1]				
	C	III	IV	IV	IV	IV	IV	IV
Distance Zones		f/m	b	s/s	f/m	b	s/s	s/s

Source: BLM 1986c

Distance zones: f/m = foreground-middleground, b = background, s/s = seldom seen areas

[1]If adjacent areas are Class III or lower then Class III is assigned. If adjacent areas are higher than Class III, then Class IV is assigned.

Table 3-39 includes the acreage for each VRI component sorted by rating (Scenic Quality, Sensitivity Level, and Distance Zone) in the Planning Area along with the resultant VRI classes. The VRI classes provide the baseline for visual resources in the Planning Area and are the indicator of visual values against which the impacts from VRM under the various RMP alternatives are measured. Maps showing the scenic quality evaluations, sensitivity levels, and VRI classes for the Planning Area are provided in Appendix X.

Table 3-39. Visual Resource Inventory Component and Class Ratings

Inventory Component and Rating	Acres (BLM-administered surface)
Scenic Quality Evaluation[1]	
A	1,333,214
B	1,017,932
C	699,458
Special Areas[2]	141,000
Sensitivity Level Determination[3]	
High	1,013,970
Medium	479,435
Low	1,557,200
Special Areas[2]	141,000
Distance Zone[4]	
Foreground/Middle Ground[4]	3,046,814
Special Areas[2]	141,000
Visual Resource Inventory Class	
Class I	140,971
Class II	984,812
Class III	384,589
Class IV	1,681,176
Not Rated[5]	37

Sources: BLM 2013a; BLM 2009e.

[1]A-rated lands are the most scenic, C-rated lands are the least.
[2]Special Areas include Wilderness Study Areas and other federal agency's surface land. These areas are either required to be managed as VRM Class I and therefore automatically placed into VRI Class I (e.g., WSAs on BLM-administered surface) or are managed under other agencies' VRM procedures and therefore not assigned to a VRI class (e.g., National Recreation Area lands around Yellowtail Reservoir). As a result, numbers may exceed total of all BLM-administered lands in Planning Area due to slight overlap in class ratings. For both cases, lands classified as Special Areas are not rated for Scenic Quality, Visual Sensitivity, or Distance Zone.
[3]High, medium, or low sensitivity levels are based on factors including amount of use, public interest, and adjacent land uses.
[4]The only distance zone in the Planning Area is Foreground/Middle Ground. Foreground-Middleground is the area seen for a distance of 3 to 5 miles.
[5]Surface lands managed by another federal agency, such as the National Park Service. These areas are not assigned to a VRI class.

BLM Bureau of Land Management

Visual Resource Management Classes

The BLM considers visual values along with other resource values in the RMP process. Based on the VRI, along with other resource values and opportunities in a given area, the BLM establishes visual objectives for VRM. The BLM conducts visual resource inventories for all lands in the Planning Area; however, only BLM-administered lands are managed within the VRM system. Approved VRM objectives according to each VRM Class (see below; not to be confused with VRI classes) provide visual management standards for the design and development of projects on the public lands. The specific objectives for the four VRM classes are as follows:

- **Class I Objective.** The objective for this class is to preserve the existing character of the landscape. This class provides for natural ecological change; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- **Class II Objective.** The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- **Class III Objective.** The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- **Class IV Objective.** The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape character elements. (Note that Class IV areas are not necessarily of low scenic quality).

Visual Contrast Rating and Design Principles

The VRM system is designed to separate the existing landscape and proposed projects into features (landforms and water, vegetation, and structures), and landscape character elements (form, line, color, and texture) to compare each part to the other to identify parts that are not in harmony. The BLM uses the visual contrast ratings (BLM 1986d) to analyze proposed projects during the environmental review process. Visual contrast ratings determine whether proposed projects meet established VRM objectives. They also are a valuable tool to identify visual impacts and to identify effective means to mitigate them. Basic landscape design principles, which include repeating landscape character elements, minimizing surface disturbance, and proper siting and location, are invaluable to design (or re-design) projects to minimize adverse visual impacts.

Visual Resource Management within the Planning Area

Important Visual Resources

There are many highly scenic areas in the Planning Area. The landscape exhibits a high degree of variability in the visual environment. The Planning Area contains open rolling hills, low mesas, badland areas, small mountain ranges, scenic river valleys, narrow, deep canyons, and dramatic colorful ridges. Specific scenic areas in the Planning Area include the slopes of the Big Horn and Absaroka mountains; badland areas such as McCullough Peaks, Fifteenmile area; dramatic landforms like Sheep Mountain, Carter Mountain, and Bald Ridge; portions of the Bighorn River corridor; Heart Mountain; and the numerous canyons along the west slope of the Big Horns. Rattlesnake and Cedar mountains, along with the Shoshone River canyon, frame the major travel corridor between Cody and Yellowstone National Park. The Wind River Canyon into Thermopolis, and Highways 16, 14, and 14a offer high scenic qualities to the casual observer as they enter the basin. Table 3-39 provides a quantitative summary of the ratings under each of the VRI components.

VRM Classes and Associated Acreages

Table 3-40 lists acreages by VRM class for all lands in the Planning Area. Lands in VRM Class I are WSAs and the Five Springs Falls ACEC. Lands not rated include the Bighorn Canyon National Recreation Area and Buffalo Bill State Park. Map 47 shows existing VRM classes in the Planning Area.

Table 3-40. Visual Resource Management (VRM) Classes

VRM Class	Acres (BLM-Administered Surface)
Class I	141,127
Class II	340,784
Class III	890,482
Class IV	1,815,043
Not Rated	23

Sources: BLM 1988a; BLM 1990; BLM 1998a; BLM 2013a.

BLM Bureau of Land Management

Visual Resource Conditions

While a large proportion of BLM-administered lands in the Planning Area are classified as VRM classes III and IV, most of the Bighorn Basin retains a fundamentally natural appearance and has notable scenic quality. Few areas are visually degraded by industrial activity and those that have undergone development (for example, the Elk Basin oil field northeast of Cody) have a very high potential to be restored to natural-appearing scenic landscapes. The Planning Area also contains fairly rugged landscapes with considerable visual variety. Landscapes such as these have the capacity to absorb visual intrusions and limit adverse impacts of development on the scenic quality of the landscape.

Types of Visual Intrusions

Visual intrusions on BLM-administered lands in the Planning Area include oil and gas fields, bentonite mining, the network of roads and highways, powerlines and various facilities needed to support mineral development, recreation, range improvements, and other facilities and infrastructure. Overall, other than the pockets containing a significant amount cultural modifications (such as Hamilton Dome, Grass Creek, Oregon Basin, and Elk Basin to name a few), the development in the Planning Area has left a small footprint and has not substantially changed the visual character of the area.

Management Challenges

Management challenges for VRM in the Planning Area remain essentially unchanged over the last 20 years. Management challenges for visual resources typically result from development associated with minerals and ROWs. An emerging management challenge for VRM in the Planning Area could result from renewable energy development. There could be wind-energy development projects in the Planning Area during the planning cycle because of wind potential and current policy direction for renewable energy development on public lands. Additional discussion on policies relevant to renewable energy production on public lands is included in Section 3.6.2, *Renewable Energy.* Due to the height and size of wind turbines and the locations of areas with high wind potential (usually along ridgelines, hills, or other highly visible areas) impacts to visual resources can be especially intrusive and difficult to mitigate. If development of wind energy occurs in the Planning Area, the BLM will face management challenges in meeting visual resource objectives in these areas.

Another challenge for VRM is the growing and expanding development of bentonite extracting activities. Currently, BLM-administered public lands managed under VRM Class II objectives overlay desirable bentonite beds. A recent increase of bentonite plans of operations have been located in VRM Class II, which provides a challenge to authorize the mining activity while maintaining Class II objectives.

3.6 Land Resources

Land Resources include the individual resources of lands and realty, renewable energy, ROWs and corridors, comprehensive travel and transportation management (CTTM), recreation, wilderness characteristics, and livestock grazing management. The following sections describe each resource, its existing condition, and management challenges.

3.6.1 Lands and Realty

The lands and realty program manages the underlying land base that supports all resources and management programs in the Planning Area. Management decisions for lands and realty are limited to BLM-administered public lands, though lands and realty actions during the life of the RMP could involve other surface managers. The primary activities of the lands and realty program include (1) land use authorizations such as ROWs, leases, and permits; (2) land tenure adjustments, including sales and other types of disposal actions, exchanges, donations, acquisitions of lands and interests in lands (i.e., access easements); (3) withdrawals, classifications, and segregations; and (4) management of land boundaries. As part of the processing of lands and realty actions, the BLM works cooperatively with other federal agencies, the state of Wyoming, cities and counties, and public and private landholders.

Land Status

The BLM administers 3,187,814 acres (56 percent) of surface lands in the Planning Area (Table 3-41). Private land ownership accounts for the second largest amount of surface land ownership in the Planning Area. Of the four counties in the Planning Area, Big Horn County contains the largest amount of BLM-administered land (Table 3-42).

Table 3-41. Surface Ownership in the Planning Area

Surface Manager	Planning Area Total Acres	Planning Area Percentage
Bureau of Land Management	3,187,267	56.5
National Park Service	15,645	0.3
State of Wyoming	418,659	7.4
Bureau of Reclamation	86,193	1.5
Private	1,919,656	34.0
Water	12,643	0.2
Other	3,777	0.1
Total	**5,644,868**	**-**

Source: BLM 2013a

Table 3-42. Acres of Bureau of Land Management-Administered Lands and Federal Mineral Estate in the Planning Area

County	BLM-Administered Land	Federal Mineral Estate[1]
Big Horn	1,157,920	1,288,238
Hot Springs	500,631	741,151
Park	624,870	1,049,904
Washakie	903,846	1,123,281
Total	**3,187,814**	**4,203,213**

Source: BLM 2013a

[1]The acreages listed for BLM-administered federal mineral estate do not include United States Forest Service lands.

BLM Bureau of Land Management

The BLM administers 4,203,213 acres of federal mineral estate in the Planning Area (Table 3-42). The CYFO extends west beyond the Planning Area boundary, but the USFS and the National Park Service manage these lands and the associated mineral estate, and they are not further addressed in this RMP and EIS. Although the BLM administers the leasing of the mineral estate underlying USFS and BOR withdrawn lands, mineral management decisions on these lands are made by the surface management agency. On many of the private lands, the mineral estate (all of the minerals or portions of the minerals) is reserved to the U.S. Government. In these cases, the BLM administers the mineral estate and the private landowners administer the surface estate. These lands are referred to as split-estate (ownership) lands.

Land Use Authorizations

Land use authorizations include various authorizations to use public surface for leases, including ROWs under Section 501 of FLPMA, permits, and easements under Section 302(b) of FLPMA; Recreation and Public Purposes (R&PP) leases under the R&PP Act of June 14, 1926 (43 U.S.C. 869 et seq.); and airport leases under the Federal Public Airport Act of 1928, as amended (49 U.S.C. Appendix, Sections 211-213). This section briefly describes land use authorizations and the authorizing regulations for these lands and realty actions.

Rights-of-Way

FLPMA Section 501 authorizes the BLM to grant ROWs for infrastructure and facilities that are in the public interest and require ROWs over, under, upon, or through BLM-administered lands. Most ROW applications in the Planning Area are for linear developments such as roads, pipelines, and other associated infrastructure. Refer to Section 3.6.3 *Rights-of-Way and Corridors* for a detailed description of ROWs in the Planning Area.

Leases, Permits, and Easements

Section 302(b) of FLPMA authorizes the BLM to issue leases, permits, and easements for the use, occupancy, and development of public lands. The field offices in the Planning Area administer six long-term special land use permits, three of which authorize farming on 60 total acres. In addition, an average of seven short-term permits are managed in the Planning Area each year, which can include

short-term permits for commercial filming projects. The BLM has never authorized easements for public land use in the Planning Area.

Recreation and Public Purposes Act Leases and Conveyances

The R&PP Act authorizes the BLM to lease or convey public surface to state and local governments and qualified nonprofit organizations for recreation and/or public purpose uses. Examples of typical uses under the R&PP Act include historic monument sites, campgrounds, schools, parks, public works facilities, and hospitals. Lands are typically leased first until development of the site is completed and then, if appropriate, the BLM may convey a title. Lands proposed to be leased or conveyed under the R&PP Act must first be classified as suitable for such use. R&PP classifications segregate the land from operation of the public land laws other than the R&PP Act; the R&PP Act precludes disposal by sale, exchange or other means, but specifically allows for R&PP lease or conveyance. R&PP classifications also segregate areas from operation of the mining laws, closing the area to mining of locatable minerals. R&PP classifications do not segregate areas from mineral leasing. R&PP leases and conveyances reserve all minerals in the land to the United States.

The BLM administers 12 R&PP patents covering 2,744 acres, including 3 pending covering 537 acres. In addition, there are a total of seven R&PP leases; six covering 435.5 acres and one pending lease application totaling 440 acres. Table 3-43 lists existing and pending R&PP leases in the Planning Area.

Table 3-43. Existing and Pending Recreation and Public Purpose Act Leases in the Planning Area

Current Leases	Lessee	Acres
Cody Archery Range	City of Cody	96
Lovell Gun Range	Big Horn County	136
Wapiti Fire Station	Fire District	2
Moonrock Equestrian Area	Washakie County	127.5
Radio-Controlled Model Airplanes	Washakie County	34
Thermopolis Radio Control Club	Hot Springs County	40
Current Total	**-**	**435.5**
Pending Leases (applications in process)	**Lessee**	**Acres**
Bighorn Bow Hunters-Archery Range	Hot Springs County	440
Pending Total	**-**	**440**

Source: BLM 2009a

Airport Leases/Grants

Six communities in the Planning Area have an associated public airport – Powell, Cowley, Greybull, Worland, Thermopolis, and Cody. In 1950, the BLM conveyed 650 acres of public land to Big Horn County/City of Greybull for the Greybull Airport, with an additional 70 acres proposed for a runway expansion. In 2004, the BLM conveyed 80 acres of public land to the City of Worland to allow shifting of the primary runway and an extension of the runway and taxiway at the Worland Municipal Airport. The BLM has not received any other airport or airway applications. Refer to Appendix M for additional details pertaining to airport grants.

Unauthorized Use, Trespass, and Illegal Dumping

Unauthorized use and trespass are the use, occupancy, or development of public land or its resources without a required authorization, or in a way that is beyond the scope and terms and conditions of an authorization; this definition excludes uses defined as casual use in the regulations (43 CFR 2920.1-2[a]).

Some trespass actions, such as illegal dumping, can cause unmitigated damage to public lands and natural resources. In the event the BLM is not able to identify a responsible party, the cost to resolve trespass and to clean up and reclaim the affected public land is often passed on to the general public. These costs direct appropriated funds away from planned work, and affect the BLM's ability to complete its mission. In addition, the public does not receive fair market value for use of the public lands, lands that could be otherwise available for use can become unavailable.

Trespass has been an ongoing problem in the Planning Area. Limited staff and funding is a contributing factor allowing trespass to continue unabated. When trespass actions go undetected or are not addressed, there is no incentive to cease and no deterrent to further trespass action. Known illegal activities include placement of beehives; indiscriminate dumping of trash, debris, and household wastes; farming/irrigation of public land; corrals; fences; and construction of roads and other utility-related features. Agriculture trespass and trash dumping are the most common, with numerous small-acreage areas involved. There are no known hazardous material issues associated with permitted facilities. An inventory of closed landfills in 2007 indicated there are no problem areas that need to be addressed in the CYFO; there has been no similar inventory for the WFO portion of the Planning Area.

In the CYFO Planning Area, there are more than 30 substantial (1 to 5 acres or more) unresolved trespass cases, and another 60 to 70 possible cases involving less than 1 acre in the CYFO. In the WFO, there are 57 documented cases of realty trespass and one documented case of ROW trespass. Typically, 3 to 5 cases are resolved each year, with some situations requiring a formal land survey to determine property boundaries. There is a potential for other unauthorized agricultural and occupancy trespass situations to occur in the Planning Area.

Land Tenure Adjustments

Scattered parcels of BLM-administered land can be difficult to manage as part of the public land system. In many cases, the small size of the scattered parcels, their isolation from other parcels of public land, and lack of legal access can make them of marginal utility for retaining in public ownership. Occasionally, these isolated parcels can serve other resource purposes, such as providing wildlife habitat in an area that has been fragmented by suburban development or providing recreational facilities.

Land tenure (or land ownership) adjustment refers to lands and realty actions that result in the retention or disposal of BLM-administered lands, or BLM acquisition of non BLM-administered lands or interests in lands. The FLPMA requires that public land be retained in public ownership unless, as a result of land use planning, disposal of certain parcels is justified. Parcels of land designated as potentially available for disposal are more likely to be conveyed out of federal ownership through an exchange rather than a sale. Prior to disposal of federal lands, the BLM conducts additional analysis including preparation of a mineral potential report and standards for boundary evidence certificate(s). Acquisition of and interests in lands are important components of the BLM land tenure adjustment strategy. Acquisition of and interests in land can be accomplished through several methods, including exchange, purchase, donation, and condemnation. Voluntary purchases or exchanges from willing sellers, including easements, are common methods used to increase access to public lands. Appendix M contains detailed information regarding land retention, acquisition, and disposal.

The BLM acquires lands and interests in lands to accomplish the following actions:

- To allow for access to BLM-administered lands across private lands.
- To improve management of public land resources through consolidation of federal, state, and private lands.
- To secure key property necessary to protect endangered species, promote biological diversity, increase recreational opportunities, and preserve archeological and historical resources.
- To implement specific acquisitions authorized or directed by acts of Congress.

Exchanges

Exchange is the process of trading lands or interests in lands. Conducted under the authority of Section 206 of the FLPMA, land exchanges are a tool that enables the BLM and other landowners to improve land management, consolidate ownership, and protect environmentally sensitive areas. By exchanging public land that is isolated and difficult to manage, the BLM is able to acquire other lands with importance for recreation, wildlife, fisheries, wetlands, habitat for threatened and endangered species, wilderness, open space, scenic, cultural, and other resource conservation purposes. Land exchanges allow the BLM to reposition lands into more manageable units and to meet community expansion needs.

Exchanges are the primary means by which the BLM acquires land. Except for exchanges that are congressionally mandated or judicially required, exchanges are voluntary and discretionary transactions with willing landowners. Lands to be exchanged must be of approximately equal monetary value and in the same state. Exchanges must also be in the public interest and conform to applicable BLM land use plans and other relevant guidance.

There has been only modest exchange activity in the Planning Area, although interest in exchanges continues to increase. The most recent land exchanges were the Hoodoo Ranch/Hunt Oil Exchange (7,848 acres conveyed, 6,487 acres acquired) in 1995 and the Great Western Exchange (6,894 acres conveyed, 2,399 acres acquired) in 1999. Another recent exchange resulted in the acquisition of 2,839 acres of private land in the South Big Horn Mountains area. Appendix M contains additional detailed information regarding BLM land exchanges and sales.

Purchases

Under Section 205 of the FLPMA, the BLM has the authority to purchase lands or interests in lands. Similar to other acquisitions, purchase is used to acquire key natural resources or to acquire legal ownership of lands that enhance the management of existing public lands and resources. Acquisition of lands through purchase helps consolidate management areas to strengthen resource protection. Given the limited funds available through appropriations, the BLM acquires lands through purchase sparingly. Depending on the designation and land ownership pattern, private, State or Bureau of Reclamation lands surrounded by BLM-administered public lands managed as a special designation, such as ACECs or WSAs, may be considered for acquisition.

The BLM recently completed several land purchases in the Planning Area using Land and Water Conservation funds. Two such purchases were completed in 2003 and involved lands associated with distinct management areas – a 160-acre in-holding in the Brown/Howe Dinosaur Area ACEC near Shell, and 8,200 acres in the Little Mountain area near Lovell. The BLM recently purchased 153 acres along the Bighorn River to secure property along the river for public access and wildlife habitat. An additional 1,179 acres of land within the Craig Thomas SMA was acquired in 2010 with Land and Water Conservation Funds.

Acquiring access easements across non-federal lands for roads and trails provides for legal public access to "landlocked" public lands. Easement acquisition has been a long-term effort in the Planning Area, largely because of the scattered land pattern in many areas. The BLM usually purchases access easements using appropriated funds, although some have been donated. Most access easements provide legal public vehicular, foot, or horseback access on roads or trails to large blocks of federal land. The BLM currently manages 110 easements acquired for public access across non BLM-administered land in the Planning Area.

Donations and Condemnations

The BLM occasionally receives gifts or donations of lands or interests in lands when an entity elects not to receive the market value for the interests being conveyed. A donation of $100,000 from the Rocky Mountain Elk Foundation was part of the Devils Canyon Ranch acquisition in 2003. The BLM has not acquired any lands in the Planning Area through condemnation.

Land Disposal

Public lands have potential for disposal when they are isolated and/or difficult to manage. Disposal actions are usually in response to public requests, such as community expansions. Disposals result in a title transfer, wherein the lands leave the public domain. The BLM coordinates all disposal actions with adjoining landowners, local governments, and current land users.

The BLM manages public sales under the Section 203 disposal criteria of FLPMA. Public lands determined suitable for sale are offered on the initiative of the BLM or through a nomination/request for sale from the public. The BLM does not sell lands at less than fair market value.

Appendix M and Map 51 describe and show properties identified for disposal or retention. Tracts of land designated in this RMP as potentially available for disposal are more likely to be conveyed out of federal ownership through an exchange rather than a sale.

Section 209 of the FLPMA specifies that all minerals underlying public lands disposed of by sale shall be reserved to the United States, unless there are no mineral values in the lands or the reservation of mineral rights to the United States is interfering with or precluding appropriate non-mineral development of the land, and such development is a more beneficial use of the land than mineral development.

Section 209 of FLPMA also specifies the conditions under which mineral rights will be conveyed, including payment of the administrative costs of the sale, payment of fair market value for the mineral rights, and conducting an exploratory program. Mineral rights may be sold with the land surface, sold as a separate transaction, or retained by the United States. In the Planning Area, the BLM has conveyed mineral rights only in conjunction with the sale of lands.

Approximately 115,905 acres of public lands are currently identified for disposal by sale. However, little public land has actually been offered for sale under FLPMA. Four parcels have been sold in the last 11 years, as follows:

- In 2003, the BLM sold 0.99 acre to Hawkins and Powers, Inc., for a parking lot for an airplane museum near Greybull.
- In 2002, the BLM sold 30 acres to Robert G. Griffin for the existing Grass Creek Sawmill site, which was previously authorized under a long-term lease.
- In 2006, the BLM sold 3.75 acres to the Mary A. Clay Revocable Trust to resolve an inadvertent trespass issue.

- The BLM has identified (and Congress has authorized) approximately 16,122 acres of land (the Westside Irrigation Project) for conveyance to local farmers for development as farm land (private land ownership). Pending inventory of these lands, some or all will be disposed from BLM ownership. The BLM will retain lands in this area not disposed of and will manage those lands consistent with adjacent BLM-administered lands.

Retention

Lands identified for retention in the Planning Area are BLM-administered lands not identified for disposal and lands not currently classified for disposal (e.g., R&PP Lands and Desert Land Entry [DLE] Lands). The BLM has identified a total of 3,071,909 acres for retention in the Planning Area.

Desert Land Entries

Congress passed the Desert Land Act on March 3, 1877, to encourage and promote the economic development of arid and semiarid public lands in the western United States. The purpose of the Act is to permit reclamation by irrigation of arid public land through individual effort and private capital. Arid lands capable of producing a reasonable cash agricultural crop using irrigation may be considered for a DLE. The lands must be untimbered, surveyed, unreserved, and unappropriated. If an applicant meets the final proof requirements of a DLE, a patent to the legal title of the land may be conveyed.

Most of the lands suitable for agricultural development in the Planning Area have already been placed into private ownership. With the problems of finding suitable public land, limited water available for irrigation, and the high cost of development, it is difficult to acquire a DLE under the 1877 Desert Land Act, but Act authority remains available.

A total of 1,409 acres are currently classified as suitable for entry under the Desert Land Act. There were DLE conveyances in 2003 west of Greybull (280 acres) and two DLE conveyances in 1999 (a total of 457 acres), also in Big Horn County. Since the previous RMPs, the BLM has received a number of DLE applications, but the BLM has not processed the applications because of other higher priority workload commitments, such as energy development. Additional details regarding BLM processes for desert land entries are located in Appendix M.

Withdrawals and Classifications

Lands are withdrawn under various legal authorities, including Acts of Congress. A withdrawal is a formal action that withholds an area of public land from settlement, sale, location, or entry under some or all of the public land laws; or segregates (closes) the area to mineral entry (locatable mineral development) or mineral leasing (leasable mineral development). Withdrawals are made with the purpose of limiting activities under those laws to maintain other public and resource values in the area, to reserve the area for a particular public purpose or program, or to transfer jurisdiction over an area of federal land from one department, bureau, or agency to another. Withdrawals are established for a wide range of public purposes, including military reservations, reclamation projects, and power-site reserves.

Existing withdrawals in the Planning Area have been established to protect resource values and to transfer jurisdiction to other federal agencies to accomplish their missions and goals. Withdrawals may be subsequently relinquished, in which case the land may be returned to its original jurisdiction. Withdrawn lands no longer needed by the agency for which the lands were withdrawn and have been relinquished by the agency, that are suitable for return to the public land status, will be managed by the BLM. Table 3-44 lists existing and proposed withdrawals, classifications, and other segregations in the Planning Area.

Table 3-44. Existing and Proposed Withdrawals, Classifications, and Other Segregations in the Planning Area

Field Office	Name	Acres[1]	Segregates/Withdrawals from	
			Disposal	*Locatables*
	Resource Protection			
CYFO	Stock Driveway	37,297	■	
WFO	Stock Driveway	60,452	■	
CYFO	Cave and Karst Areas	0		■
WFO	Cave and Karst Areas[2]	8,560		■
CYFO	Spirit (Cedar) Mountain Cave	234	■	■
CYFO	Horsethief/Natural Trap Caves	519	■	■
WFO	Big Cedar Ridge Paleontological Area	264	■	■
WFO	Red Gulch Dinosaur Tracksite	1,798	■	■
WFO	Castle Gardens Recreation Site	110	■	■
CYFO	Beck Lake Scenic Area (Proposed)	708	■	■
CYFO	Heart Mountain National Historic Landmark	72		■
	Management Areas			
CYFO	ACECs	11,935		■
WFO	ACECs[2]	22,239		■
CYFO	Wild and Scenic Rivers	4,518		■
WFO	Wild and Scenic Rivers	12,129		■
	Other Segregations			
CYFO	Cody Industrial Park	0		■
WFO	BLM-Wyoming State Office Public Water Reserve	2,140	■	
CYFO	BLM-Wyoming State Office Public Water Reserve	625	■	
WFO	BLM-Wyoming State Office Power Site Reservation	159	■	■
CYFO	BLM Power Site Reservation	3,308	■	■
	Other Federal Agency Withdrawals			
WFO	Power Site Classification (FERC)	1,249	■	■
CYFO	Power Site Classification (FERC) (Clarks Fork of the Yellowstone and Bighorn rivers)	15,696	■	■
CYFO	Department of Defense (Lovell Military Training Area)	3,543	■	■
CYFO	National Park Service – Big Horn Recreation Area	15,630	■	■
CYFO	U.S. Forest Service – Wood River Guard Station	39	■	■

Source: BLM2013a

[1]Withdwrawal and classification acreages provided in this table are not additive.
[2]Withdrawals for cave and karst areas that overlap the Spanish Point Karst ACEC are counted in both locations.

ACEC	Area of Critical Environmental Concern	CYFO	Cody Field Office
BLM	Bureau of Land Management	FERC	Federal Energy Regulatory Commission
BOR	Bureau of Reclamation	WFO	Worland Field Office

Two public land orders (Public Land Order 7396 on July 6, 1999, and Public Land Order 7370 on November 5, 1998) restored approximately 153,762 acres of previously withdrawn BOR land to BLM jurisdiction.

Land classification is a process required under specific laws to determine the suitability of public lands for certain types of disposal or lease, or suitability for retention and multiple use management. Most land classifications also segregate public lands from operation of some or all of the public land laws and/or mineral laws. Table 3-44 identifies existing site-specific classifications. Pending classifications associated with a proposal/application include 2 R&PPs and 13 DLEs which are under consideration for classification. Lands proposed to be leased or conveyed under the R&PP Act must first be classified as suitable for such use.

The 1964 Classification and Multiple Use Act established several existing classifications. The lands were classified for retention and multiple use management, and against sale, agricultural entry, and mining location, but they remain open to mineral leasing. In the Little Mountain area, approximately 2,800 acres are still included in this group of classifications.

Other segregations result from a variety of actions, such as exchanges and land sales in which the federal mineral rights are reserved to the United States in the land patent.

Management Challenges

There are a variety of management challenges for the lands and realty program in the Planning Area. These are based on historic activities and trends and current and future needs of public resources and internal and external customers. Most management challenges for lands and realty are related to balancing land tenure adjustments and land use authorizations between the maintenance of BLM resource objectives and the needs and desires of the public and other federal agencies.

Resolving trespass, dumping, and illegal use issues on public land is an important management challenge for the lands and realty program. There also are management challenges related to land tenure adjustments and the availability of lands and realty and other BLM personnel. The BLM has not fully surveyed many parcels identified for disposal and is uncertain of the condition of resources in these lands. Inventories of lands listed for disposal might identify unique resources, which could cause the BLM to reconsider these lands for disposal. Inventories of disposal lands and their resources also could increase public interest in land exchanges that would benefit both parties. Land exchanges present their own set of challenges because exchanges require a commitment of resources in both personnel and operating costs. Land exchanges, and potentially any land tenure adjustment, can be issues in relation to the value and appraisals attributed to the land and the equity of the land exchange. Interest groups and the general public are vested in the use of public lands, and the lands and realty program faces internal and external challenges to implement equitable land tenure adjustments that are in the public's interest.

Timely processing of permits (e.g., filming permits) and leases is a challenge for the lands and realty program. Local filming commissions compete intensively to bring these projects to the Planning Area, where the projects help support short-term economic activity. If the BLM cannot quickly process filming and other permits and leases, applicants often pursue other locations that would not benefit economies in the Planning Area.

3.6.2 Renewable Energy

Solar, wind, biomass, geothermal, and hydroelectric power are considered renewable energy resources. Wind energy produces electrical energy through the use of large wind turbines. Solar power refers to energy from the sun that is converted into thermal or electrical energy. Geothermal energy is derived from the heat stored in the interior of Earth. Biomass energy is the burning or use of organic materials as a source of energy. Hydroelectric power refers to the production of electrical power through the use of falling or flowing water. Wind, solar, biomass, and hydroelectric facilities are processed through the lands and realty program and authorized under Title V of FLPMA as ROW actions. Geothermal actions are considered a fluid leasable mineral and the BLM processes those actions according to the provisions of the Mineral Leasing Act.

BLM policy is to encourage the development of renewable energy in acceptable areas. In addition, Executive Order 13212 instructs the BLM "to expedite projects that will increase the production, transmission, or conservation of energy." As demand has increased for clean and viable energy to power the Nation, consideration of renewable energy sources on BLM-administered land has become a necessary component of land management planning.

In March 2009, the Secretary of the Interior issued a secretarial order making the production, development, and delivery of renewable energy on public land a top priority for the DOI. In addition to making renewable energy production a top priority for the department, the secretarial order established an energy and climate change task force with the goal of furthering the renewable energy agenda and identifying specific zones on public lands where the DOI can facilitate a rapid and responsible move to large-scale production of solar, wind, geothermal, and biomass energy.

In cooperation with the U.S. Department of Energy National Renewable Energy Laboratory (NREL), the BLM assessed renewable energy resources on BLM-administered land in the western United States, including Wyoming (BLM and DOE 2003). The BLM reviewed the potential for concentrated solar power, photovoltaic, wind, biomass, and geothermal energy on DOI, Bureau of Indian Affairs, and USFS lands in the West. Additional programmatic-level documents for wind, geothermal, and solar energy (the draft solar Programmatic EIS is under development) describe development potential, policies, and BMPs for renewable energy resources on public lands. Development of renewable energy resources on public lands follows policy and BMPs identified in these Programmatic EISs and other resource-specific policy and guidance.

Based on current policy direction and advances in technology, there is potential for renewable energy development in the Planning Area during the life of this RMP. The following paragraphs discuss resource potential and the affected environment for all types of renewable energy resources in the Planning Area. Wind energy has the greatest potential for development in the Planning Area and is discussed in more detail than other renewable resources. Additional details pertaining to wind-energy development are contained within the RFD.

Wind Energy

In 2005, the BLM completed a Programmatic EIS for a Wind Energy Development Program for the western United States (BLM 2005a). The ROD for this Programmatic EIS amended the current RMPs in the Planning Area by implementing programmatic policies and BMPs for wind-energy development in the Planning Area. IM 2009-043 (BLM 2008g) provides additional guidance for wind-energy development on BLM-administered land. The BLM issues ROWs for wind-energy projects for specific sites for meteorological towers, sites for meteorological towers and a project area (for the purpose of

excluding other wind energy ROWs while site testing and monitoring is being completed), and for full wind-energy development.

The BLM Wind Energy Programmatic EIS determined which areas on BLM-administered lands have high (Classes 4 to 7), medium (Class 3), or low (Classes 1 and 2) potential for wind-energy development based on their wind power classifications (BLM 2005a). The BLM uses NREL wind power classifications to identify wind resource potential based on wind power density at 50 meters above ground level. Class 4 to 7 wind resources are generally considered to be economically developable with current technology. Class 3 wind resources are expected to become more economical when low-wind-speed turbines, which are currently in development, become available. In some areas, a Class 3 wind resource could be economical using existing technology, depending on project-specific financing and incentives (BLM 2005a). Wind resource potential in the Planning Area varies from poor to superb (Table 3-45).

Table 3-45. Wind-energy Potential by Wind Power Class in the Planning Area

Wind Power Class	Resource Potential	Wind Speed (miles per hour)	Acres in Planning Area (BLM-Administered Acres)	Percent of Planning Area (Percent of BLM-Administered Lands)
1	Poor	0 to 12.5	3,296,107 (2,090,388)	58 (66)
2	Marginal	12.5 to 14.3	157,760 (793,995)	3 (25)
3	Fair	14.3 to 15.7	506,527 (209,481)	9 (7)
4	Good	15.7 to 16.8	147,001 (47,543)	3 (1)
5	Excellent	16.8 to 17.9	55,201 (17,788)	1 (1)
6	Outstanding	17.9 to 19.7	38,320 (13,516)	1 (Less than 1)
7	Superb	Greater than 19.7	24,100 (15,103)	Less than 1 (Less than 1)

Source: BLM 2005a

Note: The National Renewable Energy Laboratory has validated the estimates; however, the numbers are just estimates and should be confirmed by direct measurement.

In addition to wind power classifications, other factors influence the potential for wind-energy development in the Planning Area. Proximity to transmission lines to transfer energy produced at wind-energy sites influence the potential for wind-energy facilities. Adverse impacts to other resources and resource programs also affect the potential for wind-energy development in the Planning Area. Large wind turbines affect the visual landscape and can be considered a visual intrusion. Another key factor affecting wind-energy development potential in the Planning Area is the presence of special designations (e.g., ACECs and National Historic and Scenic Trails and WSAs) that are excluded from wind-energy development through the Wind Energy Programmatic EIS (BLM 2005a).

There are concentrated areas of medium (Class 3) to high (Class 4 through 7) wind potential in the south, southwest, and southeast portions of the Planning Area (Map 56). There are other areas of medium to high wind potential in the northern portion of the Planning Area around Cody along the Absaroka Mountain Front and McCullough Peaks area. The Absaroka Mountain Front area is close to major transmission lines that could be used to distribute wind energy.

Applications for ROW grants may be submitted for one of the following types of wind-energy projects:

- Site-specific wind energy site testing and monitoring ROW grant for individual meteorological towers and instrumentation facilities with a term limited to 3 years.
- Wind energy site testing and monitoring ROW grant for a larger project area, with a term of 3 years that may be renewed, consistent with 43 CFR 2807.22 and the provisions of IM 2006-216 (BLM 2006b) beyond the initial 3-year term.
- Long-term commercial wind-energy development ROW grant with a term not limited by the regulations but usually in the range of 30 to 35 years.

There are no current or pending ROW authorizations for wind energy facilities in the Planning Area. If meteorological data confirm wind resource potential along the Absaroka Mountain Front, this area could be a viable site for wind-energy development because there is major transmission infrastructure nearby. Given the current policy direction for renewable energy and the wind resources present in the Planning Area, it is likely that there will be wind-energy development during the life of this RMP. However, the BLM does not anticipate widespread wind-energy development in the Planning Area.

Solar Resources

The BLM currently processes solar energy ROW applications for lands under its Solar Energy Development Policy in IM No. 2007-097 (BLM 2007d). The U.S. Department of Energy, Energy Efficiency and Renewable Energy Program, and the BLM are preparing a Solar Energy Development Programmatic EIS to assess environmental impacts associated with development and implementation of agency-specific programs that would facilitate environmentally responsible utility-scale solar energy development on public land in six western states (Arizona, California, Colorado, New Mexico, Nevada, and Utah). The Solar Energy Development Programmatic EIS does not include Wyoming. However, the BLM would likely apply policy direction, BMPs, mitigation, and other management to solar energy projects in Wyoming.

There are no solar facilities or pending applications for solar facilities in the Planning Area. Based on the findings of the BLM Renewable Resource Assessment Project (BLM and DOE 2003), there are no locations in the Planning Area that receive six or more kilowatt hours per square meter per day of solar insolation. As a result, the potential for development of solar resources in the Planning Area is not likely.

Biomass Energy

Biomass power is obtained from the energy in plants and plant-derived materials, such as food crops and grassy and woody plants, residues from agriculture or forestry, and the organic component of municipal and industrial wastes. Biomass can be used for direct heating (e.g., burning wood in a fireplace or wood stove) and for generating electricity, or it can be converted directly into liquid fuels to meet transportation energy needs.

There are no biomass facilities and no pending applications for biomass facilities in the Planning Area. The potential for biomass energy facilities in the Planning Area is low because of low precipitation, a short growing season, allocation of grasslands resources to livestock grazing, and minimal availability of commercial forestland.

Hydroelectric

Hydroelectric power is generated through use of the gravitational force of falling or flowing water. Hydroelectric power is one of the most widespread forms of renewable energy throughout the world; however, its application is limited to the presence of flowing waterbodies of sufficient size to support economically viable development. Management of riparian and aquatic resources present additional constraints on hydroelectric development. There is no specific policy guidance or direction for the development of hydroelectric facilities on BLM-administered land as a renewable energy resource.

The BOR operates the Buffalo Bill Dam and Reservoir in the Planning Area near Cody. The dam produces hydroelectric power that is transmitted into a Western Area Power Administration transmission line. The BOR also operates Yellowtail Dam and Reservoir on the Wyoming-Montana border, which produces hydroelectric power.

New major hydroelectric power sources in the Planning Area would require construction of a new dam and reservoir, which is not likely because the only suitable site in the Bighorn Basin is in Clarks Fork Canyon. A dam and reservoir in this location could affect the WSR section of the Clarks Fork of the Yellowstone River north of Cody. There are no other known localities for major hydroelectric power production in the Planning Area.

The BLM has not received applications for hydroelectric power authorizations in the Planning Area on BLM-administered land, and it is not likely that any additional hydroelectric facilities would be developed in the future. However, there could be a need for new electrical transmission lines that serve hydroelectric turbines on non BLM-administered land.

Geothermal Energy

Geothermal resources are typically underground reservoirs of hot water or steam beneath the surface of Earth. Geothermal energy is produced when this steam or heat is used to turn a turbine to create electrical energy. Geothermal steam and hot water naturally discharge at Earth's surface in the form of hot springs, geysers, mud pots, or steam vents. Geothermal resources also include subsurface areas of hot, dry rock.

The Final Programmatic EIS for Geothermal Leasing in the Western United States evaluates various alternatives for allocating lands as being closed or available for geothermal leasing and analyzes stipulations to protect sensitive resources. The ROD for the Geothermal Programmatic EIS (BLM and USFS 2008a) amended existing plans to facilitate geothermal leasing on federal mineral estate in the Planning Area. The ROD for the Geothermal Programmatic EIS allocates acreages as open and closed, as listed in Table 3-46.

Table 3-46. Acres of Federal Mineral Estate Allocated as Open and Closed in the Record of Decision for Geothermal Leasing in Western States

Field Office	Land Use Plan Amended	Acres Open to Geothermal Leasing	Acres Closed to Geothermal Leasing
Cody	Cody RMP	722,834	39,317
Worland	Grass Creek RMP Washakie RMP	1,537,942	91,803

Source: BLM and USFS 2008b

RMP Resource Management Plan

Although geothermal resources are present throughout the Bighorn Basin, there are no active or pending federal geothermal leases in the Planning Area.

According to the Geothermal Programmatic EIS, there is potential in the Bighorn Basin for geothermal resource development; however, this potential is likely low to moderate because of the quality of geothermal resources and the backlog of geothermal resource development in other western states (BLM and USFS 2008a). Policy direction, advances in technology, and increased interest in renewable energy resources could lead to minimal geothermal resource development in the Planning Area during the life of this RMP.

For more information on geothermal resources, see Section 3.2.4 *Leasable Minerals – Geothermal* in this RMP and EIS and the *Reasonable Foreseeable Development Scenario for Geothermal, Bighorn Basin Planning Area* (BLM 2009h).

Management Challenges

One of the most notable management challenges associated with renewable energy resources is the ability to transmit power generated by renewable energy sources to the grid and to deliver it to the load centers where the energy is needed. Capacity to transmit new power out of the Planning Area appears to be limited unless existing lines are upgraded or new transmission lines built. Like wind turbines, power transmission lines include vertical structures, but also introduce a linear feature that can be particularly noticeable on a visual horizon on certain landscapes. Adverse impacts to other resources and resource uses caused by the development of renewable energy facilities can create additional management challenges.

3.6.3 Rights-of-Way and Corridors

Section 501 of FLPMA authorizes the BLM to grant ROWs for infrastructure and facilities that are in the public interest and require ROWs over, under, upon, or through BLM-administered lands. The BLM ROW program consists of the evaluation, authorization, and management of ROWs, including corridors, for a variety of uses on public/federal land. A ROW grant is an authorization to use specific pieces of public land for certain types of projects, such as developing roads, pipelines, transmission lines, and communications sites. A grant authorizes rights and privileges for a specific use of the land for a specific period.

In the existing plans, ROW corridors were formally designated as the preferred location for existing and future ROWs in the Planning Area. Land uses that typically do not require ROWs are those defined as "casual use" (43 CFR 3809.5). Casual use activities involve practices that do not ordinarily cause any appreciable disturbance to BLM-administered lands, resources, or existing improvements.

An important component of the ROW program is the intrastate and interstate transportation of commodities ultimately delivered as utility services (e.g., natural gas and electricity) to residential and commercial customers. Equally important at the local level is the growing demand for legal access to private homes and ranches using ROW grants. While most existing ROW actions in the Planning Area are for linear facilities, there also are many existing site ROWs for non-linear communications sites, water reservoirs, and energy resource distribution and transmission.

The BLM and other agencies (U.S. Department of Energy Office of Electricity Delivery and Energy Reliability and the USFS) prepared the Programmatic EIS for the Designation of Energy Corridors on Federal Land in Eleven Western States (DOE and BLM 2008b). The Programmatic EIS evaluates potential impacts associated with the proposed action to designate corridors on federal land in 11 western states

(including Wyoming) for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities. The ROD for the Programmatic EIS amended current RMPs in both the CYFO and WFO by designating energy corridor 79-216 as a multi-modal energy corridor (Map 63). Energy corridor 79-216 is the preferred location for major transmission and linear energy infrastructure in the Planning Area. This corridor contains several existing pipelines that go from the southern boundary of the Planning Area to the Montana border.

Existing ROW corridors are the preferred location for minor ROW grants (Map 63). These routes or areas are located primarily along existing highways, major pipelines and powerlines, oil fields, and communication sites. Concentrating new ROW grants along existing corridors works well when the source and terminus are nearby or when land along the route is predominantly on federal land. Due to the large blocks of public land and the various locations requested for the applications received, it is not always possible to concentrate new grants into designated corridors.

The use of ROW corridors in the Planning Area has been moderate, and existing corridors designated for major ROWs have been sufficient to meet demand and the needs of public land users. ROWs on BLM-administered lands in the Planning Area have primarily supported the development of energy minerals (i.e., project access roads, gathering/transportation pipeline systems, and related oil and gas facilities). However, in recent years, access roads and utilities associated with development of private lands have become more common.

Communications sites are authorized by a ROW under Section 501 of FLPMA and administered under regulations at 43 CFR 2800. Communications sites are typically site ROWs, which consist of facilities such as small buildings, towers, antennas, and other structures. The Planning Area contains a total of 72 communications sites concentrated in seven areas (Map 63). Communications site concentration areas are typically on mountaintops, ridgelines, or other high-elevation areas to allow uninterrupted transmission of the associated communications signal. Communications site plans have been prepared for each of the communications site concentration areas identified on Map 63. These plans govern specific development and management of communications sites in the area. Regularly updated information on communications site facilities, concentration areas, links to site plans, and other information for communications sites in the Planning Area can be found though the BLM website at: http://www.blm.gov/commsites/.

There are 2,192 existing ROWs (see Table 3-47) in the Planning Area covering approximately 44,539 acres. Most ROW applications in the Planning Area are for the development of powerlines, transportation and delivery of mineral-related commodities and facilities, telephone facilities (including fiber optic lines and communications sites), access roads, and water-related facilities (pipelines, ditches and canals, reservoirs). Over the last 10 years, the BLM has processed between 45 and 60 new or amended ROW applications every year for the Planning Area.

Table 3-47. Existing Rights-of-Way in the Planning Area

Existing Authorization	Number of Sites	Acres
Linear Rights-of-Way	2,108	43,659
Site Rights-of-Way	84	880
Total	**2,192**	**44,539**

Source: BLM 2009a

In the past 10 years, regional demand for ROWs on public land in Wyoming has increased; however, ROW demand in the Planning Area has remained relatively stable (BLM 2009a). Much of the regional demand has focused on exporting energy products through and from the sparsely populated western states to population centers, most recently dominated by west coast power demands. The upsurge in exploration and development of cleaner-burning fuels, such as natural gas, CBNG, and renewable energy resources, has resulted in the need for more pipelines and transmission lines. Technological advancements have also resulted in new demands on public land, largely related to wind energy and telecommunications (such as cellular and fiber optic). ROW applications in the region are likely to continue a slight upward trend during the planning cycle, while ROW demand in the Planning Area is expected to remain relatively stable.

If the current rate of development continues and current management remains in place, designated ROW corridors should adequately meet future needs over the next 10 to 20 years. At this rate of development, corridors could eventually be more intensively used, but the BLM does not anticipate crowding.

Oil and gas production in the Planning Area is expected to continue to come mostly from established fields that already have adequate infrastructure such as roads, powerlines, and gathering/transmission lines. Produced oil volume is flat or declining from these fields, and gas volume is stable or increasing. Therefore, no major increase in the number of new ROWs for oil and gas infrastructure (each field office currently issues 4 to 8 per year) is anticipated for the next 10 to 15 years unless there is more activity, such as the construction of a pipeline to bring CO_2 gas for use in oil recovery in existing oilfields.

The BLM estimates that demand for public land for access roads and electric or pipeline ROWs in the Planning Area will remain moderate over the next 10 to 20 years, depending on the location of energy mineral development (Williams 2011). A small increase in demand for public land for major energy transportation ROWs is expected, potentially involving one or two major projects every 10 years. Further development of renewable energy resources, specifically wind in Wyoming, could create additional need for ROWs for transmission lines in the region and through the Planning Area to deliver energy produced in Wyoming to other markets.

With the current market demand, the BLM expects the demand for communications sites on BLM-administered land to continue in the foreseeable future. Future need for additional fiber optic lines is not known; however, because these types of development tend to run between population centers, existing ROW corridors appear to be sufficient to meet future needs.

Management Challenges

In general, ROW management challenges include meeting national and regional demands for energy, infrastructure, telecommunications, and other services while balancing management objectives for other resources (e.g., the preservation of sagebrush habitat).

A specific management challenge associated with linear ROWs is the proliferation of unauthorized roads and trails caused by the general public driving along the ROWs. This unauthorized development can cause extensive damage to resources that often goes unmitigated.

3.6.4 Comprehensive Travel and Transportation Management

There are two fundamental and interrelated tasks associated with CTTM – (1) the delineation of travel management areas and (2) the delineation of OHV management areas, which designates travel management (as open, limited, or closed).

The transportation network on the public lands in the Bighorn Basin consists of federal and state highways, county roads, and roads built to facilitate industrial and commercial development. There is also an extensive network of official BLM roads that range from regularly maintained ditched and crowned gravel roads to an extensive array of unofficial roads and vehicle routes that were never formally constructed and rarely receive maintenance. Many are two-track vehicle trails created and maintained simply by the passage of motor vehicles. The network of two-track roads and trails is important for recreational and ranching uses on public lands.

Motorized Vehicle Use in the Planning Area

For purposes of this RMP and EIS, motorized vehicle use refers to the use of motor vehicles (e.g., all-terrain vehicles) off the main highway network in the Planning Area. The road and trail network in the Planning Area provides access for private, commercial, and industrial vehicles. Motor vehicle use supports many other resource uses, including livestock grazing, mineral exploration and development, communications, administrative activities, and recreation. Numerous types of motor vehicles are used on BLM-administered lands in the Planning Area, including large trucks, four-wheel drive vehicles, automobiles, motorcycles, and all-terrain vehicles.

Motorized vehicle use in the Planning Area has local, regional, and national significance, and has increased over the last 10 years. Recreation enthusiasts are buying OHVs at a rate of approximately 1,500 units per day nationwide (BLM 2001a). The use of these motorized vehicles is linked to a variety of recreation activities, including dispersed camping, hunting, and fishing, and they have become a popular form of recreation in the Planning Area. The McCullough Peaks area, Little Mountain, the west slope of the Big Horn Mountains, and Carter Mountain are popular areas for OHV use, especially during hunting season. In addition, OHVs have become tools for resource-related industries, including ranching, mineral exploration, and oil and gas production. Due to increases in the price of gasoline, there has been an increasing trend in the use of OHVs for recreational activities and common transportation.

The use of OHVs is expected to continue to grow, increasing the demand for specialized trails and areas available to motorized vehicle use (BLM 2001a). Areas between Basin and Greybull, outside of Lovell, and the Red Lakes area south of Cody, Wyoming, are experiencing an increase in off-road motorized vehicle use, even though this activity violates current motorized vehicle use management prescriptions for these areas.

Off-Highway Vehicle Management Areas

All public lands are required to have motorized vehicle use designations (43 CFR 8342). Accordingly, all lands are to be designated as open, limited, or closed to motorized vehicle use (Map 69). Lands designated as open are open to all motor vehicle use, on or off established roads and vehicle routes, as long as this activity does not cause unacceptable levels of resource damage. Limited means OHV use is restricted to designated roads and trails, and where an area is restricted, at certain times, in certain areas, and/or to certain vehicle uses. These restrictions can be of any type, but generally can be accommodated within the following categories: number of vehicles; types of vehicles; time of season of vehicle use; permitted or licensed use only; use on existing roads and trails (limited to existing roads and trails); and use on designated roads and trails (limited to designated roads and trails). Existing roads and trails are to be used as an interim designation until a Travel Management Plan designates each individual route as open or closed for motorized use (BLM Handbook 8342-1). Closed means the area is closed to all motor vehicle access, with the authorized officer granting exceptions for emergencies,

firefighting, public safety, or related incidents. A closed designation usually does not exclude foot or horseback travel or mechanized (such as mountain bikes) travel, and can be implemented to protect back country recreational setting opportunities or sensitive wildlife habitat.

The BLM manages some areas in the Planning Area specifically for nonmotorized vehicle use. Areas with trails open only to foot traffic include interpretive areas such as the Red Gulch Dinosaur Tracksite, Gooseberry Interpretive Trail, and Legend Rock. Areas open only to foot travel and mechanized vehicle use include the Paint Rock Trail, Lone Tree Trail, Salt Lick Trail, Canyon Creek access trail, Gebo, Bobcat/Houlihan Trail, and Four Bear Trail. The BLM manages these areas to protect their natural resources, provide for semi-primitive recreation opportunities, and provide for public health and safety.

Open to Motorized Vehicle Use

Approximately 1,311 acres in the Planning Area are open to motorized vehicle use. These locations include an area south of Cody, an area southeast of Lovell, an area northeast of Lovell, areas near Powell, and an area west of Worland. Several of the areas have been used for many years and continue to be used for this type of activity, even though there has been no formal implementation of this travel designation. See Appendix R for a list of other areas open to motorized vehicle use.

OHV groups, in coordination with the BLM, had previously adopted an area southeast of Worland called The Pits as a "play area" (an area open to motorized vehicle use where on- or off-route travel is almost unrestricted). However, after further monitoring and analysis, the BLM closed the area as a designated play area because of concerns about public health and safety related to H_2S from the oil and gas wells in the area. As a result, an area located west of Worland was allocated for open OHV use, but implementation plans have never been completed.

Other areas throughout the Bighorn Basin exist where off-road cross-country OHV use is observed, although the areas are not allocated to accommodate the use. In some areas, law enforcement has attempted to impede these activities, and in other areas, these areas are examined to determine whether or not they qualify (as per 43 CFR §8340.0-5, (f), (g) and (h) respectively) as open OHV areas.

Motorized Vehicle Use Limited

Motorized Vehicle Use Limited to Existing Roads and Trails

Motorized vehicle use is limited to existing roads and trails on approximately 2,315,896 acres in the Planning Area. The BLM created this designation to allow motorized vehicle use without increasing the number of acres disturbed by route creation. Recreational users are not authorized to travel off of roads and trails in these areas, except during the performance of necessary tasks such as the retrieval of game or for maintenance of range improvements and livestock management. Throughout the life of the current land use plans, OHV use in the Bighorn Basin has increased dramatically (BLM 2009a). Each year, new unauthorized pioneered routes and trails are being created by recreational users, casual use and necessary tasks in support of land use projects, and during observed spikes in OHV use, such as during hunting season. See Appendix R for a list of other areas where motorized vehicle use is limited to existing roads and trails. In recognition of the continual proliferation of pioneered routes in areas managed as "limited to existing roads and trails", recent BLM guidance changed "limited to existing roads and trails" from an OHV management allocation to an interim designation. The designation will change from "limited to existing roads and trails" to "limited to designated roads and trails upon the completion of a travel management plan" (BLM Handbook 8342-1).

Motorized Vehicle Use Limited to Designated Roads and Trails

Motorized vehicle use is limited to designated roads and trails on approximately 797,077 acres, primarily in environmentally sensitive areas, in the Planning Area. These areas include the west slope of the Big Horn Mountains (which includes the Little Mountain ACEC, West Slope Special Recreation Management Area (SRMA), Medicine Lodge and Renner Wildlife Habitat Management Units, Carter Public Access Area, and South Brokenback); the Upper Nowood area; the Bridger Mountains; the Red Canyon Creek area south of Thermopolis; Meeteetse Draw Rock Art area; the Sheep Mountain Anticline ACEC; the McCullough Peaks area; and the Absaroka Mountains which include the southern Absaroka Mountain foothills, Carter Mountain ACEC, the mountains along the North and South Forks of Shoshone River; Rattlesnake Mountain; and Bald Ridge. This designation has been successfully applied in a number of these locations. Travel management has been successfully implemented in the Grass Creek/Enos Creek area, Carter Mountain ACEC, Rattlesnake Mountain, McCullough Peaks, Little Mountain, Medicine Lodge and Renner Wildlife Habitat Management Areas, South Brokenback area, and the Upper Nowood. Such implementing strategies used to enforce travel management decisions include on the ground tools such as fences, regulatory signs, barricades, and enforcement, as well as through the assistance and cooperation of affected stakeholders. The off-road travel that does occur is infrequent, and the establishment of new two-tracks has remained minimal. Additional areas where motorized vehicle use is limited to designated roads and trails include essential and recovery habitat for threatened or endangered species, areas with fragile soils or with Class I or II VRM ratings, areas containing important cultural and paleontological resources, and areas over important caves or cave passages. See Appendix R for a list of other areas where motorized vehicle use is limited to designated roads and trails.

Seasonal and Over-Snow Closures

A number of locations in the Planning Area are generally limited to designated roads and trails, but also have a seasonal closure. During a portion of the year these areas are closed to motorized vehicle use. These seasonal restrictions are designed to protect the values of other resources, such as crucial wildlife winter range, and to protect fragile soils. Areas with seasonal closures include Carter Mountain, Medicine Lodge and Upper Renner WHMAs, Little Mountain Travel Management Area, Bald Ridge area, and Twin Creek Trail; the dates of these closures appear in Appendix R.

Areas closed to over-snow travel are generally decided on a case-by-case basis. However, some areas, such as Lynx Analysis Units, are designated as closed to this type of use to protect important habitat.

Closed to Motorized Vehicle Use

Approximately 68,115 acres in the Planning Area are closed to motorized vehicle use. Travel management designations in these areas are designed to protect resources from unnecessary damage, to sustain and manage for wilderness characteristics in the WSAs, and to protect recreationists from hazardous conditions. These areas include the Cody Archery Range; the Lovell Rod and Gun Club area; around the Duck Swamp-Bridger Trail Environmental Education area; surrounding the rifle range west of Worland; Sheep Mountain, Red Butte, Bobcat Draw Badlands, and the Owl Creek WSAs; the Spanish Point Karst ACEC; and along the Bighorn River south of Greybull, Wyoming, to protect threatened and endangered species habitat. See Appendix R for a list of other areas closed to motorized vehicle use.

Travel Management Areas

In order to manage the transportation system, the BLM addresses travel management by subdividing the field office into travel management areas that focus travel management planning efforts to maintain desired resource objectives, manage use and user conflicts, and protect public health and safety. Travel

management areas address acceptable modes of access and travel consistent with the designation criteria (43 CFR 8342.1). They also identify objectives for allowing travel in the area and setting characteristics to be maintained, including recreational settings for SRMAs. Travel management plans identify the appropriate network of roads and trails, including nonmotorized vehicle access, in travel management areas.

The BLM has implemented travel management plans for the McCullough Peaks; areas along the West Slope of the Bighorns including Little Mountain, South Brokenback, Medicine Lodge and Renner wildlife habitat areas, and the Upper Nowood area; and areas along the Absaroka Front including Grass Creek, Carter Mountain ACEC, and Rattlesnake. The BLM implements these plans through coordination with many stakeholders including, but not limited to local landowners, the WGFD, and the Wyoming State Trails program. Using the designation criteria as spelled out in 43 CFR 8342.1, travel management plans designate and develop travel routes as well as identify areas closed to motorized vehicle use in areas popular for big game hunting, hiking, camping, horseback riding, interpretive environmental education, and OHV use, and in crucial wildlife habitat areas. The areas for which travel management plans have been completed and implemented are areas where substantial motor vehicle use was identified as compromising the health and sustainability of the resources. The BLM established cooperative agreements with private land owners and other entities, including the WGFD and the Wyoming State Board of Land Commissioners, to manage motorized vehicle use in areas in the Absaroka foothills and the west slope of the Big Horn Mountains. Through the life of the existing RMPs, the WFO and CYFO implemented Off-Road Vehicle Designations for the McCullough Peaks (CYFO), Owl Creek, Bobcat Draw Badlands, Sheep Mountain, and Red Butte WSAs (WFO). The McCullough Peaks plan designated the primitive routes within the WSA, and the Grass Creek Resource Area's WSA travel management plan closed all primitive routes within the WSAs mentioned above to motorized use.

Motorized Vehicle Use and Environmental Concerns

In the Planning Area, the number and percent of lands open to cross-country motorized vehicle use is minimal and in areas where there are less likely to be sensitive resources or where potential conflicts can be mitigated (1,311 acres, or less than one percent of BLM-administered surface in the Planning Area). In addition to areas currently managed as open to cross-country motorized vehicle use, several new areas or expansions of existing areas are analyzed as part of this RMP revision project. Table 3-48 shows all areas proposed as open to cross-country motorized vehicle use currently or under any of the RMP alternatives, and any of a selection of key resource values each such area overlaps. Where overlaps between areas open to cross-country motorized vehicle use and these key resource values occurs. Table 3-48 describes why such use does not pose resource damage concerns or cause inherent conflicts. The percentage of lands closed to motor vehicle use is limited to areas, such as certain WSAs, where resource protection is paramount. Most of the Planning Area is available to motorized vehicle access on the designated or existing network of roads and trails (see Appendix R), and these areas include locations where motorized vehicle access and the protection of resources are important priorities.

Table 3-48. Overlap of Areas Open to Cross-Country Motorized Travel with Select Key Resource Values

Open Area	Acres	Wetland Riparian Areas (acres)	Greater Sage-Grouse Key Habitat Areas (acres)	Big Game Crucial Winter Range (acres)	Known Prehistoric or Historic Cultural Sites[2]	NHTs /Other Historic Trails (acres within 3 miles)[3]	Area Description
Hill Climbing areas near Cowley	118	0	0	0	No	0/0	This area is a de facto OHV hill climbing area. Motorcycle hill climbing events have been authorized in the past using Special Recreation Permits. Members of the public have used the area for many years for this purpose. The area is being mined for bentonite, and previous events were coordinated with the mining company. Once mining is completed, there may be an opportunity for hill climbing, depending upon land ownership and the terrain.
Hills area near Lovell (Bentonite Hills)	43	0	0	0	No	0/0	This area was identified in the Cody Resource Management Plan (BLM 1990) as an open area, but implementation never occurred. Motorized recreationists (using all-terrain vehicles and motorcycles) use the area for its technically challenging hill climbing opportunities. Nearly the entire area has been used for cross-country motorized travel.
Lovell Lakes Motocross Area	158	0	0	0	No	0/0	This area was identified in the Cody Resource Management Plan (BLM 1990) as an open area, but implementation never occurred.

Table 3-48. Overlap of Areas Open to Cross-Country Motorized Travel with Select Key Resource Values (Continued)

Open Area[1]	Acres	Wetland Riparian Areas (acres)	Greater Sage-Grouse Key Habitat Areas (acres)	Big Game Crucial Winter Range (acres)	Known Prehistoric or Historic Cultural Sites[2]	NHTs /Other Historic Trails (acres within 3 miles)[3]	Area Description
Red Lakes area near Cody	67	0	0	0	Yes	0/0	This area was identified previously as an open area, but implementation never occurred. This area is a de facto OHV play area where motorized recreationists (using all-terrain vehicles and motorcycles) use the area for its technically challenging hill climbing opportunities. Much of the area has been used for cross-country motorized travel.
Area near Park County Landfill	619	0	406	0	Yes	0/343	The open area is on the periphery of the Greater Sage-Grouse Key Habitat Area, where the habitat is marginal. This area is used by motorized recreationists (using all-terrain vehicles and motorcycles).
Basin Gardens Play Area	4,600	4	0	0	Yes	0/0	Wetland/riparian areas and known eligible historic properties could be mitigate through site specific implementation.
Rattlesnake Ridge	7,996	0	0	0	Yes	0/61	This area is a de facto OHV play area where motorized recreationists use the area for its technically challenging hill climbing opportunities. The area is also heavily used for oil and gas activities, a concern due to high levels of hydrogen sulfide gas. The area is currently managed as motorized use limited to existing roads and trails.

Table 3-48. Overlap of Areas Open to Cross-Country Motorized Travel with Select Key Resource Values (Continued)

Open Area[1]	Acres	Wetland Riparian Areas (acres)	Greater Sage-Grouse Key Habitat Areas (acres)	Big Game Crucial Winter Range (acres)	Known Prehistoric or Historic Cultural Sites[2]	NHTs /Other Historic Trails (acres within 3 miles)[3]	Area Description
Worland OHV Play Area	1,576	0	0	842	Yes	0/1,289	The Grass Creek Resource Area Resource Management Plan (BLM 1998a) designated about 900 acres as open for cross-country motorized travel, but implementation never occurred.

Sources: BLM 1998a; BLM 1990, BLM 2013a.

[1]Area, or portion of area, currently managed as open to motorized vehicles.
[2]Based upon existing available inventories and information. An inventory would precede the site-specific analysis for any plan to open these areas to cross-country motorized travel.
[3]Inventories and assessments have not occurred to determine where the contributing segments of these Other Historic Trails are located.

NHT National Historic Trail
OHV Off-highway vehicle

Environmental concerns associated with motorized vehicle use include a loss of soil and damage to vegetation due to surface disturbance, the creation of scars on hillsides, habitat loss, disturbance of wildlife in crucial habitats such as winter ranges, siltation of streams due to erosion from roads and trails, and degradation of scenic qualities and cultural sites.

Areas of concern in relation to actual and potential damage from motorized vehicle activity generally include highly erodible soils, riparian/wetland areas, crucial wildlife habitat (such as winter range), fragile soils and vegetation, scenic areas, WSAs, ACECs, cultural sites, and historic trails.

Management Challenges

Managing motorized vehicle use on public lands is one of the great challenges associated with public land management. This is not just a challenge unique to the Bighorn Basin or the state of Wyoming, but all over the United States. The BLM uses travel management designations, public information and education, and law enforcement as primary tools to manage motorized vehicle use on public lands.

Controlling the proliferation of unauthorized roads and trails is a challenge for the BLM CTTM program. Unauthorized road and trail proliferation damages scenic resources, disturbs vegetation and wildlife, and degrades wildlife habitats, the end result of which is that long-term resource values and uses are compromised.

3.6.5 Recreation

This section briefly describes the broad spectrum of recreational opportunities available on BLM-administered land in the Bighorn Basin.

Recreation Management

Recreational opportunities are offered to the public on all BLM-administered lands in the Planning Area to which there is legal access. Federal lands in the Planning Area provide a broad spectrum of outdoor opportunities that afford visitors the freedom of recreational choice with minimal regulatory constraints. The BLM provides opportunities for outdoor recreation and nature-based tourism using the concept of multiple-use management. Visitors to public lands are afforded the opportunity to enjoy natural landscapes, the freedom to choose a particular activity in which to participate, the opportunity to test skills in a sport, time spent with family and friends, and the opportunity for discovery. Recreational activities on public lands are multi-faceted.

There is dispersed recreation throughout the Planning Area in a wide range of recreational settings, and recreation can occur in combination with other resource activities. Dispersed recreation includes, but is not limited to, hunting, sightseeing, touring, backpacking, horseback riding, mountain biking, hiking, OHV use, spelunking, photography, wildlife viewing, fishing, boating and other water-related activities, and camping. The BLM offers some combination of these recreational opportunities to the public on all BLM-administered lands in the Bighorn Basin. Public access to BLM-administered lands is more readily available in the central and eastern portions of the Planning Area, in the basin and along the western slopes of the Big Horn Mountains, and less available in the southern Absaroka Foothills region.

In addition to managing dispersed recreation throughout the Planning Area, the CYFO and WFO recreation programs manage developed recreation sites ranging from minor improvements for parking to multi-site hosted campground areas. The BLM manages seven SRMAs (Map 75) and one National Back Country Byway (Map 90) in the Planning Area (refer to Section 3.7.2 *National Back Country Byways* for more information).

The BLM manages recreational uses on public lands to protect resources, reduce user conflicts, and promote public safety. Travel management designations are one of the ways this is accomplished. These designations have been implemented statewide and are designed to direct the appropriate use of motorized vehicles on BLM-administered lands.

The BLM uses law enforcement and routine monitoring of recreational uses and areas, along with information from the public, to identify issues related to recreation. The BLM addresses recreational issues through user education, signs, additional facilities, maintenance, and law enforcement attention.

The BLM has actively embraced the Leave No Trace and Tread Lightly programs in an effort to encourage responsible use of public lands. Both programs promote and teach outdoor ethics and are geared toward reducing the adverse impacts of recreation. The goal is to make recreational uses more sustainable in the long run.

Recent BLM guidance (IM No. 2006-060 and IM No. 2007-043) establishes the agency's commitment to incorporate the framework of benefits-based management (BBM) into its recreation management program. BBM is a method of managing recreation that focuses on the beneficial outcomes from engaging in recreational activities in areas managed for desired settings and experiences, rather than only on the recreation activities themselves. This approach gives the BLM a framework within which to manage recreation on public lands to provide outcomes that benefit individuals, communities, economies, and the environment (BLM 2009o). BBM represents a departure from previous recreation management methodologies by integrating management of recreation settings with desired recreation opportunities and benefits through collaboration with public and local and private-sector providers. It is guided by the premise that the BLM is not a sole-source provider of recreation opportunities and that recreation planning must be considered in a regional context (BLM 2007e). Appendix O provides more information about BBM.

Special Recreation Permits

The field offices in the Planning Area have active SRP programs, administering over 80 SRPs per year for outfitters, activities, and events. Typical activities and events include outfitting and guiding for hunting, fishing, floating, horseback rides, wild horse viewing tours, interpretive tours, livestock drives, horseback fundraising events, horse endurance rides, yoga trips, motorcycle hill climbs, paragliding, triathlon events, mountain bike races, and wagon trains. The field offices collect between $11,000 and $14,000 per year in SRP fees and spend this revenue on visitor services, maintenance, monitoring, and law enforcement.

Outfit-guided hunting trips are the most popular SRP activity in the Bighorn Basin. Outfitters are widely dispersed over several hunt areas, and authorized activities take place during different times and places throughout the Planning Area. Conflicts between these SRP activities and other recreational uses are not uncommon and can result in visitor displacement.

Recreation Management Areas

The RMP planning process identifies areas where recreation is the management focus. SRMAs were traditionally areas that had higher recreation use or required extra recreation investment, or where more intensive recreation management was needed. When the Bighorn Basin planning revision was initiated, the 2005 revision of the BLM Land Use Planning Handbook (H-1601-1) amended the criteria for identifying an SRMA; these are administrative units where the predominant land use and emphasis is recreation. SRMAs provide specific long-term recreation opportunities (activities, experiences, benefits) and settings. SRMAs must identify a distinct, primary recreation-tourism market (destination, community, or undeveloped), and a corresponding and distinguishing strategy.

Since then, Washington Office Instruction Memorandum No. 2011-004 revised the guidance for Recreation and Visitor Services planning in conjunction with the BLM land use planning process. The major change establishes a three-tier classification for lands used and managed for recreation. This new

classification replaces the existing 30-year-old, two-tier system where all lands were classified as either special or extensive recreation management areas.

New guidance now defines RMAs as designated in a land use plan. The RMAs are classified as either SRMAs or extensive recreation management areas (ERMAs). The RMAs are land units where Recreation and Visitor Services (R&VS) objectives are recognized as a primary resource management consideration and specific management is required to protect the recreation opportunities. The RMA designation is based on: recreation demand and issues, recreation setting characteristics, resolving use/user conflicts, compatibility with other resource uses, and resource protection needs.

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation. SRMAs are managed to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation setting characteristics. Within SRMAs, R&VS management is recognized as the predominant LUP focus, where specific recreation opportunities and recreation setting characteristics are managed and protected on a long-term basis.

SRMAs may be subdivided into recreation management zones (RMZ) to further delineate specific recreation opportunities. The BLM Land Use Planning Handbook (H-1601-1) states that each RMZ has four defining characteristics − it (1) serves a different recreation niche within the primary recreation market, (2) produces a different set of recreation opportunities and facilitates the attainment of different experience and benefit outcomes (to individuals, households, communities, economies, and the environment), (3) has distinctive recreation setting character, and (4) requires a different set of recreation provider actions to meet the strategically targeted primary recreation market demand. At present, there are no designated RMZs in the Planning Area, but several are proposed as part of this RMP revision project.

SRMAs/RMZs must have measurable outcome-focused objectives. Supporting management actions and allowable use decisions are required to: 1) sustain or enhance recreation objectives, 2) protect the desired recreation setting characteristics, and 3) constrain uses, including non-compatible recreation activities that are detrimental to meeting recreation or other critical resource objectives (e.g., cultural or threatened and endangered species).

The Cody, Washakie, and Grass Creek RMPs identified seven areas to be managed as SRMAs (Map 75) based on the unique values and identified desired recreational settings, experiences, and beneficial outcomes. Chapter 2 describes current management for SRMAs and the proposed management for RMZs. The following paragraphs briefly describe existing SRMAs and proposed RMZs in relation to those SRMAs.

Absaroka Mountain Foothills SRMA – Goals and objectives for the 72,130-acre Absaroka Mountain Foothills are to enhance semi-primitive motorized and nonmotorized recreational opportunities in this scenic area.

Badlands SRMA – Goals and objectives for the approximately 213,981-acre Badlands SRMA are to provide for interpretive opportunities and to display the scenic qualities of the area. There are three RMZs proposed for the Badlands SRMA − Tour de Badlands, Wild Badlands, and Tatman Mountain.

Bighorn River SRMA – Goals and objectives for this approximately 15,256-acre SRMA are to provide for and enhance public access to the Bighorn River so as to enhance recreational opportunities and wildlife management. Recreational uses of public lands along the Bighorn River include fishing, hunting, and floating.

Historic Trails SRMA – This 12,065-acre SRMA includes segments of the Nez Perce NHT, Bridger Trail, and the Fort Washakie Trail to Red Lodge Stage Route.

The Rivers SRMA – This SRMA includes about 18,247 acres of public land along the Clarks Fork of the Yellowstone River, the north and south forks of the Shoshone River, and the main stem of the Shoshone River.

West Slope SRMA – The west slope of the Big Horn Mountains is popular for dispersed recreational activities due to scenic qualities; a variety of recreational resources, activities, opportunities, and experiences; access to the Bighorn National Forest, and accessibility in the area. The area provides recreation opportunities such as hunting, fishing, camping, hiking, backpacking, horseback riding, driving for pleasure, sightseeing, and spelunking. This SRMA contains several caves rated as significant. The West Slope SRMA is approximately 375,888 acres. There are four RMZs proposed in the West Slope SRMA − Trapper Creek, Paint Rock, Brokenback/Logging Road Area, and South Bighorns.

Worland Caves SRMA – The goals of this cave-focused SRMA are to provide protection for the fragile cave resources, promote ethical uses, and help educate the public on proper management and recreational use.

In addition, this RMP and EIS propose several new SRMAs (Red Canyon, Basin Garden, Horse Pasture, Rattlesnake Ridge, Newton Lake Ridge, Beck Lake, and McCullough Peaks).

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand or R&VS program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. Management of ERMAs are commensurate with the management of other resources and resource uses.

ERMAs must have measurable objectives. Supporting management actions and allowable use decisions must facilitate the visitors' ability to participate in outdoor recreation activities and protect the associated qualities and conditions. Non-compatible uses, including some recreation activities, may be restricted or constrained to achieve interdisciplinary objectives. In ERMAs, the BLM must identify management actions and allowable use decisions for R&VS and other programs to achieve ERMA objectives. In ERMAs, all decisions are compatible with other resource objectives. Within the R&VS Program, the BLM is to identify decisions necessary to facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts (e.g., areas closed to target shooting, camping limits); and address the type(s), activities, and locations where special recreation permits would be issued or not issued. Within other programs, the BLM must establish terms, conditions, or special considerations for other resource programs necessary to achieve the ERMA objective (e.g., stipulations on mineral or other development, designations for all types and modes of travel, areas available for livestock grazing, or visual resource management classes). All actions must conform to applicable program policy, regulations and valid existing rights.

Several new ERMAs are proposed as part of this RMP revision project: Bighorn River ERMA, Absaroka Foothills ERMA, Rattlesnake Ridge ERMA, Red Canyon Creek ERMA, Southern Bighorns ERMA, and Basin Gardens ERMA.

Public lands that are not designated as RMAs are managed to meet basic R&VS and resource stewardship needs. Recreation is not emphasized however recreation activities may occur. The R&VS are managed to allow recreation uses that are not in conflict with the primary uses of these lands. Management actions and allowable use decisions may still be necessary to address basic R&VS and resource stewardship needs (visitor health and safety, use and user conflicts, the type(s), activities and

locations where special recreation permits would be issued or not issued, and mitigation of recreation impacts on cultural and natural resources).

The remaining BLM-administered public lands in the Bighorn Basin that are not identified as an RMA, which named under the old guidance, are the Cody ERMA (756,152 acres) and the Worland ERMA (1,566,022 acres). These areas do not have substantial numbers of developed recreational facilities such as campgrounds, nor does the BLM develop specific recreational setting prescriptions or recreation activity plans for these areas. The BLM provides custodial management of recreational activities in these areas to help ensure user health and safety, protect resources, and resolve use and user conflicts.

Recreational Use Patterns

Hunting and fishing are two of the most common recreational activities for local users on BLM-administered public lands in the Planning Area. Most pronghorn hunting, and a major portion of deer, elk, and upland bird (greater sage-grouse) hunting in the Planning Area occurs on public lands.

Hunting opportunities available in the Bighorn Basin also are available to non-residents. Commercial outfitting provides recreational opportunities for residents of other states, and the recreation and tourism industry is one of the most important industries in the Planning Area and the state of Wyoming as a whole.

Regionally, the Wyoming Travel Industry Impact Report of 2006 concluded that 7.3 million overnight visits to Wyoming resulted in $2.5 billion in direct travel-generated expenditures. The report also notes that 98 percent of visitors came to Wyoming for pleasure, while only 2 percent came for business. Travel and tourism resulted in $103 million in state and local tax revenues and $624 million in earnings for Wyoming residents (Wyoming State Office of Travel and Tourism 2007). The economic report of Wyoming Travel economic impacts for 2012 shows an increase of 5.4 percent since 1998 with 8.6 million visits in 2012 (Strategic Marketing & Research, Inc. 2012), contributing to $128 million in revenue, and $759 million in earnings, an 18 percent increase of overnight visits to Wyoming, a 24 percent increase in revenues, and 22 percent increase in earnings since 2006 (Wyoming Office of Tourism 2012). Refer to Section 3.8.2, *Economic Conditions* for more information.

A large proportion of outdoor recreation on public lands relates to hunting and fishing activities. The numbers of hunters and fishermen remain fairly constant over time because they depend on wildlife population numbers and available licenses. While there is no trend toward increased recreation related to hunting and fishing, the numbers do reflect the magnitude of recreation demand on public lands.

Table 3-49 lists hunting and fishing recreation days for Wyoming, BLM-administered lands in Wyoming, and public lands in the Planning Area from 2003 through 2011. The Planning Area estimates assume representative proportions of visitations in Wyoming and are based on a ratio of acreage in the Planning Area to acreage of land in Wyoming.

Table 3-49. Hunting and Fishing Recreation Days

Year	Wyoming	Bureau of Land Management (statewide)	Worland Field Office	Cody Field Office	Planning Area
2003	5,657,670	1,640,742	198,018	96,180	294,198
2004	3,626,301	1,051,627	126,921	61,647	188,568
2005	3,358,523	973,972	117,548	57,095	174,643
2006	3,458,582	1,002,989	121,050	58,796	179,846
2007	3,531,431	1,024,115	123,600	60,034	183,634
2008	3,683,371	1,068,178	128,918	62,617	191,535
2009	3,531,820	1,024,228	123,614	60,041	183,655
2010	3,665,862	1,063,100	128,305	62,320	190,625
2011	3,558,016	1,031,824	124,531	60,4186	185,017

Source: WGFD 2011a

Literature reviews show that recreation visitation trends in the United States fluctuate for a number of reasons, including drought, current social conditions, international conditions, current economic conditions and trends, and an increase in the costs for amenities such as fuel (Pergams and Zaradic 2006; Roggenbuck and Watson 1988).

Recreational use has generally been increasing in Wyoming, particularly in the northwest part of the state. Visitation data have been collected for Yellowstone National Park and Bighorn Canyon National Recreation Area, two national tourist attractions near the Planning Area. While visitation trends between 2002 and 2005 in both of these areas fluctuated, showing an overall decline in visitors, trends in both areas have shown a gradual increase since 2006 (NPS 2008). Based on current upward population trends in the state of Wyoming (Wyoming State Office of Travel and Tourism 2007) and the expansion of energy development in the state, it is likely that the general upward trend in outdoor recreation on public lands will continue for the foreseeable future (BLM 2009a).

There is a modest upward trend in overall public land recreational use in the Planning Area, though the degree of increase of this trend varies by activity. In 2006, 61 percent of recreational visits to Wyoming were to northwest Wyoming, which includes the Planning Area. Use of public land for some activities has remained stable, while use for other activities has increased. Locally, the BLM has seen increases in driving for pleasure, OHV use, fishing, hunting, camping, wildlife and wild horse viewing, and mountain biking. There has also been increased demand for SRPs on BLM-administered land in the Planning Area over the past 20 years.

Over the past 20 years, the BLM has seen a large increase in motorized recreation in relation to other forms of recreation. Part of this increase could be due to a shift in preferences and activities. For example, many hunters have shifted from more traditional foot or horseback travel to OHV travel.

If travel and transportation costs increase, the BLM would expect to see more Wyoming residents recreating on nearby public lands as a substitute for taking trips to more distant locations.

Management Challenges

Managing recreation and recreational resources to maintain the desired settings, experiences, and beneficial outcomes is a challenge when there are such a variety of conflicting uses. OHV recreation poses the most challenging activity in terms of maintaining and enhancing desired opportunities, experiences, and outcomes, as well as addressing the observable impacts OHV use can create. National, regional, and local OHV recreation has been trending upward for many years. The result is more demand for motorized vehicle trails and motorized vehicle use areas. The proliferation of unauthorized roads and trails continues. The BLM recreation program works to minimize resource damage, and use and user conflicts related to such activities. The BLM attempts to address these challenges by working and collaborating with local user groups and organizations, through formal travel management planning, promotion of educational efforts such as the tread lightly program, through resource monitoring, and through law enforcement activities.

3.6.6 Lands with Wilderness Characteristics

As mandated by FLPMA, Section 201, the BLM is to maintain an inventory of all resources, which include wilderness characteristics, and as mandated by FLPMA, Section 202, the BLM is to analyze management of all resources, including wilderness characteristics, in a Land Use Plan, which is reiterated in the BLM Land Use Planning Handbook (H-1601-1). Following the passage of Public Law 112-10, Section 1769 (2011 CR), which prohibit the appropriation of funds to implement, administer, or enforce the designation of lands with wilderness characteristic under Secretarial Order 3310, the BLM released IM 2011-154 clarifying the requirements of Section 201 and 202 of the FLPMA and providing guidance on the consideration of lands with wilderness characteristics in the planning process (BLM 2011f). Two BLM Manuals were released subsequent of the IM, BLM Manual 6310, Conducting Wilderness Characteristics Inventory on BLM Lands, and BLM Manual 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process. The criteria used to identify these lands originate from the Wilderness Act of 1964.

The inventory process utilized by the Cody and Worland Field Offices is consistent with the process for conducting inventories for lands with wilderness characteristics on BLM lands outlined in Manual 6310. Section 201 of FLPMA requires the BLM to maintain an inventory of all public lands and their resources. As specifically outlined in BLM Manual 6310, the lands with wilderness characteristics inventory included the following steps:

1) A boundary delineation process to define wilderness characteristic inventory unit boundaries, which can be based on existing wilderness characteristics inventory units. The boundary is generally based on the presence of wilderness inventory roads (a route analysis is conducted on all identified vehicle passageways to determine if the route is considered a road for wilderness inventory purposes), federal ownership boundaries, or developed right-of-ways.
2) An analysis of wilderness characteristics, including criteria for sufficient size, naturalness, and outstanding opportunities for either solitude or primitive and unconfined recreation. In addition, it may also possess supplemental values.
3) A boundary delineation process to define the area with wilderness characteristics to exclude wilderness inventory roads and other substantially noticeable human-caused impacts.

The BLM performed an inventory maintenance for all BLM-administered public lands within the Planning Area (see an example inventory form in Appendix S), including areas recommended as part of the "Wilderness at Risk: Citizens' Wilderness Proposal for Wyoming BLM-administered Lands" submitted to

the BLM by the Wyoming Wilderness Association in February 2004, 2011, and once again in 2012 (Wyoming Wilderness Coalition 2004, Wyoming Wilderness Coalition 2011, Wyoming Wilderness Coalition 2012). In addition, the Biodiversity Conservation Alliance submitted wilderness proposals in 2010 to the BLM. The wilderness proposals promoted the designation of approximately 1.1 million acres of BLM-administered lands for wilderness statewide, of which approximately 283,709 acres are in the Planning Area. During the inventory, BLM reviewed comments made during public scoping and recommendations developed during an internal review of multiple-use lands in the Planning Area, as well as incorporated wilderness data submitted by Environmental Resources Group (ERG), an environmental service company contracted out by the cooperators to assist in working on the RMP revision, Local Government Cooperating Agencies, and other local citizens. Consistent with WO IM 2013-106, these comments were integrated into the wilderness characteristics inventories and, as a result, some previously mapped lands with wilderness characteristic's boundaries were adjusted, and other areas previously believed to possess wilderness characteristics were dropped from the inventory after being found to lack those characteristics.

The original inventory identified 52 lands with wilderness characteristics (565,868 acres) in the Planning Area (Map 79). Table 3-50 lists the acreage and other resource values for each area. The final evaluation forms are available for public review at the WFO and the CYFO and on their respective websites. During the time between the Draft EIS, and the Final EIS, the BLM reevaluated data submitted from the public, resulting in 43 lands with wilderness characteristics (476,398 acres).

At present, the BLM manages lands with wilderness characteristics in accordance with the current RMPs. No specific management for retention of wilderness characteristics exists under the current RMPs. Current management for lands with wilderness characteristics appears in Table 3-51.

Table 3-50. Lands with Wilderness Characteristics and Other Resource Values and Uses

Lands with Wilderness Characteristics Area Name	Acres	2011 Inventory Number	2011 Inventory Acres	Supplemental Resource Values	Valid Existing Rights Present	Locatable Mineral Development Potential	Moderate Oil and Gas Development Potential	Scientifically-significant Fossil Potential	In Holdings and/or Access Issues	Existing ROW or ROW Corridor	Limited Manageability (insufficient size, configuration)	Proximity to Wildland Urban Interface
0008 DH	6,417	WY-010-220 Subunit B	6,417	Cultural Resources; Paleontological Resources; Special Status Species	Yes							Yes
0016 DH	6,186	WY-010-221 Subunit E	6,185	Paleontological Resources	Yes							Yes
0048 PR	7,107	WY-010-222 Subunit C	8,757	None identified	Yes							Yes
005 PR	8,014	WY-010-236 Sununit B	7,874	Cultural Resources; Special Status Species	Yes	Yes						Yes
069 JW	1,056	WY-010-213 Subunit A	1,056	Wildlife Resources; Scenic		Yes					Yes	Yes
130 JW	248	WY-010-218 Subunit A	248	Wildlife Resources; Scenic; Cultural Resources							Yes	Yes
1535 PR	17,458	WY-010-242 Subunit B	14,985	Cultural Resources		Yes						
1536 PR	10,685	WY-010-242 Subunit C	7,099	Cultural Resources								Yes
31 PR	2,972	WY-010-231 Subunit A	2,699	Cultural Resources							Yes	Yes

Table 3-50. Lands with Wilderness Characteristics and Other Resource Values and Uses (Continued)

Lands with Wilderness Characteristics Area Name	Acres	2011 Inventory Number	2011 Inventory Acres	Supplemental Resource Values	Valid Existing Rights Present	Locatable Mineral Development Potential	Moderate Oil and Gas Development Potential	Scientifically-significant Fossil Potential	In Holdings and/or Access Issues	Existing ROW or ROW Corridor	Limited Manageability (insufficient size, configuration)	Proximity to Wildland Urban Interface
508 AK	4,035	WY-010-126 Subunit D	0	Scenic; Cultural Resources	Yes						Yes	Yes
508 TriState Gooseberry N Platte	13,464	WY-010-131 Subunit D	13,449	Wildlife Resources; Cultural Resources; Paleontological Resources; Topographic Features	Yes							Yes
509 AK	13,876	WY-010-130 Subunit B	0	Wild Horses; Wildlife Resources; Cultural Resources; Paleontological Resources	Yes				Yes			Yes
509 AK Dorsey Ck.	4,578	WY-010-131 Subunit F	0	Cultural Resources; Paleontological Resources	Yes		Yes				Yes	Yes
516 DH	553	WY-010-115 Subunit A	553	Wildlife Resources; Special Status Species; Recreation; Scenic					Yes		Yes	
568 TS	2,491	WY-010-102 Subunit A	2,492	Wildlife Resources; Special Status Species; Recreation; Scenic					Yes		Yes	

Table 3-50. Lands with Wilderness Characteristics and Other Resource Values and Uses (Continued)

Lands with Wilderness Characteristics Area Name	Acres	2011 Inventory Number	2011 Inventory Acres	Supplemental Resource Values	Valid Existing Rights Present	Locatable Mineral Development Potential	Moderate Oil and Gas Development Potential	Scientifically-significant Fossil Potential	In Holdings and/or Access Issues	Existing ROW or ROW Corridor	Limited Manageability (insufficient size, configuration)	Proximity to Wildland Urban Interface
577 AK	7,107	WY-010-131 Subunit	0	Wildlife Resources; Paleontological Resources; Cultural Resources	Yes					Yes		Yes
622 AK	29,690	WY-010-124 Subunit A	0	Wildlife Resources; Scenic; Cultural Resources; Special Status Species	Yes					Yes		Yes
626 AK	10,280	WY-010-126 Subunit C	0	Scenic; Cultural Resources					Yes			Yes
639 AK	13,921	WY-010-130 Subunit D	13,916	Cultural Resources; Paleontological Resources	Yes			Yes	Yes			Yes
651 AK	6,410	WY-010-131 Subunit E	6,410	Cultural Resources; Paleontological Resources; Topographic Features; Wildlife Resources	Yes							Yes
652 Lower, Upper AK	21,153	WY-010-130 Subunit E	21,147	Paleontological Resources; Wild Horses; Wildlife Resources	Yes				Yes			

Table 3-50. Lands with Wilderness Characteristics and Other Resource Values and Uses (Continued)

Lands with Wilderness Characteristics Area Name	Acres	2011 Inventory Number	2011 Inventory Acres	Supplemental Resource Values	Valid Existing Rights Present	Locatable Mineral Development Potential	Moderate Oil and Gas Development Potential	Scientifically-significant Fossil Potential	In Holdings and/or Access Issues	Existing ROW or ROW Corridor	Limited Manageability (insufficient size, configuration)	Proximity to Wildland Urban Interface
661 TS	743	WY-010-104 Subunit B	0	Wildlife Resources; Scenic; Cultural Resources					Yes		Yes	
665 CW	15,688	WY-010-111 Sununit A	11,200	Recreation; Scenic; Topographic Features	Yes					Yes		Yes
668 AK	3,435	WY-010-131 Subunit F	0	Cultural Resources; Paleontological Resources	Yes		Yes				Yes	Yes
669 AK	8,387	WY-010-130 Subunit C	8,386	Cultural Resources; Paleontological Resources; Wild Horses; Wildlife Resources	Yes							Yes
676 AK, PR	14,225	WY-010-126 Subunit E	14,225	Cultural Resources; Paleontological Resources; Wild Horses; Wildlife Resources	Yes			Yes				
Alkali Creek NW CP	4,444	WY-010-241 Subunit D	4,444	Cultural Resources		Yes			Yes		Yes	Yes

Table 3-50. Lands with Wilderness Characteristics and Other Resource Values and Uses (Continued)

Lands with Wilderness Characteristics Area Name	Acres	2011 Inventory Number	2011 Inventory Acres	Supplemental Resource Values	Valid Existing Rights Present	Locatable Mineral Development Potential	Moderate Oil and Gas Development Potential	Scientifically-significant Fossil Potential	In Holdings and/or Access Issues	Existing ROW or ROW Corridor	Limited Manageability (insufficient size, configuration)	Proximity to Wildland Urban Interface
Bald Ridge	7,077	WY-020-001	4,920	Special Status Species; Wildlife Resources	Yes	Yes						Yes
Bobcat Draw South CP	4,200	WY-010-126 Subunit C	14,471	Scenic; Cultural Resources; Paleontological Resources	Yes						Yes	Yes
Bobcat Draw South II CP	7,567	WY-010-126 Subunit D	11,597	Scenic; Cultural Resources	Yes							
Bobcat Draw West CP	5,511	WY-010-126 Subunit B	5,457	Scenic; Cultural Resources	Yes			Yes		Yes		
Carter Mountain	14,496	WY-020-002	11,777	Special Status Species; Vegetation Resources			Yes		Yes			Yes
Cedar Ridge	6,364	WY-020-003	4,823	None identified	Yes		Yes		Yes			Yes
Coon Creek	30,769	WY-020-004	30,539	None identified	Yes							Yes
Crystal Creek	15,165	WY-020-005	12,807	Scenic; Public Access	Yes	Yes		Yes	Yes	Yes		Yes
Honeycombs 164 CP	1,157	WY-010-221 Subunit D	1,136	Paleontological Resources					Yes		Yes	Yes
Honeycombs NW 107 CP	2,026	WY-010-221 Subunit C	2,015	Cultural Resources; Paleontological Resources					Yes		Yes	Yes

Table 3-50. Lands with Wilderness Characteristics and Other Resource Values and Uses (Continued)

Lands with Wilderness Characteristics Area Name	Acres	2011 Inventory Number	2011 Inventory Acres	Supplemental Resource Values	Valid Existing Rights Present	Locatable Mineral Development Potential	Moderate Oil and Gas Development Potential	Scientifically-significant Fossil Potential	In Holdings and/or Access Issues	Existing ROW or ROW Corridor	Limited Manageability (insufficient size, configuration)	Proximity to Wildland Urban Interface
Honeycombs South CP	34,487	WY-010-221 Subunit B	34,228	Cultural Resources; Paleontological Resources	Yes		Yes	Yes	Yes			Yes
Little Dry Creek	48,929	WY-020-006	42,866	Scenic	Yes				Yes	Yes		Yes
Medicine Lodge North CP – Subunit A	6,322	WY-010-240 Subunit C	6,188	Scenic; Cultural Resources								Yes
Medicine Lodge North CP – Subunit B	0	WY-010-240 Subunit B	1,132	Scenic; Cultural Resources								Yes
N. YU Bench	25,097	WY-020-007	22,108	Open Space	Yes		Yes			Yes		Yes
Owl Creek CP	7,423	WY-010-104 Subunit B	8,168	Scenic; Cultural Resources				Yes	Yes			Yes
Painted Hills	9,182	WY-020-008	7,892	None identified	Yes	Yes				Yes		Yes
Paintrock CP	8,809	WY-010-239 Subunit B	8,795	Scenic; Cultural Resources							Yes	
Rattlesnake Mountain	18,663	WY-020-009	0	Special Status Species	Yes	Yes		Yes	Yes	Yes		Yes
Red Butte North CP	11,777	WY-010-131 Subunit F	19,528	Cultural Resources	Yes		Yes					Yes
Rough Gulch	12,508	WY-020-010	12,188	Wild Horses	Yes				Yes	Yes		Yes
Sheep Mountain South CP	2,172	WY-010-130 Subunit B	16,042	Paleontological Resources							Yes	
Sheep Mountain	13,063	WY-020-011	12,527	Special Status Species; Wildlife Resources		Yes			Yes			Yes

Table 3-50. Lands with Wilderness Characteristics and Other Resource Values and Uses (Continued)

Lands with Wilderness Characteristics Area Name	Acres	2011 Inventory Number	2011 Inventory Acres	Supplemental Resource Values	Valid Existing Rights Present	Locatable Mineral Development Potential	Moderate Oil and Gas Development Potential	Scientifically-significant Fossil Potential	In Holdings and/or Access Issues	Existing ROW or ROW Corridor	Limited Manageability (insufficient size, configuration)	Proximity to Wildland Urban Interface
Trout Creek	4,514	WY-020-012	4,504	Fish and Wildlife Resources; Special Status Species							Yes	
Whistle Creek	37,727	WY-020-013	30,234	Wild Horses	Yes		Yes		Yes	Yes		Yes

Sources: BLM 2011a, BLM 2013a.

CP Citizens Proposed
ROW Rights-of-way

Table 3-51. Acreage of Current Management in Lands with Wilderness Characteristics

Minerals Management			Rights-of-Way			Visual Resources Management				Travel Management				
Withdrawn from Locatable Mineral Entry	*Mineral Materials Closure*	*Closed to Mineral Leasing*	*Exclusion*	*Avoidance/Mitigation*	*Open*	*Class I*	*Class II*	*Class III*	*Class IV*	*Closed*	*Limited to Designated Roads and Trails*	*Limited to Existing Roads and Trails*	*Open*	*Seasonal Restrictions*
21,428	14,355	33,603	12,902	116,045	347,402	< 6	106,900	90,371	278,969	5,714	145,392	325,236	0	17,725

Source: BLM 2013a

< less than

BLM Manual 6320 establishes the BLM's approach for considering lands with wilderness characteristics in land use planning documents (e.g., RMP revisions), and provides national guidance to the BLM on how to meet its obligation to identify and consider lands with wilderness characteristics. The guidance states that "The BLM will analyze the effects of (1) plan alternatives on lands with wilderness characteristics and (2) management of lands with wilderness characteristics on other resources and resource uses. The decision making process the BLM uses to evaluate lands with wilderness characteristics during the preparation of land use plans are the management alternatives (see Chapter 2 of this document for potential management actions for lands with wilderness characteristics in the Planning Area). Under Manual 6320, outcomes of this planning process may include "(1) emphasizing other multiple uses as a priority over protecting wilderness characteristics; (2) emphasizing other multiple uses while applying management restrictions (conditions of use, mitigation measures) to reduce impacts to wilderness characteristics; (3) the protection of wilderness characteristics as a priority over other multiple uses."

In making lands with wilderness characteristics management decisions, BLM will consider, as outlined in Manual 6310, manageability, resource values and uses, and the congressional release of WSAs.

Table 3-50 provides information on other resource uses and values within each area with wilderness characteristics.

3.6.7 Livestock Grazing Management

Before 1934, the General Land Office managed grazing on public lands outside forest perimeters. Congress initiated comprehensive management of these lands in 1934 when it passed the Taylor Grazing Act. The Grazing Service was established and charged with implementing the provisions of the Act. Specific tasks included establishment of a permit system, organization of grazing districts, fee assessment, and consultation with local advisory boards.

In 1946, the Grazing Service and General Land Office merged to form the BLM. Until Congress passed the FLPMA in 1976, the Taylor Grazing Act was the principle legislation used to administer livestock grazing on public lands. In 1978, Congress passed the Public Rangelands Improvement Act, which established a grazing fee formula that sets and adjusts annual fees for grazing on public land.

In 1985, the BLM established three categories for grazing allotments to identify areas with the potential need for management, and to prioritize workloads and the use of range improvement dollars. The BLM categorized allotments as Improve Existing Resource Conditions (I), Maintain Existing Resource Conditions (M), or Custodial Management (C). Criteria the BLM used to place allotments in category I included the amount of public land in the allotment; the willingness of lessees to invest in management; opportunities for constructing range improvements; the existence of grazing-related resource conflicts; the allotment had moderate to high forage production potential and was producing at low to moderate levels; the rancher or the BLM identified opportunities for improvement in range condition; range trend was static or downward; livestock management could be improved through water distribution; seasons of use or other factors; and opportunities for a positive economic return on public investments. The *Glossary* defines the criteria for placing allotments into the three categories; Appendix P provides a complete list of allotments in each of the categories.

In August of 1995, the 43 CFR 4180 regulations were enacted that changed BLM methods and administrative procedures for managing public lands. These regulations directed the establishment and application of standards for healthy rangelands and guidelines for livestock grazing management to achieve the four fundamentals of rangeland health (43 CFR 4180.1). Those four fundamentals are (1)

watersheds are functioning properly; (2) water, nutrients, and energy are cycling properly; (3) water quality meets State standards; and (4) habitat for special status species is protected. The Secretary of the Interior approved *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* in 1997.

Cattle are the primary livestock grazers on public lands, but grazers also include sheep, domestic horses, and small numbers of bison. Goats and sheep are sometimes authorized for the purpose of suppressing weeds. The relative number of these grazing animals has varied in response to their economic value as a commodity and their use in ranching operations.

Animal Unit Month Allocations

All livestock grazing units in the Planning Area are classified as allotments. Livestock permits authorize grazing use based on perennial vegetation. Grazing preference is attached to base property owned or controlled by a permittee and has a priority position against others for the purpose of receiving a grazing permit. Base property in the Planning Area is land based.

At present, the BLM administers 687 grazing allotments covering 3.2 million acres in the Planning Area. Approximately 203 of these grazing allotments are located either completely or partially in lands with wilderness characteristics. Appendix P provides additional details about grazing allotments, including allotment number, allotment name, total federal acres, type of management, management category (M, I, or C), active use, and kind of livestock. Map 80 shows grazing allotments in the Planning Area. The *Glossary* provides detailed definitions related to livestock grazing management including, but not limited to, Active Use, Permitted Use, and Suspended Non-Use.

Permitted use is the amount of forage available for livestock grazing under a permit and is expressed in AUMs. Permitted use includes active use, suspended use, and temporary suspended use. Active use is the maximum amount of forage generally available in any given year under a permit. Due to fluctuating forage production, in any given year the BLM might authorize more or less forage for use for livestock grazing under a valid permit due to fluctuating forage production. The BLM determines stocking rates by monitoring the condition and amount of vegetation on a given site to ensure that adequate plant recovery time is provided and ample residual forage remains after livestock grazing to provide for healthy rangelands and other uses. Monitoring climate and water availability has resulted in forage availability adjustments, and by extension, adjustments to the numbers of livestock on the range. Predation also has resulted in changes in livestock type from sheep to cattle, and in some cases from cattle to horses. In other areas, disease-related concerns have resulted in the voluntary removal of domestic sheep in areas occupied by bighorn sheep.

Total active use for the Planning Area is 305,264 AUMs. The number of AUMs authorized annually in the Planning Area (Table 3-52) has remained fairly constant, but there has been a slight decline since 1989. This decline in authorized AUMs is due primarily to user requests for temporary non-use and unfavorable climatic conditions. For example, the gradual implementation of rest-rotation grazing systems leaves a portion of the allotment in non-use each year, contributing to the reduction. In addition, until 2009, which was a rare year of above-average rainfall, the Bighorn Basin had experienced drought conditions since 1999. The drought has resulted in less forage available for livestock use and the need for permittees/lessees to take voluntary non-use. During drought years, livestock operators and the BLM work closely to tailor the adjustments in livestock use to meet the needs of the land and ranching operations. In addition, annual fluctuations in authorized AUMs can develop from user demands, climatic conditions, and/or from the collection of monitoring information.

Grazing allotments typically include intermingled federal, state, and private lands that are managed as a unit. Ranches that lease federal rangelands obtain, on average, 28 percent of the total rangeland AUMs from federal lands, 3 percent of AUMs are from state lands, and the remaining 69 percent of rangeland AUMs from private lands, both leased and deeded (Gee et al. 1986a; Gee et al. 1986b). Based on this allocation, ranchers obtain an estimated 2.46 AUMs of rangeland grazing from other sources for every AUM of federal grazing land (Skold and Davis 1995).

Under certain scenarios, such as the relinquishment of grazing permit, the BLM may designate a unique type of grazing unit known as a reserve common allotment. Reserve common allotments may be used by grazing permittees who are temporarily unable to use their regular allotments for various reasons; for instance, to complete range improvements. These allotments would be created with ranchers cooperatively and voluntarily to promote healthier grazing lands. There are currently no reserve common allotments in the Planning Area.

Table 3-52. Billed Animal Unit Months

Year	Worland Field Office	Cody Field Office	Planning Area
1989	151,089	104,336	255,425
1990	161,473	104,287	265,760
1991	160,117	100,208	260,325
1992	154,932	95,090	250,022
1993	167,984	102,388	270,372
1994	168,116	101,782	269,898
1995	176,807	102,481	279,288
1996	183,454	98,301	281,755
1997	173,882	105,514	279,396
1998	175,665	98,773	274,438
1999	171,373	95,330	266,703
2000	148,738	84,531	233,269
2001	128,602	72,893	201,495
2002	96,255	58,686	154,941
2003	108,141	59,295	167,436
2004	121,010	50,130	171,140
2005	123,033	64,274	187,307
2006	133,754	67,828	201,582
2007	137,185	61,080	198,265
2008	129,937	39,031	168,968
2009	136,292	35,631	171,923
2010	137,513	33,912	171,425
2011	149,412	42,568	191,980
2012	144,516	37,987	182,503

Source: BLM Land and Resources Project Office 2013

Livestock grazing uses several resources directly and some resources indirectly. Livestock use rangeland vegetation for forage, but also might use riparian areas and wetlands for sources of water and forage. The BLM authorizes livestock grazing on specific allotments during different seasons. Grazing seasons vary with elevation and geographical change, resource needs, and user preference. Higher-elevation allotments are generally grazed during summer and fall. Lower-elevation allotments may be grazed during any season, but are generally used in fall, winter, and spring. Most of the allotments in the Planning Area are operating under grazing strategies that incorporate rest, seasonal rotations, deferment, and prescribed use levels that provide for adequate plant recovery time to enhance rangeland health. When rangelands are not meeting resource objectives due to current livestock grazing, the BLM implements changes in grazing management. It should be noted that possible deleterious resource uses on public lands (defined in this case as uses that prevent objectives from being met) are not limited to grazing. Policies and regulations provide BLM with direction for coordination, cooperation and consultation with permittees and interested publics regarding the collection, analyses, and reporting of monitoring information.

According to the USDA National Agricultural Statistics Service (NASS), in 2013, Wyoming accounted for 1.4 percent of the total number of cattle and calves within the United States. During 2013, Wyoming accounted for 7 percent of the total number of sheep and lambs in the United States. Nationally, as of 2012 Wyoming ranked second in wool production, second in total number of sheep and lambs, and twenty-third in total number of cattle and calves.

The Stock Raising Homestead Act of 1916 authorized and a Secretarial Order created stock driveways for the specific purpose of creating lanes and reserving water sources for trailing livestock. Stock driveway withdrawals prohibited disposal of these lands, protected water sources, and placed limits on mining activity.

Use of stock driveways was an important part of livestock operations, especially for ranchers driving livestock between summer and winter ranges across the Planning Area. At present, 92,932 acres of public lands are identified as being part of the stock driveway system (BLM 2013a). Approximately 170 miles of stock driveways have been withdrawn for livestock trailing in the Planning Area. Stock driveways in use include predominantly the W-T, Nowater, and Rome Hill Livestock Trails and the Rawhide Allotment (03098). There are more designated livestock trailing routes that do not incorporate land withdrawals. Annual trailing use is over 2,200 AUMs (BLM 2008a).

There are a number of methods livestock managers use to evaluate rangeland health that can reveal trends in the composition or productivity of a plant community. The BLM monitors rangelands throughout the Planning Area as part of the landscape health assessment process.

Overall rangeland trends in relation to livestock grazing are stable or improving. The BLM manages many allotments under grazing rotations and seasons of use designed to meet soil cover and desired plant species growth requirements. Observations of old headcuts, roads, and other disturbances show that perennial species have increased in these areas once disturbances ended. Generally, these observations have been confirmed in the rangeland health determinations completed to date. Where the BLM has identified existing livestock grazing or levels of use as a primary cause for rangeland health standards not being met, it has changed grazing use. The majority of allotments assessed to date meet, or are making progress towards meeting, the *Wyoming Standards for Healthy Rangelands*. Disturbances related to other ongoing resource uses (including oil and gas development and mining) can affect the observed trend.

Starting in 1998, the BLM began assessing grazing allotments for adherence to the approved *Wyoming Standards for Healthy Rangelands* (Appendix N) per the 1995 revision to the 43 CFR 4100 grazing

regulations, and making management decisions in accordance with these standards (Appendix N). The BLM offers grazing permits, and permittees accept them with the understanding that before reissuance, the BLM will evaluate resource conditions to determine if they conform to the standards for healthy rangelands approved by the Secretary of the Interior on August 12, 1997. The *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* allow sustainable livestock grazing management to continue while simultaneously protecting watersheds, riparian and upland ecosystems, and wildlife habitat. Standards address the health, productivity, and sustainability of BLM-administered public rangelands and represent the minimum acceptable conditions for public rangelands. The standards apply to all resource uses on public lands. The BLM will determine their application as use-specific guidelines are developed. Standards can be synonymous with goals and are observed on a landscape scale. They describe healthy rangelands rather than important rangeland byproducts. The achievement of a standard is determined by observing, measuring, and monitoring appropriate indicators. An indicator is a component of a system the characteristics of which (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles.

BLM specialists use Technical Reference 1734-6 version 4-2005, *Interpreting the Indicators of Rangeland Health*, to assist in making a determination for achievement of upland standards for healthy rangelands (Pellant et al. 2005). The BLM authorized officer is required to take appropriate action as soon as practical but not later than the start of the next grazing year upon determining that existing grazing management needs to be modified to ensure that the Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration are either met or making significant progress towards achievement (CFR 4180.1). As discussed in Section 3.4.3, *Vegetation – Riparian/Wetland Resources*, the BLM currently manages all riparian/wetland areas to meet Proper functioning condition (PFC), which under certain circumstances, may require changes in grazing management.

From 1998 through the end of the 2010 fiscal year, the BLM had completed rangeland health evaluations for 308 allotments in the Planning Area (Appendix P). Of these, 168 allotments were found to meet or were making significant progress towards meeting *Wyoming Standards for Healthy Rangelands* 1, 2, 3, and 4. Allotments which had the Water Quality Standard of "unknown" are not considered as Not Meeting Standards. That status is a BLM policy unless the Wyoming DEQ provides specific information that waters in the allotment are not meeting state water quality standards. Including these allotments as "not meeting standards" would be misleading in terms of the current status of grazing allotments in the RMP. Allotment-specific guidelines are being implemented to improve rangeland conditions in areas that do not meet standards. In most allotments not meeting standards, not all public lands were considered to be failing. In addition, many not meeting standards determinations were for reasons other than current livestock management (e.g., historic livestock grazing use, OHV use, oil field development, and mineral extraction). Of allotments not meeting these standards, 20 were due to current permitted livestock grazing management and all 20 have had corrective actions taken. Where current livestock grazing management has been identified as contributing to an allotment failing rangeland health standards, the BLM uses the *Wyoming Guidelines for Livestock Grazing Management* to direct new grazing management stipulations for the allotment.

Range improvement projects and grazing systems, collectively known as BMPs, and allotment management plans (AMPs) have been used in range management since the early 1970s. There are many older range improvement projects on public lands that appear to have never been authorized by the BLM. These consist primarily of reservoirs and fences. It is possible some of these projects were authorized, but their records are not available. In recent years the BLM has cost shared with other agencies and private organizations on some projects to reach mutual goals or objectives.

The BLM Range Improvement Project System database lists range improvement projects completed in the Planning Area. Since the completion of the Cody, Grass Creek, and Washakie RMPs, the BLM has initiated approximately 423 projects and 82,314 acres of vegetation treatments in the Planning Area (Table 3-53). In addition, it has modified or reconstructed several older projects. Projects include vegetative manipulation treatment projects using prescribed fire, mechanical treatments, seeding, or chemical treatments to modify plant communities. The BLM also has constructed fences, water developments, spring enclosures, and cattleguards. Range improvements are planned and designed to enhance rangeland health and wildlife habitat and to mitigate conflicts with other uses. In several projects, the BLM has replaced or modified existing fences to make it easier for wildlife to pass.

Table 3-53. Type and Number of Range Improvement Projects in the Planning Area Since Completion of Previous Resource Management Plans

Type of Project	Number of Projects/Acres Completed
Fences	176 projects
Reservoirs	120 projects
Springs	35 projects
Wells	23 projects
Pipelines	69 projects
Brush Control	82,314 acres

Source: BLM Land and Resources Project Office 2013

Note: This table has not been updated to include a small number of range improvements installed in the Planning Area since the publication of the Draft RMP and Draft EIS.

Management Challenges

Management challenges for the livestock grazing management program include water supply and distribution, forage production, forage quality, and topography. Water availability can have an important effect on the ability of livestock to properly utilize the range. Distribution of water affects the ability of the livestock to efficiently use the forage available in the allotment. Well-distributed water sources equates to efficient use of the grazing pasture, reducing the number of areas that are grazed too intensely or not used at all. Range suitability is related to the distance to water, slope, season of use, and class and kind of livestock. Forage availability is also an important feature. Forage production affects the carrying capacity of the range for all uses and, more specifically, how many and how long livestock can remain on the range. The condition of the range affects forage quantity and quality. For example, a range dominated by appropriate cool-season bunchgrasses generally provides a better forage base than one dominated by invasive species. Surface-disturbing activities (e.g., mineral development) can reduce or change the status of forage in the Planning Area.

3.7 Special Designations and Other Management Areas

This section describes ACECs, National Back Country Byways, NHTs and Other Historic Trails, WSRs, and WSAs. Where data exists, these areas are depicted on maps 84-89, 90, 91-92, 94, and 93, respectively.

3.7.1 Areas of Critical Environmental Concern

Section 103(a) of the FLPMA defines an ACEC as an area within public lands where special management attention is required to protect and prevent irreparable damage to important historical, cultural, or scenic values; fish and wildlife; or other natural systems or processes, or to protect life and safety from natural hazards. BLM regulations for implementing FLPMA ACEC provisions are at Title 43 CFR) Part 1610.7-2(b).

The CYFO and WFO manage nine ACECs in the Planning Area – Carter Mountain, Five Springs Falls, Little Mountain, Sheep Mountain Anticline, Brown/Howe Dinosaur Area, Upper Owl Creek Area, Spanish Point Karst, Red Gulch Dinosaur Tracksite, and Big Cedar Ridge. Refer to Map 84 for the locations of these ACECs in the Planning Area.

Through the public and internal scoping processes, the BLM received a number of nominations for new or expanded ACECs. The BLM reviewed all such nominations to determine if they met the importance and relevance criteria required for consideration as an ACEC as established and defined in 43 CFR 1610.7-2 and outlined in *BLM Manual 1613 – Areas of Critical Environmental Concern* (BLM 1988b). Of the nominations received, 10 new proposed ACECs met the criteria, as did areas adjacent to five existing ACECs (referred to as expansion areas). Table 3-54 lists existing and proposed ACECs, their acreages, the resource value(s) of concern that justify their consideration as ACECs, and identified threats to the areas. Appendix F contains further discussion of the ACEC nomination process, and the ACEC Evaluation Report (BLM 2010b), available on the project website, contains the ACEC evaluation forms completed by the BLM for all existing and proposed ACECs. The ACEC evaluations provide more information about the ACECs identified in this section, including additional references, rationale, and data to support each ACEC nomination.

Table 3-54. Existing and Proposed Areas of Critical Environmental Concern in the Planning Area

Area	Acreage		Value(s) of Concern	Threats
	Existing	Proposed		
Existing ACECs (No Expansion Proposed)				
Big Cedar Ridge	264	N/A	Paleontological	Threats to this ACEC include surface disturbance from mineral and ROW development, and theft and vandalism.
Red Gulch Dinosaur Tracksite	1,798	N/A	Paleontological	Threats to this ACEC include surface disturbance from mineral and ROW development, and theft and vandalism.
Sheep Mountain Anticline	11,520	N/A	Geologic; Caves; Cultural; Scenic	Threats to this ACEC include surface disturbance from mineral and ROW development.
Spanish Point Karst	6,298	N/A	Caves; Recreational; Sinking Stream Segments; Water Quality	Threats to this ACEC include surface disturbance from mineral and ROW development, and aerial spraying of pesticides onto karst aquifer recharge areas.
Existing ACECs (and Proposed Expansion)				
Brown/Howe Dinosaur Area	5,501	15,233	Paleontological	*Existing:* Threats to this existing ACEC include surface disturbance from mineral and ROW development, and theft and vandalism. *Expansion:* Threats to the proposed expansion area of this ACEC include surface disturbance from mineral and ROW development.
Carter Mountain	10,867	5,707	Vegetation; Wildlife *Expansion:* Cultural; Recreational; Special Status Species; Vegetation; Watershed; Wildlife; Soils	*Existing:* Threats to this existing ACEC include surface disturbance from mineral and ROW development, renewable energy development, and theft and vandalism of cultural resources. *Expansion:* Threats to the proposed expansion area of this ACEC include surface disturbance from mineral (including gravel pit) and ROW development, renewable energy development, timber extraction, heavy recreational and motorized vehicle use, and invasive weed infestations. These activities threaten habitat for special status species and have the potential to create disturbances for wintering wildlife.

Table 3-54. Existing and Proposed Areas of Critical Environmental Concern in the Planning Area (Continued)

Area	Acreage		Value(s) of Concern	Threats
	Existing	Proposed		
Five Springs Falls	163	1,646	Recreational; Scenic; Special Status Species *Expansion*: Geologic; Scenic; Public Safety	*Existing:* Rare and endemic plants that occur as a result of the "spray" from Five Springs Falls are in danger when hikers/climbers attempt to climb the wall of the water fall. *Expansion:* Threats to the proposed expansion area of this ACEC include surface disturbance from mineral and ROW development.
Little Mountain	21,475	50,576	Caves; Cultural; Paleontological; Scenic *Expansion:* Recreational; Special Status Species; Vegetation; Wildlife; Scenic	*Existing:* Threats to this existing ACEC include surface disturbance from mineral (including gravel pits, uranium, and limestone) and ROW development, timber extraction, heavy recreational and motorized vehicle use, and invasive weed infestations. These activities threaten habitat for special status species and have the potential to create disturbances for wintering wildlife. *Expansion:* Threats to the proposed expansion area of this ACEC are the same as for the existing ACEC.
Upper Owl Creek Area	13,758	18,975	Cultural; Fish; Recreational; Scenic; Soils; Special Status Species; Vegetation; Wildlife	*Existing:* Threats to this existing ACEC include surface disturbance from mineral and ROW development. *Expansion*: Threats to the proposed expansion area of this ACEC include surface disturbance from mineral and ROW development, timber extraction, and land disposals.
Proposed ACECs				
Chapman Bench	N/A	23,326	Special Status Species; Vegetation; Wildlife	Threats to this proposed ACEC include the resulting probable mining interests when this reserved land is opened to all public land laws. This area was formerly BOR reserved land, and thus had protection from the public land laws and the 1872 mining law. Issuing an opening order, will allow all exploration of resources. Surface disturbance for exploration and claims will have an impact to the resources that are in need of protection: long-billed curlew, mountain plover, and greater sage-grouse.

Table 3-54. Existing and Proposed Areas of Critical Environmental Concern in the Planning Area (Continued)

Area	Acreage		Value(s) of Concern	Threats
	Existing	Proposed		
Clarks Fork Basin/Polecat Bench West Paleontological Area	N/A	23,895	Paleontological; Scenic	Threats to this proposed ACEC include surface disturbance from mineral (including gravel pit, and limestone quarries) and ROW development, timber extraction, heavy recreational and motorized vehicle use, and invasive and nonnative species infestations. These activities threaten habitat for special status species and create disturbances in crucial winter range during critical periods. Heavy public recreational use and existing special recreation permits also threaten recreation experiences. Water quality and quantity issues, as a result of surface and groundwater withdrawals and untreated irrigation outflows, also threaten the area.
Clarks Fork Canyon	N/A	12,249	Geologic; Open Space; Recreational; Special Status Species; Wildlife	Threats to this proposed ACEC include surface disturbance from mineral and ROW development.
Foster Gulch Paleontological Area	N/A	27,302	Paleontological; Scenic	Threats to this proposed ACEC include surface disturbance from mineral and ROW development.
Greater Sage-Grouse Key Habitat Areas	N/A	1,232,583	Special Status Species; Vegetation	Threats to this proposed ACEC include surface disturbance from mineral (including gravel pits) and ROW development, nonrenewable and renewable energy developments, brush eradication programs, prolonged drought, heavy recreational and motorized vehicle use, wildfire, predation, and invasive and nonnative species infestations. These threaten important greater sage-grouse habitats, including breeding, later brood-rearing, and winter concentration areas.
Greater Sage-Grouse Priority Habitat Management Areas	N/A	1,116,698	Special Status Species; Vegetation	Same as above.
McCullough Peaks South Paleontological Area	N/A	6,994	Paleontological; Scenic	Threats to this proposed ACEC include surface disturbance from mineral and ROW development.
Rainbow Canyon	N/A	1,433	Paleontological; Geologic; Scenic	Threats to this proposed ACEC include surface disturbance from mineral and ROW development.

Table 3-54. Existing and Proposed Areas of Critical Environmental Concern in the Planning Area (Continued)

Area	Acreage		Value(s) of Concern	Threats
	Existing	Proposed		
Rattlesnake Mountain	N/A	19,137	Special Status Species; Vegetation; Wildlife	Threats to this proposed ACEC include surface disturbance from mineral (including gravel pits) and ROW development, renewable energy developments, timber extraction, heavy recreational and motorized vehicle use, and invasive and nonnative species infestations. These activities threaten rare plants and habitat for special status species, and have the potential to create disturbances for wintering wildlife.
Sheep Mountain	N/A	25,151	Vegetation; Wildlife	Threats to this proposed ACEC include surface disturbance from mineral (including gravel pit) and ROW development, renewable energy developments, timber extraction, heavy recreational and motorized vehicle use, and invasive and nonnative species infestations. These activities threaten rare plants and habitat for special status species, and have the potential to create disturbances for wintering wildlife.

Sources: BLM 2013a; Appendix F; USFWS 2010 Endangered and Threatened Wildlife and Plants; 12-Month Findings (USFWS 2010); USFWS Conservation Objectives Team (COT) Report (USFWS 2013a); Big Horn Basin Sage-grouse Local Working Group (BHBLWG 2007).

Note: Portions of the Proposed Clarks Fork Basin/Polecat Bench West Paleontological Area, Proposed Foster Gulch Paleontological Area, and Proposed McCullough Peaks South Paleontological Area ACECs make up the proposed PETM ACEC (14,906 acres) under Alternative D. The values of concern listed for those three proposed ACECs are the same for the Proposed PETM ACEC.

ACEC Area of Critical Environmental Concern
BOR Bureau of Reclamation
N/A Not applicable
PETM Paleocene, Eocene Thermal Maximum
ROW rights-of-way

3.7.1.1 Existing Areas of Critical Environmental Concern

Big Cedar Ridge

The Big Cedar Ridge ACEC is on 264 acres of BLM-administered land southwest of Ten Sleep, Wyoming, in Washakie County, in an area of abundant paleontological resources, particularly fossilized plants (Kerr 1992). Fossilized plants were discovered in the Meeteetse Formation in 1990, and the area contains a complete and well-preserved late Cretaceous Period plant community. Sites with such in-place preservation of entire plant communities are rare; however, other sites have been found including two smaller sites in Wyoming and one in New Mexico (Kerr 1992). In addition, 100 previously unknown plant species have been identified at this location (BLM 1997).

Management objectives for the Big Cedar Ridge ACEC are to protect and maintain its paleontological resources in order to provide educational, hands-on experiences for visitors, university studies, and school and paleontological groups, by allowing and promoting collection of reasonable quantities of the fossilized plants for personal use while making negligible disturbance.

Red Gulch Dinosaur Tracksite

The Red Gulch Dinosaur Tracksite ACEC is on 1,798 acres of BLM-administered land off U.S. Highway 14, approximately 10 miles east of Greybull, Wyoming, in Big Horn County. The Red Gulch Dinosaur Tracksite is the largest tracksite in Wyoming. The "basal member" of the lower Sundance Formation contains rare Middle Jurassic dinosaur tracks, which are approximately 167 to 170 million years old. The interval occurs in previously unrecognized intertidal to supratidal carbonate units once thought to be totally marine in origin (Archer et al. 2001). The dinosaur tracks might have been made by at least two types of theropods, meat-eating dinosaurs that walked on their hind legs. Adding to its scientific importance, evidence from this location brings into question assumptions about the geologic history of the area during the Middle Jurassic Period; this location was originally thought to be an ancient sea. Dinosaur tracks in the area have been exposed to surface weathering for varying amounts of time, and new tracks may potentially be exposed each year. The ACEC is also important because of its extensive and unusual Middle Jurassic fossil occurrence. Fossil resources are found throughout the area and include abundant marine fossils such as belemnites, oysters, trilobites, brachiopods, and ammonites, and fossilized plants. In addition, the area consists of the Red Gulch Dinosaur Tracksite recreation area and a small portion of the Red Gulch/Alkali Road National Back Country Byway.

Management objectives and challenges for this ACEC are to protect and maintain paleontological resources. The application of foreign substances such as plaster, resin, and other materials used to make molds has damaged some of the dinosaur tracks in this area. Other types of damage include people scratching circles around tracks or scratching tracks to clean them of sediment. In the outlying areas of the site where more brittle exposures occur, there is evidence of damage to the fossil-bearing surface from people walking on the surface. The possibility remains people could remove or destroy tracks, although removal of individual tracks would be difficult because of the brittle limestone in which the tracks are found.

Sheep Mountain Anticline

The Sheep Mountain Anticline ACEC is on approximately 11,520 acres of BLM-administered land north of Greybull, Wyoming. The ACEC is composed of a classic Laramide anticline, an upward folded rock

structure often featured in geology textbooks. Researchers visit the ACEC and use it for educational field trips. This ACEC also contains several caves that provide recreational, educational, and research opportunities. Some of these caves are of scientific importance because they contain active thermal springs and therefore provide information about the formation of these types of caves and related features.

The management objective for this ACEC is to protect its geological features.

Spanish Point Karst

The Spanish Point Karst ACEC is on approximately 6,298 acres of BLM-administered land on the west slope of the Big Horn Mountains in Big Horn County. The area consists of deeply incised canyon and mountainous terrain, the Medicine Lodge and Trapper Creek WSAs (refer to Section 3.7.6 *Wilderness Study Areas*), several eligible and suitable WSRs (refer to Section 3.7.5 *Wild and Scenic Rivers*), four significant cave and karst systems, sinking stream segments, and regionally important groundwater recharge areas.

Associated with the caves, within the ACEC boundaries, are 45,000 feet of explored cave passages and 100,000 feet of subkarstic waterways. Cave entrances, passages, and waterways in this ACEC serve as a receptacle and circulation system for fresh water originating in the highlands to the east on USFS lands. A portion of the water that circulates through the karsitic system is trapped in the carbonate rocks and recharges the widely used (by both municipalities and irrigators) and economically important Madison aquifer. The Madison aquifer is the source of municipal water for the communities of Worland, Ten Sleep, and Hyattville, and most recently Basin, Greybull, Manderson, and Kirby. The water provides irrigation water for thousands of acres within the Bighorn Basin.

There are recreational opportunities in the area because of its good access for the public, scenic values, and varied potential recreation activities (primarily hiking, rock climbing, and caving). Popular caves in the area include Great X, Tres Charros, Bad Medicine, and P-Bar.

Management objectives for the Spanish Point Karst ACEC are to protect the cave system, sinking stream segments, and groundwater quantity and quality services the area provides.

3.7.1.2 Existing ACECs with Proposed Expansions

Brown/Howe Dinosaur Area

Existing Area

The Brown/Howe Dinosaur Area ACEC is on 5,501 acres of BLM-administered land north of Shell, Wyoming. The area was designated to protect paleontological resources, most notably dinosaur fossils from the suborder Theropoda and Sauropoda that have been recovered there. Tracks of both suborders of dinosaurs have been found in this area, as have soft-tissue fossils. Since the 1930s, the Brown Howe Quarries, which are on nearby private land, have produced hundreds of dinosaur bones. The fossil-bearing sediments continue onto portions of adjacent BLM-administered lands in the ACEC. The Big Al Quarry in the Morrison Formation, on BLM-administered land just north of the Brown Howe Quarries, was the site of the discovery of a nearly complete Allosaurus ("Big Al") skeleton that has subsequently been the subject of several scientific studies and a television program. Additional quarrying is ongoing in this area for dinosaur fossils, such as sauropods, and nonsauropod plant eaters.

Proposed Expansion

The proposed expansion of the Brown/Howe Dinosaur Area ACEC flanks the existing ACEC to the southeast and the northwest and would expand the area by 15,233 acres. As with the existing ACEC, the proposed expansion area contains paleontological resources, primarily from dinosaurs and marine reptiles. This expansion area also typically includes vertebrate fossils and scientifically important paleobotanical, palynological (pollen), mammalian fossil, and dinosaur eggshell site resources.

Management challenges for this area include soil instability, erosion potential, and fossil occurrence that make it vulnerable to surface disturbance. At present, the BLM manages the proposed expansion area as VRM Class II, III, or IV, with approximately 15,160 acres limited to designated roads and trails and 73 acres closed to motorized vehicle use.

Carter Mountain

Existing Area

The Carter Mountain ACEC consists of approximately 10,867 acres of BLM-administered lands on the east slope of the Absaroka Mountains. The BLM manages the area to protect areas of alpine tundra and fragile soils, much of which remains in pristine condition. Some disturbance has occurred in the past, and this juxtaposition of disturbed and undisturbed alpine tundra allows an opportunity to study the effects of disturbance on alpine soils, vegetation, and wildlife. The ACEC also contains scenic areas and provides crucial winter range for elk and mule deer. As stated by Hurley (1996), the Cody elk herd equals or exceeds migratory distances documented for elk, and protection and maintenance of this crucial winter range on Carter Mountain is imperative to the long-term survival of these elk. Recreational opportunities in the ACEC include hunting opportunities pursued by local and visitors from outside the region.

The alpine tundra plant community, which is slow growing and difficult to recover following mechanical disturbance, is responsible for holding fragile soils in the ACEC (Auerbach et al. 1997). The difficulty in recovering these areas is due to a very short growing season, low available water, harsh growing conditions, and desiccation through wind, snow and ice. Alpine environments are indeed "fragile," and may take thousands of years to heal after soil has been lost (Billings 1973). Destruction of the insulating layer of turf can cause thermakarst erosion, which is severe (Billings 1973). Alpine environments can heal from disturbance; however, such recovery depends on the severity of the impact and resistance to disturbance of the vegetation (Billings 1973). Alpine meadows are also susceptible to damage, especially in rocky sites like the Absaroka Mountain Range (Billings 1973). Many other areas in the Absaroka Range are protected as Wilderness, offering greater protection for vegetation and soils than comparable resources receive in the Carter Mountain area.

Proposed Expansion

The proposed expansion of the Carter Mountain ACEC surrounds the area of the existing ACEC and would expand the area by 5,707 acres. Like the existing ACEC, the proposed expansion is a scenic area that contains intact alpine tundra and other habitats, fragile soils, and crucial winter ranges for big game (BLM 2010a). The proposed expansion also contains important habitat for wildlife transition, calving areas, and summer ranges. Elk, deer, and bighorn sheep use the area as they migrate from Yellowstone National Park and the upper reaches of the Shoshone National Forest. In addition, the proposed expansion area supports grizzly bears and grey wolves, and has potential Canada lynx habitat; all three species are current or former listed species (see Section 3.4.9 *Special Status Species – Wildlife*). Three perennial streams in the area support riparian habitat and a pure strain of Yellowstone cutthroat trout

(a BLM sensitive species; see Section 3.4.8 *Special Status Species – Fish*); additional streams in the area might have suitable habitat. Portions of the expansion area contain several special status raptor species and a number of rare and special status species plants (BLM 2010a). The position of Carter Mountain is unique because it is at the edge of the Absaroka Range in an ecotone where species diversity is high. Rare plants often begin to evolve and persist due to the differing ecological pressures of alpine tundra and mountain shrub zones and their phenoplasticity producing ecotypical differentiation. This is why it is more common that these rare plants are found in this zone (see Fertig and Mills 2000).

Management challenges for the area include fragile and unstable soils. In combination with high winds or intense storms, these soils can create hazardous conditions for hikers and other users. At present, the BLM manages this area as VRM Classes II and IV, with 533 acres limited to designated roads and trails and 5,174 acres limited to existing roads and trails for motorized vehicle use.

Five Springs Falls

Existing Area

The Five Springs Falls ACEC consists of 163 acres of BLM-administered public lands on the west slope of the Big Horn Mountains east of Lovell, Wyoming. The BLM objective for managing the ACEC is to protect existing populations of four near-endemic rare and sensitive plant species in the Five Springs Falls area; see BLM 2010a for information about these plant species. This ACEC also contains the Five Springs Falls Campground, which attracts local and Yellowstone National Park visitors. Waterfalls in the steep rocky canyon that makes up the ACEC are public recreational and scenic attractions.

Proposed Expansion

The proposed expansion of the Five Springs Falls ACEC is south and west of the existing ACEC and would expand the area by 1,646 acres. The area of the proposed expansion is dominated by outcrops of highly folded, faulted, and forested limestones and Paleozoic age dolomites. The area is unstable due to steep topography. Downslope movements of soil and rock are common, and landslide deposits and rock-fall (slump) have been documented in the area. This natural phenomenon can pose a risk to public safety. The area also has unstable soil, erosion potential, and fossil occurrence that make it vulnerable to continued surface disturbance and loss of paleontological resources. At present, the BLM manages this area as VRM Classes II and III, with motorized vehicle use limited to designated roads and trails.

Little Mountain

Existing Area

The Little Mountain ACEC consists of approximately 21,475 acres of BLM-administered land on the west slope of the Big Horn Mountains northeast of Lovell, Wyoming. BLM objectives for managing the ACEC are to protect and manage important caves and cave-related paleontological resources, cultural resources, and the maintenance of scenic values. The Little Mountain ACEC contains several caves used by the public for recreational, educational, and research purposes. This ACEC provides hunting opportunities. The area also contains AML hazards due to previous uranium mining activities (refer to Section 3.8.3 *Health and Safety*).

Proposed Expansion

The proposed expansion of the Little Mountain ACEC includes areas east and south of the existing ACEC and would expand the area by 50,576 acres. This expansion area is proposed due to identified wildlife, special status species, recreation, vegetation, and scenic values. The proposed expansion area includes

big game winter, transition, and calving areas; migration corridors; and a bighorn sheep population (see Section 3.4.6 *Fish and Wildlife Resources – Wildlife*). A number of BLM sensitive wildlife species and regionally endemic plant species can be found in the area. Potential Canada lynx habitats and greater sage-grouse brood-rearing, nesting, and winter range can also be found in this area. Lynx Analysis Units in the proposed expansion area were determined in coordination with the USFWS and USFS to provide suitable lynx habitat and to be functional with the adjacent USFS suitable habitat (Lynx Biology Team 2000). Desired plant communities in the proposed expansion area include a portion of the only curl-leaf mountain mahogany population in Wyoming. Recreational use (including hunting, fishing, wildlife viewing, and visitation to the nearby medicine wheel archeological site) is heavy. Scenic resources in the area include deep canyons (including Devil's Canyon and Cottonwood Canyon) and high plateaus that contain paleontological resources. At present, the BLM manages the area as VRM Classes II and III, with motorized vehicle use limited to designated roads and trails.

Upper Owl Creek

Existing Area

The Upper Owl Creek ACEC includes 13,758 acres of BLM-administered public lands in the upper foothills of the Absaroka Mountains surrounding the Owl Creek, Rock Creek, Klicker Creek, Slab Creek, and Vass Creek drainages. BLM management objectives for the area are to protect overlapping and important big game habitats and migration corridors, fisheries habitat, shallow soils, alpine vegetation and rare plants, cultural resources and Native American traditional values, primitive recreational opportunities, and scenic quality (BLM 1998a). The ACEC contains wildlife resources and special status species (including migratory birds, wolves, grizzly bears, moose, and wolverines), cultural resources, and primitive recreational opportunities such as hiking, camping, fishing, and horseback riding. Desired plant communities include endemic plants species growing in "moonscapes" where rocky, sparsely-vegetated soils support low-growing, cushion plant communities, and forested areas that include old-growth tree stands. This ACEC also provides hunting opportunities.

Proposed Expansion

The proposed expansion of the Upper Owl Creek ACEC includes areas east and south of the existing ACEC and would expand the area by 18,975 acres. BLM management objectives and resource values for this area are similar to those in the area of the existing Upper Owl Creek ACEC. At present, the BLM manages the area as VRM Classes II and III, with 18,080 acres limited to designated roads and trails and 1,640 acres limited to existing roads and trails for motorized vehicle use.

3.7.1.3 Proposed ACECs

Chapman Bench

The proposed Chapman Bench ACEC (23,326 acres) is north of Heart Mountain National Landmark and east of Highway 120 in an area of predominantly BLM-administered land. The area contains sagebrush habitat used by sensitive bird species and other wildlife.

The proposed ACEC is an Audubon Society-designated important bird area, and the area contains a diverse and abundant bird population map (Taylor 1986) of this important bird area http://netapp.audubon.org/IBA/State/US-WY). The Chapman Bench area supports at least 12 sensitive species. Greater sage-grouse, long-billed curlew, and mountain plover occur in this sagebrush steppe; all three are BLM sensitive. These sensitive bird species prefer shortgrass or vegetation cover and bare

ground, and they have evolved in disturbance regimes that include grazing and fire. Both these regimes can modify a vegetation community to be more suitable; however, it should be noted that these species also select short stature vegetation types like gardener saltbush dominated sites and blue grama dominated sites regardless of disturbance regimes. Sagebrush obligate species in the area also include the sage thrasher, sage sparrow, Brewer's sparrow, and loggerhead shrike. This area provides nesting habitat for one of the highest concentrations of these species together in the Bighorn Basin. In addition, this area provides pronghorn and mule deer crucial winter range. Visitors travel the area, which provides views of the Absaroka Mountain foothills, on their way to Yellowstone National Park.

At present, the BLM manages this area as VRM Classes II, III, and IV, and motorized vehicle use is limited to existing roads and trails. There has been little development in the proposed ACEC to date.

Clarks Fork Basin/Polecat Bench West Paleontological Area

The proposed Clarks Fork Basin/Polecat Bench West Paleontological Area ACEC (23,895 acres) is west of Powell, Wyoming, in Park County, in the northwestern corner of the Planning Area. The ACEC is proposed to protect the area's stratigraphic contact zone and the paleontological and geochemical values associated with these rock layers, which are exposed in only a few areas worldwide. The area contains mammalian and botanical fossil resources and its geologic information relates to global warming and paleoclimate change. This stratigraphic boundary represents a transition from the Paleocene Epoch to the Eocene Epoch, and produces fossils and geochemical data used in the study of a major Carbon Isotope Excursion recorded during a period of global warming (the Paleocene-Eocene Thermal Maximum). The area also contains scenic and colorful badlands and eroded features.

Management challenges for this area include soil instability, erosion potential, and fossil occurrence that make it vulnerable to surface disturbance and the loss of its identified resource values. At present, the BLM manages this area as VRM Classes III and IV, with motorized vehicle use limited to existing roads and trails.

Clarks Fork Canyon

The proposed Clarks Fork Canyon ACEC (12,249 acres or 4,746 acres depending on the management alternative) is in the far northwestern portion of the Planning Area. The ACEC is proposed to protect the area's geologic, wildlife and special status species habitat, open space, and recreational resources and uses. The geology of the Clarks Fork Canyon, the Canyon Mouth Anticline, and glacial features in the area are of scientific and educational value. The area contains crucial winter range for mule deer, elk, and moose, one of only two ranges for mountain goats in the state, and one of the largest bighorn sheep ranges in the country. The area provides habitat for several species of raptors and contains caves with bat hibernacula and roost sites. Special status species in the proposed ACEC include plant species (such as Shoshonea and Ute ladies'-tresses), habitat for BLM sensitive wildlife species (such as greater sage-grouse, mountain plover, long-billed curlew, sage thrasher, Brewer's sparrow, Baird's sparrow, and loggerhead shrike), and BLM sensitive Yellowstone cutthroat trout. The Clarks Fork area provides opportunities for recreation on large unbroken tracts of public land, including a segment of the Clarks Fork of the Yellowstone River WSR eligible waterway.

At present, the BLM manages this area as VRM Class II, and motorized vehicle use is limited to existing roads and trails with seasonal management restrictions.

Foster Gulch Paleontological Area

The proposed Foster Gulch Paleontological ACEC (27,302 acres) is 10 miles south of Lovell, Wyoming, in Big Horn County. The ACEC is proposed to protect the area's stratigraphic contact zone and the paleontological and geochemical values associated with these rock layers, which are exposed in only a few areas worldwide. The area typically contains mammalian and botanical fossil resources, and its geologic information relates to global warming and paleoclimate change. This stratigraphic boundary represents a transition from the Paleocene Epoch to the Eocene Epoch (the Fort Union/Willwood formations) and produces fossils and geochemical data used in the study of a major Carbon Isotope Excursion recorded during a period of global warming (the Paleocene-Eocene Thermal Maximum). The area also contains scenic and colorful badlands and eroded features.

Management challenges for this area include soil instability, erosion potential, and fossil occurrence that make it vulnerable to surface disturbance and the loss of its identified resource values. At present, the BLM manages the area as VRM Class IV, with motorized vehicle use limited to existing roads and trails.

Greater Sage-Grouse Key and Priority Habitat Management Areas

The proposed Greater Sage-Grouse Key Habitat Areas ACEC encompasses BLM-administered lands in Key Habitat Areas (1,232,583 acres), while the Greater Sage-Grouse PHMAs ACEC encompasses BLM-administered lands in PHMAs (1,116,698 acres). These ACECs encompass large portions of the Planning Area (39 percent of BLM-administered surface for the Greater Sage-Grouse Key Habitat Areas ACEC and 35 percent for the PHMAs ACEC). Both proposed ACECs are discussed together, since both met the same relevance and importance criteria and contain the same values of concern.

The BLM has identified the priority greater sage-grouse habitat encompassed by the proposed Key and PHMAs ACECs as highly important to the health and viability of greater sage-grouse populations. The sagebrush steppe has been identified as one of the most threatened ecosystems in America (Stiver et al. 2006). Numerous sagebrush obligate species are dependent on healthy, intact sagebrush steppe ecosystems and are put at risk by its decline. The primary threats to the Wyoming Basin greater sage-grouse population include energy development and transfer, long-term drought, and brush eradication programs (USFWS 2013b). In addition, sagebrush steppe area provides habitat for numerous BLM sensitive species, including greater sage-grouse, Brewer's sparrow, sage thrasher, sage sparrow, loggerhead shrike, mountain plover, burrowing owl, white-tailed prairie dog, black-tailed prairie dog, long-billed curlew, and Baird's sparrow. Portions of the ACEC in Chapman Bench and Loch Katrine that contain sagebrush steppe habitat are designated as important bird areas by the Audubon Society. Many other animal species are also dependent upon this ecosystem for grazing, pollination, winter range, nesting areas, and birthing areas. For example, pronghorn, though not a sensitive species, are dependent on the sagebrush steppe; Wyoming supports the majority of this species' population.

McCullough Peaks South Paleontological Area

The proposed McCullough Peaks Paleontological Area ACEC (6,994 acres) is adjacent to the McCullough Peaks WSA (which forms the proposed ACEC's northeastern boundary), east of Cody, Wyoming, in Park County. The ACEC is proposed to protect the area's stratigraphic contact zone and the paleontological and geochemical values associated with these rock layers, which are exposed in only a few areas worldwide. The area typically contains mammalian and botanical fossil resources and its geologic information relates to global warming and paleoclimate change. This stratigraphic boundary represents a transition from the Paleocene Epoch to the Eocene Epoch (the Fort Union/Willwood formations) and produces fossils and geochemical data used in the study of a major Carbon Isotope Excursion recorded

during a period of global warming (the Paleocene-Eocene Thermal Maximum). The area also contains scenic and colorful badlands and eroded features.

Management challenges for this area include soil instability, erosion potential, and fossil occurrence that make it vulnerable to surface disturbance and the loss of its identified resource values. At present, the BLM manages the area as VRM Classes II and III, with motorized vehicle use limited to designated roads and trails.

Rainbow Canyon

The proposed Rainbow Canyon ACEC (1,443 acres) is at the foot of the western Big Horn Mountains in Big Horn County, near the northeastern corner of the Planning Area. The BLM acquired access easements using Land and Water Conservation Funds that provide public access across the private land between Wyoming State Highway 14A and public land where Rainbow Canyon is located.

The public access is needed in order to develop Rainbow Canyon as a recreation site involving a scenic overlook.

The proposed ACEC contains scenic and geologic resources, and paleontological resources that include dinosaurian and paleobotanical fossils. The area is dominated by outcrops of the Cretaceous Cloverly Formation, which is known for early Cretaceous dinosaur fossils. These important scientific resources are found throughout large portions of the area. The geology of the area is weathered and eroded, creating a colorful landscape. The viewscape in the ACEC is dominated by exposed beds of the Cloverly Formation, which includes dramatic pink, lavender, and white beds that are exposed in mirror images across the drainage. Though the Cloverly Formation can be found around the Bighorn Basin, the colorful bands presented in the Rainbow Canyon stand out in counter-relief below the backdrop of tan and black Cretaceous shales; this quality is distinct from other bas-relief areas of badlands in the region.

Management challenges for this area include soil instability, erosion potential, and fossil occurrence that make it vulnerable to surface disturbance and the loss of its identified resource values. At present, the BLM manages this area as VRM Class III, with motorized vehicle use limited to designated roads and trails.

Rattlesnake Mountain

The proposed Rattlesnake Mountain ACEC (19,137 acres) is approximately 5 miles northwest of Cody and immediately north of the Buffalo Bill Reservoir. The area is proposed to protect wildlife habitat and desired plant communities, including special status plant species; see BLM 2010a for information about these plant species. The proposed ACEC contains winter, transition, and calving areas for elk, mule deer, and moose (WGFD 2011b). The winter ranges in this area are the eastern-most terminuses of some of the longest intact migration routes in the lower 48 states. The area also contains grizzly bear and gray wolf habitat, and potential Canada lynx habitat. While the area does not contain Lynx Analysis Units, it does contain spruce habitat which meets standards in the Canada Lynx Conservation Assessment and Strategy 2000 (Lynx Biology Team 2000) as suitable habitat and is linked to other suitable habitat to the west. Bird habitat in the area includes greater sage-grouse brood-rearing and migratory bird nesting areas. Watersheds that comprise the area drain into the north fork of the Shoshone River, which provides cold water fisheries habitat. The area is used for hunting and other recreational activities. Important vegetation types and sensitive plant species in the area include mixed conifer and aspen stands and riparian willow, sagebrush, and mountain shrub communities. The unusual aspect of the vegetation habitat in this area is the volcanic, Precambrian, and limestone soils (associated with the

Laramide Orogeny), which provide habitat for rare and BLM sensitive plant species. At present, the BLM manages the area as VRM Class II.

Sheep Mountain

The proposed Sheep Mountain ACEC (25,151 acres or 14,200 acres depending on the management alternative) is immediately west of Buffalo Bill Reservoir in the northwestern quadrant of the Planning Area. The area is proposed to protect important wildlife habitat and desired plant communities. The area contains big game winter, transition, and lambing areas, and migration corridors that link USFS land and Yellowstone National Park with available habitat for wintering and raising young (WGFD 2011b). The area also contains grizzly bear and gray wolf habitat, potential Canada lynx habitat, and greater sage-grouse brood-rearing and migratory bird nesting habitat. While the area does not contain Lynx Analysis Units, it does contain spruce habitat, which meets standards in the Canada Lynx Conservation Assessment and Strategy 2000 (Lynx Biology Team 2000) as suitable habitat and is linked to other suitable habitat to the west. Drainages in the area provide cold water fisheries habitat. The area is used for hunting and other recreational activities and contains visual alignments associated with the equinox and solstice.

Important vegetation types and sensitive plant species in the area include mixed conifer and aspen stands, riparian willow, sagebrush, and mountain shrub communities. The unusual aspect of the vegetation habitat in this area is the volcanic and limestone soils (associated with the Heart Mountain Detachment), which provide habitat for rare and BLM sensitive plant species.

At present, the BLM manages this area as VRM Class II. The area contains 22,926 acres limited to designated roads and trails and 2,227 acres limited to existing roads and trails for motorized vehicle use.

3.7.2 National Back Country Byways

The BLM began a back country byway program in 1989 to focus on enhancing recreational opportunities. Two years later, Section 1047 of the Intermodal Surface Transportation Efficiency Act of 1991 established the National Scenic Byway System. Section 1032 of the Act recognized the BLM's Back Country and Scenic Byways program as a component of the National Scenic Byway System. The objectives of the BLM's Back Country and Scenic Byways program include:

- Enhance opportunities for the American public to see and enjoy the unique scenic and historical opportunities on public lands.
- Foster partnerships at local, state, and national levels.
- Contribute to local economies.
- Enhance visitors' recreation experiences and communicate the multiuse management message through effective interpretative programs.
- Manage visitor use along the National Back Country Byway to minimize impacts to the environment and to protect visitors.
- Contribute to the National Scenic Byway System in a way that is uniquely suited to BLM-administered national public lands.

Red Gulch/Alkali Road National Back Country Byway

The BLM manages one National Back Country Byway in the Planning Area – the Red Gulch/Alkali Road National Back Country Byway. This route is a 32 mile gravel road that provides a scenic drive through

the foothills of the Big Horn Mountains and access to three WSAs and the Red Gulch Dinosaur Tracksite ACEC. Active promotion of the Red Gulch/Alkali Road National Back Country Byway has been limited to available brochures and interpretive kiosks at either end of the route, and its proximity to the Red Gulch Dinosaur Tracksite, which attracts thousands of visitors per year. Local and out-of-state visitors familiar with the area constitute most recreational use. These visitors are generally comfortable with the experience and enjoy the seclusion and the panoramic scenery of the Big Horn Mountains and the Bighorn Basin and the experience, opportunities, and benefits that come from the local areas accessible via the National Back Country Byway.

Management Challenges

Management challenges for the Red Gulch/Alkali Road National Back Country Byway include improving visitor safety and managing for multiple-use resource activities while maintaining the scenic character of the landscape. Outdoor enthusiasts unfamiliar with the area can become intimidated by the type II and III road conditions and limited signage. Hazardous road conditions along this route include a narrow running surface, deep ruts, steep slopes, and soil types that become extremely muddy and slippery during times of inclement weather, even light rain. The route is impassable during winter. Additional signage and increased visitor information is needed to ensure public safety along the Red Gulch/Alkali Road National Back Country Byway.

Multiple-use resource activities have remained limited in the corridor of the National Back Country Byway. Visual intrusions along the byway do not disrupt the overall character of landscape. However, impacts of dispersed recreation, including OHV use, are becoming apparent and can be attributed to the popularity of the area during the hunting season and as a location for horn hunting.

3.7.3 National Historic Landmarks

There is one National Historic Landmark in the Planning Area – the Heart Mountain Relocation Center National Historic Landmark.

The Heart Mountain Relocation Center is a National Historic Landmark designated by the Secretary of the Interior under 36 CFR 65.5. From 1942 through 1945, 14,000 Japanese-Americans passed through the Heart Mountain Relocation Center. At its peak population of approximately 11,000 (two-thirds of whom were American citizens), Heart Mountain was the state's third largest community. The center was built to house some of the 110,000 persons evacuated from the West Coast following the Japanese attack on Pearl Harbor in December 1941. The Heart Mountain Relocation Center is a reminder of a unique episode in American history and is relevant to the military, social, and political history of the Nation (Heart Mountain Wyoming Foundation 2009; NPS 2009).

3.7.4 National Historic Trails and Other Historic Trails

A National Historic Trail (NHT) is a congressionally designated trail that is an extended, long-distance trail, not necessarily managed as contiguous, that follows as closely as possible and practicable the original trails or routes of travel of national historic significance. The purpose of a NHT is the identification and protection of the historic route and the historic remnants and artifacts for public use and enjoyment. A NHT is managed in a manner to protect the nationally significant resources, qualities, values, and associated settings of the areas through which such trails may pass, including the primary use or uses of the trail (BLM 2012c).

In accordance with BLM Manual 6280 (BLM 2012d), the BLM establishes a National Trail Management Corridor where a designated trail is within the Planning Area and sets forth allocation decisions, management actions, and necessary restrictions for resources and resource uses within that National Trail Management Corridor. The Oregon/Mormon NHTs Management Plan (Trails Management Plan) (BLM 1986b) provides specific guidelines for the evaluation and protection of historic wagon trails that apply to all historic trails of either national, regional, or local significance (whether or not the trail is a wagon trail). The BLM manages and protects trails in the Planning Area using these guidelines. The guidelines specifically focus on (1) historical significance and use, (2) the integrity of the setting of the trail segment, and (3) the physical integrity of the trail, including ruts and swales.

As a result of these guidelines, the BLM developed the concept of a protective corridor "at the discretion of individual districts," and defined this management corridor as "a width of ¼ mile either side of the trail or the visual horizon, whichever is less..." (BLM 1986b). At that time, the BLM considered the 0.25-mile management corridor sufficient to identify and protect physical remnants and associated sites. The overall trail setting or viewshed was of secondary importance to preserving the physical evidence. Although developed for the primary routes and important ancillaries to the Oregon/Mormon Pioneer NHTs, in the current RMPs for the Planning Area, the BLM also applied the corridor concept to other historic trails. Subsequent project-specific consultation has indicated that development activity beyond the 0.25-mile management corridor can adversely affect the qualities that contribute to a trail's eligibility. In recent years, the BLM has employed viewshed analysis techniques from VRM guidance to determine the extent of the effects of development activities on nearby trails and other important historic properties.

Trails and Routes in the Planning Area

There is one NHT in the Planning Area – the Nez Perce (Nee-me-poo or Nimi'ipuu) NHT (Maps 91 and 92) (USFS 1990). A total of 16.49 miles of the Nez Perce NHT occurs within the Planning Area, 4.67 miles of which travel across BLM-administered land. The Nez Perce NHT was established by Congress through Public Law 99-445 on October 6, 1986 which amended the National Trail System Act of 1968 to designate the Nez Perce Historic Trail as a component of the National Trails System. The Nez Perce NHT was designated to commemorate the 1877 flight of the non-treaty Nez Perce from their homelands in eastern Oregon, Idaho, and Washington. Five Nez Perce bands, nearly 800 men, women, and children, struggled across 1,170 miles of rugged country. The course they chose on their epic journey has been memorialized in the Nez Perce NHT. In its entirety the, Nez Perce NHT covers 1,170 miles, 319 miles of which have been designated high potential segments.

The Nez Perce NHT follows a mixture of nonmotorized trails and motorized roads and generally follows the route depicted in the "Nez Perce (Nee-Me-Poo) Study Report", prepared by the Department of Agriculture in March, 1982 and the Environmental Assessment and Decision Notice signed by Assistant Secretary of Agriculture Peter C. Myers on July 1, 1985 (16 U.S.C.1244 [a][14]). Motorized use is allowed where the Nez Perce NHT overlaps an existing road and along the auto tour route. Where the Nez Perce NHT follows BLM system trails, the Nez Perce NHT is regarded as a simple facility for hikers and horsemen (USFS 1990).

Highways that roughly parallel the 1877 Nez Perce flight and have been designated as the official Nez Perce NHT Auto Route. Through the cooperative efforts of the USFS and the states of Oregon, Idaho, Washington, Wyoming, and Montana, 1,500 miles of selected roadway now display the Nez Perce Auto Route sign. In the Bighorn Basin Planning Area, the Auto Route travels from the Shoshone National

Forest boundary along the Chief Joseph National Scenic Byway (Wyoming Highway 296) where it trends north on Wyoming Highway 120 to the state line.

The portion of the Nez Perce NHT that passes through the Planning Area is one of the few segments where the "nontreaty" bands were successful in concealing their route of travel from the Army and its scouts. The Nez Perce separated into small groups and used a variety of routes, most of which remain unknown today. Warriors created false trails in hopes of gaining time for the main body of the tribe to travel north toward Canada. As a result of this history, there are no "High Potential Route Segments" or "high potential trail historic sites" identified in the *Nez Perce (Nee-me-poo or Nimi'ipuu) National Historic Trail Comprehensive Plan* within the Planning Area (USFS 1990). As a Congressionally designated historic trail, land management considerations include applying constraints such as no surface disturbance within 0.25 mile of the trail, or the visual horizon, whichever is closer. This results in a 0.5-mile-wide management corridor centered on the trail. Specific segments also have a no surface occupancy (NSO) stipulation.

The Nez Perce NHT corridor protects the historical values for which the trail was designated while providing a high quality scenic, primitive hiking, and pack and saddle stock experience. Activities within the Nez Perce NHT corridor will not preclude further management options for the Nez Perce NHT. A variety of compatible recreation opportunities are provided. Access to the Nez Perce NHT is primarily by foot and horseback. Roads and motorized trails are not present except at designated crossings.

The Nez Perce NHT corridor is characterized by a predominantly natural appearing environment. Improvements such as trailheads, trails, signs, bridges, and fences that enhance the recreation opportunities may be present. Evidence of past and present resource management may exist, but blends with the natural appearance of the landscape. Vegetation alterations may be present to enhance viewing opportunities.

The Nez Perce NHT is managed to protect its historical values while providing recreation opportunities in a natural appearing landscape consistent with *National Historic Trail Comprehensive Plan* within the Planning Area (USFS 1990) and any revisions therefore after.

A number of other trails and historic routes traverse the Planning Area. Other historic trails total 271.76 miles in the Planning Area, 69.08 miles of which travel across BLM-administered land (Maps 91 and 92). Trails dating to before contact between Native Americans and European Americans include the Bad Pass, or Sioux Trail. This foot trail is marked by a line of stone cairns of unknown age and might date from many thousands of years ago. Although the date of its earliest use is not known, records do establish that the trail was much traveled by peoples from pre-Columbian times up to the middle 1830s. Mountain men used the trail through Bighorn Canyon to bring furs from the Bighorn Basin east to the Missouri River. Portions of the Sioux Trail underlie a scenic byway in the eastern Bighorn Basin. Another such prehistoric trail network, the Bannock Trail, is thought to exist on the East Slope of the Absaroka Mountains, but its exact route is not known.

Routes from the historic period include the Bridger Trail, which Jim Bridger created in 1864 to connect with the Oregon Trail to the south (Maps 91 and 92). The route was an important alternative to the Bozeman Trail, which crossed the Powder River Country. Before the railroad was constructed, the Bridger Trail was an important freight route for wagons carrying supplies during the early settlement of the Bighorn Basin in the 1880s and 1890s. The trail connected the Bighorn Basin with Billings, Montana, to the north and Casper, Wyoming, to the southeast. Portions of the Bridger Trail along Kirby Creek were used on the later stage route connecting Thermopolis and Lost Cabin with Casper (Woods 1997). The BLM has installed interpretive signage along the Bridger Trail.

In 1881, Meeteetse became a terminus of the old Meeteetse Trail, which the military built as a stage and freight road. The Fort Washakie to Meeteetse to Red Lodge trail originally ran north from Fort Washakie to Meeteetse. Freight was shipped north from the Union Pacific Railroad to Fort Washakie and then on to Meeteetse; when the railroad reached Red Lodge the traffic pattern reversed, from north to south. The trail was the first road built in the Bighorn Basin. Red Lodge Road was later extended to Lander and Rawlins.

Although eclipsed in importance by railroads and other routes, the Bridger Trail was the predecessor to the increased system of roads connecting ranches and towns with expanding railheads in the Bighorn Basin. The Chicago, Burlington & Quincy Railroad completed its line from Toluca, Montana, to Cody, Wyoming, in 1901, and continued it south along the Bighorn River to Kirby by 1905. The rail line was completed through the Wind River Canyon to Casper in October 1914. The Chicago & North Western Railroad built into Casper by 1888 and expanded west to Shoshone, Riverton, and Lander by 1906 (Larson 1978).

Early automobile routes still in use today include the Yellowstone Highway (U.S. Highway 20) (part of the Park to Park Highway) and the Black and Yellow Trail (Highway 16), both examples of some of the earliest modern-era highways traversing the diverse geographical regions of Wyoming.

Management Challenges

Historic trails are among the most difficult resources to manage because of "their varying degrees of preservation and diverse range of environmental settings" (BLM 1986b). Trails in the region in general are under increased pressure as a result of the cumulative effects of energy development and large-scale projects. The area with the highest potential for wind farm development in the Bighorn Basin is close to the Nez Perce NHT. Current BLM management practices for NHTs include the following:

- Avoid surface disturbance within the viewshed of historic trails.
- Minimize the effect of trail crossing by utilizing existing ROWs crossing areas.
- Utilize VRM techniques to minimize effects to the setting of NHTs and other regionally important roads and trails.
- Limit surface disturbance within 0.25 mile or the visual horizon (whichever is closer) of historic trails.
- Avoid running a linear project parallel to a trail.
- Cross trails or historic routes at 90-degree angles using a dog-leg or an S-curve.
- Relocate the proposed disturbance where it will be less visible from the trail (e.g., behind a rise).
- Restrict the width of a working ROW within management corridor on either side of a trail.
- Avoid any blading on a ROW within management corridor if a track will suffice.
- Consider special rehabilitation measures (e.g., revegetation) that will help reestablish the visual integrity of the trail.
- Consider special interpretive measures (e.g., signing).
- Consider special preventive measures (e.g., fencing) to reduce the area affected by the project.

3.7.5 Wild and Scenic Rivers

The National Wild and Scenic River System (NWSRS) is a series of nationally designated waterways and their immediate environments (the land within the waterway corridors). Wild and Scenic Rivers (WSRs) are designated under the authority of the Wild and Scenic Rivers Act of 1968 (Public Law 90-542, as amended; 16 USC) for the purpose of preserving the stream or stream section in its free-flowing condition, preserving water quality, and protecting its outstandingly remarkable values (ORVs). ORVs are identified on a segment-specific basis and may include scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Section 5(d)(1) of the Wild and Scenic Rivers Act directs federal agencies to consider potential wild and scenic rivers in their land and water planning process. To fulfill this requirement, the BLM evaluates streams for potential inclusion into the NWSRS when developing or revising its RMPs. The NWSRS consists of three types of rivers, as follows:

- *Recreational* — rivers or sections of rivers readily accessible by road or railroad and might have some development along their shorelines and might have undergone some impoundments or diversion in the past.
- *Scenic* — rivers or sections of rivers free of impoundments, with shorelines or watersheds still largely undeveloped but accessible in places by roads.
- *Wild* — rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

Of the 12,560 miles of waterways that are part of the NWSRS, approximately 2,423 miles of WSRs are on BLM-administered land (Interagency Wild and Scenic Rivers Coordinating Council 2008). BLM Manual 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, and Management, provides guidance for implementing the Wild and Scenic River Act for these WSRs (BLM 2012e). The BLM is responsible for evaluating all rivers on BLM-administered land to determine if they are suitable for addition to the NWSRS and making recommendations to Congress accordingly. Ultimately, the BLM uses the RMP revision process, including comments received on the Draft RMP and Draft EIS to determine which if any of the waterways in the Planning Area to recommend as suitable to Congress for addition to the NWSRS.

At present, there are no designated WSRs in the Planning Area. However, the CYFO and WFO manage lands along 20 waterways that have been found eligible for WSR designation (Map 94). All contain ORVs, such as scenic and geologic (remarkable vistas due to the steep vertical canyon walls, some areas are more than 1,200 feet deep, immense spires, and riparian valley bottoms), cultural, historical, fish, recreational, sinking streams, and aquifer recharge zones. These waterways were identified during a review of all BLM-administered public lands along waterways within the Planning Area. This review was done to determine eligibility, assign a tentative classification, and screen for suitability factors, as identified in the Wild and Scenic Rivers Act of 1968, as amended. Along the 20 eligible waterways, 14 waterway segments were found to meet the suitability factors.

Step I – Eligibility Criteria

The BLM has assessed 297 waterways in the CYFO and WFO Planning Areas (BLM 2002a; BLM 2003a; BLM 2009p). There was a review of waterways in the CYFO Planning Area in 1993 (with an update to management prescriptions in 2003 and an addendum report in 2009) and a review of waterways in the WFO in 2002 (BLM 2003a; BLM 2002a). These reports are available on the Bighorn Basin RMP Revision Project website and contain detailed descriptions of the waterway identification and review processes. To begin these reviews, the BLM identified natural waterways (including both perennial and

nonperennial rivers and streams) in the Planning Area based on guidance in BLM Manual 6400. Following this initial inventory, BLM Interdisciplinary Team members reviewed the waterways to determine if they met eligibility criteria of being free-flowing and containing at least one of the ORVs described in BLM Manual 6400. These ORVs include scenic, recreational, geologic, fish, wildlife, cultural, historic, and other similar values (e.g., ecologic/biologic diversity, paleontologic, or botanic values). Of the 297 waterways reviewed, 277 were found to not meet the definition of free-flowing or to not possess ORVs. The BLM subsequently dismissed these 277 waterways from further consideration. The BLM preliminary determined that 20 waterways meet the WSR eligibility criteria, and tentatively classified all eligible waterway segments as wild, scenic, or recreational, based on the degree of development along the waterway and on adjacent lands at the time of the evaluation. Table 3-55 lists these waterways, their lengths, the acreage of BLM-administered land within their waterway corridors, their ORVs, and their tentative classifications.

Where necessary to protect the values that made them eligible for inclusion in the NWSRS, the BLM developed specific interim management prescriptions for the public lands along eligible waterway segments. These interim management prescriptions were designed to protect the identified ORVs and maintain the tentative classifications assigned to these waterways. Where specific interim management prescriptions were not developed, the BLM used case-by-case evaluations of discretionary actions (e.g., oil and gas leasing) to ensure activities that could degrade ORVs or free-flowing conditions would be avoided. Chapter 2 lists the current management of these eligible waterway segments.

Table 3-55. Characteristics for Wild-and-Scenic-River-Eligible Waterways in the Planning Area

Waterway	Total Length of Waterway Reviewed (miles)	Total Length of Segments on BLM-administered Lands (miles)	Tentative Classification	Outstandingly Remarkable Values	Waterway Segment (BLM-administered Land) Meets Suitability Screening Factors?
Clarks Fork of the Yellowstone[1]	14.08	8.51	Scenic	Cultural; Fish; Geologic; Historic; Other Values (whitewater); Recreational; Scenic; Wildlife	Yes (downstream 4.74 miles) No (upstream 3.77 miles)
Cottonwood Creek	4.05	4.05	Scenic	Geologic; Historic; Other Values (endemic/rare vegetation, aspen stands, riparian); Scenic; Wildlife	Yes
Cow Creek	2.01	1.92	Wild	Cultural; Geologic; Historic; Other Values (aspen stands, riparian, endemic/rare vegetation); Scenic; Wildlife	Yes
Deer Creek	1.46	1.45	Scenic	Cultural; Fish; Recreational; Scenic	Yes
Meeteetse Creek	3.31	2.78	Wild	Geologic; Historic; Other Values (riparian, alpine vegetation, volcanic-specialized vegetation); Wildlife	No
North Fork Shoshone River	4.87	0.85	Recreational	Cultural; Fish; Geologic; Historic; Recreational; Scenic; Wildlife	No
Oasis Spring Creek	2.40	2.07	Wild	Cultural; Fish; Recreational; Scenic	No
Pat O'Hara Creek	7.63	2.17	Scenic	Cultural; Historic	No
Porcupine Creek	10.80	10.80	Wild/Scenic	Cultural; Fish; Other Values (riparian); Recreational; Scenic	Yes
South Fork Shoshone River	19.15	1.99	Recreational	Cultural; Fish; Geologic; Historic; Recreational; Scenic; Wildlife	No
Trout Creek	1.30	0.96	Wild	Cultural; Fish; Other Values (riparian); Recreational; Scenic	Yes
Canyon Creek	1.30	1.30	Scenic	Cultural	No
Deep Creek	5.20	5.20	Wild	Fish; Recreational; Scenic	Yes
Dry Medicine Lodge Creek	10.61	10.59	Scenic	Cultural; Geologic; Other Values (caving, aquifer recharge); Recreational; Scenic	Yes
Kirby Creek	2.11	0.10	Recreational	Historic	No

Table 3-55. Characteristics for Wild-and-Scenic-River-Eligible Waterways in the Planning Area (Continued)

Waterway	Total Length of Waterway Reviewed (miles)	Total Length of Segments on BLM-administered Lands (miles)	Tentative Classification	Outstandingly Remarkable Values	Waterway Segment (BLM-administered Land) Meets Suitability Screening Factors?
Medicine Lodge Creek	5.77	5.70	Wild	Cultural; Geologic; Other Values (sinking streams, aquifer recharge); Recreational; Scenic	Yes
Paint Rock Creek Unit (Paint Rock Creek, South Paint Rock Creek, and Laddie Creek)	13.77	11.18	Recreational	Cultural; Fish; Geologic; Historic; Recreational; Scenic	Yes (Paint Rock Creek, South Paint Rock Creek, and portion Laddie Creek 10.57 miles) No (upstream portion of Laddie Creek 0.70 miles)
Powder River (Middle Fork)	2.53	1.12	Recreational	Fish; Recreational	Yes
Trapper Creek	10.91	10.91	Wild	Cultural; Geologic; Other Values (caving area); Recreational; Scenic	Yes
White Creek	11.26	6.98	Wild	Cultural; Geologic; Scenic	Yes (downstream portion 5.72 miles) No (upstream portion 1.26 miles)

Sources: BLM 2002a; BLM 2003a; BLM 2013a; BLM 2009p.

[1]Waterway segment revaluated as part of the 2009 Cody Field Office Wild and Scenic River Addendum Report.

Note: information in columns *Total Length of Waterway Reviewed* comes from BLM 2002a, BLM 2003a, BLM 2013a, BLM 2009p. Information in column *Total Length of Segments on BLM-administered Lands* was calculated using BLM 2013a.

BLM Bureau of Land Management

Step II – Suitability Factors

The BLM reviewed all waterway segments that meet the eligibility criteria to determine if they were also suitable for inclusion in the NWSRS. The Wild and Scenic River Act and BLM Manual 6400 list a number of factors that should be considered when assessing the suitability of waterways for inclusion in the NWSRS. Along the eligible waterways, the BLM found 14 that also met the suitability factors.

Several things caused eligible waterways to not meet suitability factors, including: management conflicts and/or challenges due to adjacent non BLM-administered lands or mineral estate, and the effectiveness of current non-WSR management in protecting the identified ORVs. Refer to the WFO and CYFO WSR Reports, available on the project website, and Appendix F of this document for additional detail on the WSR evaluation process.

3.7.6 Wilderness Study Areas

In 1964, Congress passed the Wilderness Act, thereby establishing a national system of lands for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. Until 1976, the National Park Service and the USFS managed most land considered for and designated as wilderness. With the passage of FLPMA in 1976, Congress directed the BLM to inventory, study, and recommend which public lands under its administration should be designated as wilderness. Areas identified under this direction are WSAs. To be designated as wilderness, an area must have the following characteristics:

- **Size:** roadless areas of at least 5,000 acres of public lands or of a manageable size.
- **Naturalness:** generally appears to have been impacted primarily by the forces of nature.
- **Opportunities:** provides outstanding opportunities for solitude or primitive and unconfined types of recreation.

WSAs also often have special qualities such as ecological, geological, educational, historical, scientific, and scenic values. There are no congressionally designated wilderness areas in the Planning Area.

In the late 1980s and early 1990s, Wyoming BLM drafted an EIS analyzing the impacts of managing the areas that were identified as containing wilderness characteristics after the initial wilderness inventories in the mid-1970s, and the subsequent intensive inventories in the 1980s, which includes the areas within the Bighorn Basin. The final EIS, published in 1991, included the BLM's recommendations to Congress of which areas should be managed as wilderness. As mandated by the late Interim Management Policy for Lands under Wilderness Review, which was recently replaced by BLM Manual 6330, Management of Wilderness Study Areas, the areas analyzed in the EIS are to be managed by the non-impairment standard until Congress either designates an area as wilderness or releases it back to multiple use (BLM 2012a).

There are 10 WSAs in the Planning Area (Map 93 and Table 3-56). These areas contain important natural resources, special features, naturalness, and primitiveness to support eco-based tourism. With the increase in demand for consumptive and non-consumptive resources, and an increase in development in natural and primitive areas, the WSAs have natural recreational resources that provide unique niches that are still preserved. The following paragraphs identify the locations, important features, and original inventory numbers (assigned at the time of the BLM wilderness inventory) of the WSAs in the Planning Area.

Table 3-56. Wilderness Study Areas and Acreages in the Planning Area

Wilderness Study Area	Acres
Alkali Creek	9,475
Bobcat Draw Badlands	16,969
Cedar Mountain	20,425
Honeycombs	20,156
McCullough Peaks	24,531
Medicine Lodge	7,181
Owl Creek	668
Red Butte	10,805
Sheep Mountain	23,256
Trapper Creek	7,475
Total	140,940

Source: BLM 2013a

Alkali Creek Wilderness Study Area

The Alkali Creek WSA (WY-010-241) includes 9,475 acres of BLM-administered public lands surrounding private lands totaling 680 acres. The WSA is in Big Horn County, 7 miles north of Hyattville, Wyoming, along the west slope of the Big Horn Mountains. The WSA boundaries follow Alkali and Red Gulch Roads on the east and north, and a two-track trail along the western boundary. The southern boundary follows state and private property lines and Alkali Road.

The WSA is in and represents a rare pristine example of the transition zone between the lower west slopes of the Big Horn Mountains and the floor of the Bighorn Basin. Visual and geologic resource values enhance the wilderness characteristics of Alkali Creek WSA. On the rims of the canyons, scenic vistas provide an unencumbered view of the basin floor and the majestic mountains. The WSA is known to contain pictographs, rock shelters, and other important cultural values of early occupation.

Bobcat Draw Badlands Wilderness Study Area

The Bobcat Draw Badlands WSA (WY-010-126) includes 16,969 acres of BLM-administered public land and 13 acres of state-owned land. The WSA is in Washakie and Big Horn counties, approximately 25 miles west of Worland, Wyoming. The southern, western, and eastern boundaries of the WSA follow primitive roads. The northeast boundary follows a road and then detours around a state-owned section and continues along a road to the southeast to a two-track trail, which was used as a boundary to exclude an area lacking wilderness characteristics.

The western portion of the WSA is dominated by broad, grass-covered benches or ridges separated by deep, wide drainages running into the Big Draw drainage to the north or the Fifteenmile drainage to the east. Bare, rugged desert pockets of colorful badland scenery and geologic formations like hoodoos, spires, and mushrooms are predominant in the central and southern portions of the WSA and offer

interesting attractions to recreationists. The variable terrain and the rugged, colorful badland topography offer a unique and interesting wilderness and primitive recreation setting. Human intrusions in the Bobcat Draw Badlands WSA are minor and do not have an important impact on the natural character of the area.

Cedar Mountain Wilderness Study Area

The Cedar Mountain WSA (WY-010-222) includes 20,425 acres of BLM-administered public lands with 42 acres of private or state in-holdings. The WSA is in Washakie County, 2 miles east of Kirby along the east side of the Bighorn River. Part of the eastern boundary is along a natural gas pipeline ROW, roads, and state lands property lines. The southern boundary is mainly along a road and private property boundary.

The WSA is an area of rugged topography characterized by deep, steep-sided drainages flowing north or west toward the Bighorn River. The abrupt elevation difference in the area (from 4,200 to 5,500 feet amsl), combined with the belt of junipers on the top and sides of Cedar Mountain, creates a scenic and contrasting element against the other natural elements. Cedar Mountain is the dominant visual feature of the unit. The area is unusual because of its elevation, the vegetation growing on it, and the imposing rock escarpment that forms its southern side. Visual, paleontological, and geographic resource values enhance the wilderness characteristics of Cedar Mountain WSA. The soil, rock, and vegetation colors and the area's topography contribute to the visual features. Petrified wood and reptilian fossils are found in the southern portion of the area. Mammalian fossils are found north of Cedar Mountain.

Honeycombs Wilderness Study Area

The Honeycombs WSA (WY-010-221) contains 20,156 acres of BLM-administered public lands, and 13 acres of split-estate lands. The WSA is located in Washakie County, 16 miles southeast of Worland, Wyoming. The north and east boundaries are the BLM's Blue Bank Road, state, and private lands. The southern and western boundaries are two-track trails, one section of state lands, and Nowater Creek.

The WSA consists of two land forms. A central core area is comprised of sharply eroded, strongly dissected badlands. The area around the core is rolling to steep hills. The exposures of the Willwood Formation provide opportunities to study scenic erosion patterns. The soil colors vary from reds, pinks, and purples to numerous shades of browns to tans. The Honeycombs WSA is also known to have the potential for deposits of large mammalian fossils from the Tertiary period.

McCullough Peaks Wilderness Study Area

The McCullough Peaks WSA (WY-010-335) includes 24,531 acres of BLM-administered public land and a 640 acre in-holding of state land. The WSA is in Park County, 10 miles northeast of Cody, Wyoming, and 6 miles south of Powell, Wyoming. The boundary consists primarily of roads, property lines, and a powerline ROW.

The WSA consists of the badlands that form the north slope of the McCullough Peaks. The terrain is characterized by sharp ridges and deeply eroded drainages. There also are large expanses of open, gentle terrain. The area is scenic and provides opportunities for solitude and primitive recreation. The topography, scenic vistas, and wildlife attract visitors. Nationally important paleontological resources and cultural resources are present in the area. Locals use the area for a variety of recreational activities.

Medicine Lodge Wilderness Study Area

The Medicine Lodge WSA (WY-010-240) includes 7,181 acres of BLM-administered public lands with 4 acres of private or state in-holdings. The WSA is in Big Horn County, 5 miles northeast of Hyattville, Wyoming, along the west slope of the Big Horn Mountains. The WSA is bounded mainly by Cold Springs Road on the south, Black Butte Road on the north and the west, and the Bighorn National Forest on the east.

The WSA consists of canyon walls towering 1,000 feet above Medicine Lodge Creek. The remainder of the WSA consists of steeply sloping shrub-steppe and broken rugged areas with shallow canyons and unusual knobby rock outcrops. Bighorn sheep, which were reintroduced in the Paint Rock Canyon area several years ago but no longer inhabit the area, used the Medicine Lodge WSA as summer range. Outstanding ecological values include vegetative and wildlife communities that are essentially unaffected by human activity. Exposed geologic features provide the opportunity to study the geologic history of the area. The Madison Formation is a storehouse of fossils such as branchiopods, corals, bryozoans, and crinoid stems. Medicine Lodge Canyon rates extremely high in scenic value based on its rich color combinations, and the vertical or nearly vertical cliffs, spires and formations.

The Spanish Point Karst ACEC, which maintains and protects the cave and karst system, sinking stream segments, and groundwater quantity and quality, includes portions of the Medicine Lodge WSA. The extra management efforts to maintain the ACEC, cave systems, and travel management designations greatly enhance the efforts to maintain the wilderness characteristics of the Medicine Lodge WSA.

Owl Creek Wilderness Study Area

The Owl Creek WSA (WY-010-104 a, b, c) consists of three tracts totaling 668 acres. The WSA is in Hot Springs County in the upper foothills of the Absaroka Range near a peak called Washakie Needles. The boundary of Tract a is formed by the Washakie Wilderness to the north, the South Fork of Owl Creek and the Wind River Indian Reservation to the west, Klicker Creek to the south, and private land to the east. Tract b is adjacent to the Washakie Wilderness, which forms the north boundary, and private land surrounds the rest of the tract. The east boundary of Tract c extends along Rock Creek and the Washakie Wilderness on the west. The north boundary is formed by a short segment of private property and the south boundary is along the south section line of section 31.

The landscape is dominated by a ridge line that divides the main drainages of Rock Creek and the South Fork of Owl Creek. Several steep, rugged spur ridges extend laterally from the main ridge, and are sharply separated by a number of deep side-draws that drain into the relatively wide, flat bottoms of the main drainages. Evidence of modern human activity is virtually nonexistent in the WSA. The WSA is also influenced by Upper Owl Creek Area ACEC management, which protects overlapping and important big game habitats and migration corridors, fisheries habitat, shallow soils, alpine vegetation and rare plants, diverse cultural resources and Native American traditional values, primitive recreational opportunities, and high scenic quality.

Red Butte Wilderness Study Area

The Red Butte WSA (WY-010-131) is on 10,805 acres of BLM-administered public land and is in Big Horn County, approximately 15 miles northwest of Worland, Wyoming. All boundaries, except for approximately 1.5 miles of section on the west side of the WSA, are along improved dirt roads on BLM-administered land.

The WSA contains bare, rugged badlands created by peaks and ridges broken by irregular, sharply cut drainages radiating from the central portion of the area that is dominated by Red Butte. The bare, red-hued soils of this area are highly eroded, creating a dissected, rugged landform. The northeastern portion exhibits less rugged badlands intermixed with a series of small bench-like terraces overlooking the flat drainage bottom of Fivemile Creek. The western portion of the unit consists of badlands opening up to broad, shallow drainages and flat-to-rolling plains along the drainages of Reservoir Creek and the North Fork of Fifteenmile Creek.

Sheep Mountain Wilderness Study Area

The Sheep Mountain WSA (WY-010-130) includes 23,256 acres of BLM-administered public lands and 19 acres of split-estate lands. The WSA is located in Big Horn County approximately 20 to 25 miles northwest of Worland, Wyoming, and 18 to 20 miles west of Greybull and Basin, Wyoming. State and private lands and the Burlington Pass Road form the western boundary of the WSA. The eastern boundary is along a major oil pipeline ROW and the Dorsey Creek Road. The southern boundary is located along the township line to exclude areas lacking the wilderness characteristic of naturalness and a finger of land created by roads accessing livestock management facilities. The northern boundary follows a road and an oil pipeline.

The WSA contains bare, rugged badlands created by peaks and ridges broken by irregular, sharply cut drainages radiating from the central portion of the area that is dominated by Sheep Mountain. The bare, red-hued soils of this area are highly eroded, creating a dissected, rugged landform. Sheep Mountain and the eastern-most portion of Tatman Mountain are the dominant topographic features. Sharply incised drainages radiate from these mountains and combine to form moderately broad, flat, grassy bottoms separated by rounded badland ridges along the perimeter of the unit.

Trapper Creek Wilderness Study Area

The Trapper Creek WSA (WY-010-242) includes 7,475 acres of BLM-administered public lands with 17 acres of private or state in-holdings. The WSA is in Big Horn County, 5 miles southeast of Shell, Wyoming, along the west slope of the Big Horn Mountains. The boundary along the western and northern portions follows Black Mountain Road, physical boundaries, and state and private lands. The eastern and southern boundaries are Trapper Rim Road, private land, and legal boundaries.

Trapper Creek canyon contains some of the most valuable scenery on the west slope of the Big Horn Mountains. The canyon is characterized by the dramatic vertical relief of the cliffs, with a total depth of more than 1,200 feet from the rim to the creek. Other features include spires, and massive rock outcrops of the canyon walls, a rich variety of vegetation, a clear cascading stream, and rich color combinations. There is a riparian plant community along the length of Trapper Creek. The lower entrance to Great X Cave is in the WSA. Trapper Creek landscape has scenery of exceptional quality. The Spanish Point Karst ACEC includes portions of the WSA, which maintains and protects the cave and karst system, the sinking stream segments, and groundwater quantity and quality.

Other Wilderness Study Areas

The BLM Billings Field Office in Montana also manages two WSAs that lie predominately in Montana, but include some acreage in Wyoming. Neither the CYFO nor the WFO addresses management of these WSAs.

3.8 Socioeconomic Resources

The Socioeconomic Resources topic includes the individual resources of social conditions, economic conditions, health and safety, environmental justice, and tribal treaty rights. Each individual resource section provides a description of the resource and the current condition of the resource.

3.8.1 Social Conditions

Social conditions concern the human communities in the Planning Area, including towns, cities, and rural areas, and the custom, culture, and history of the area as it relates to human settlement, as well as current social values.

This section discusses population and demographics, custom, culture, and social trends. For information on the history of human settlement in the Planning Area, see Section 3.5.1 *Cultural Resources*.

Population and Demographics

Table 3-57 provides a summary of population for the Planning Area counties in 1970 and 2012, and Table 3-58 provides information on population in individual towns in the Planning Area. The most populous county in the Planning Area is Park County, with about 28,700 residents. Big Horn County contains approximately 11,800 residents, Washakie County contains approximately 8,500, and Hot Springs County contains approximately 4,800. The most populous cities in the Planning Area, in order of decreasing population, are Cody (Park County), Powell (Park County), Worland (Washakie County), Thermopolis (Hot Springs County), and Lovell (Big Horn County). Figure 3-18 provides additional detailed trend information for county populations from 1970 through 2012. The figure shows population generally increased from 1970 to the early 1980s in all four counties within the Planning Area, then generally declined through the mid to late 1980s. In Park County, population increased steadily from about 1990 to the present day. In Big Horn County, population remained relatively constant during the same period with a slight growth trend since 2005. In Hot Springs and Washakie counties, population decreased slightly from 1990 levels, particularly from the late 1990s to 2005.

Table 3-57. Population Change by County, 1970-2012

Area	Population in 1970	Population in 2012	Change 1970-2012	Average Annual Change 1970-2012
Big Horn County	10,264	11,794	15%	0.33%
Hot Springs County	5,023	4,822	-4%	-0.10%
Park County	17,805	28,702	61%	1.14%
Washakie County	7,557	8,464	12%	0.27%
State of Wyoming	333,795	576,412	73%	1.31%
United States	203,798,722	313,914,040	54%	1.03%

Sources: BEA 2010a; U.S. Census Bureau 2012; U.S. Census Bureau 2013a.

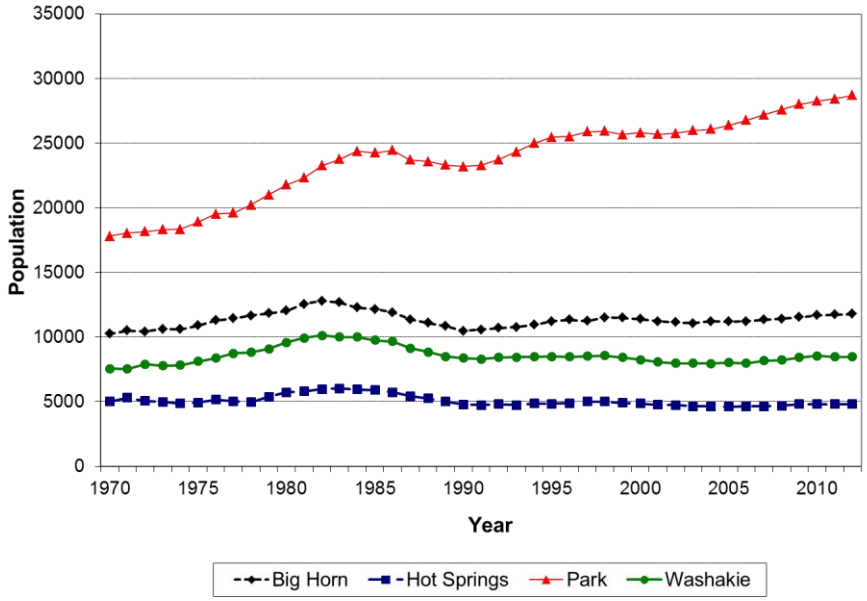
Table 3-58. Population of Towns in 2000 and 2012

Town	Population in 2000	Population in 2012	Change 2000-2012	Average Annual Change 2000-2012
Big Horn County	11,461	11,794	3%	0.2%
Basin	1,243	1,292	4%	0.3%
Burlington	250	309	24%	1.8%
Byron	557	599	8%	0.6%
Cowley	560	694	24%	1.8%
Deaver	177	182	3%	0.2%
Frannie[1]	209	161	-23%	-2.2%
Greybull	1,815	1,853	2%	0.2%
Lovell	2,361	2,381	1%	0.1%
Manderson	104	115	11%	0.8%
Hot Springs County	4,882	4,822	-1%	-0.1%
East Thermopolis	274	253	-8%	-0.7%
Kirby	57	93	63%	4.2%
Thermopolis	3,172	3,019	-5%	-0.4%
Park County	25,786	28,702	11%	0.9%
Cody	8,895	9,689	9%	0.7%
Meeteetse	351	330	-6%	-0.5%
Powell	5,367	8,308	55%	3.7%
Washakie County	8,289	8,308	0%	0.0%
Ten Sleep	304	264	-13%	-1.2%
Worland	5,289	5,569	5%	0.4%
State of Wyoming	493,782	576,412	17%	1.3%

Sources: U.S. Census Bureau 2000; U.S. Census Bureau 2013a.

[1]Includes portions of Frannie in both Big Horn and Park counties.

Figure 3-18. Population Trends by County, 1970-2012



Sources: BEA 2010a; U.S. Census Bureau 2013a; U.S. Census Bureau 2013b.

Table 3-59 presents information about the population distribution by various age groups in 2012. The table shows the median age was higher in all four Planning Area counties than in the state or nation, and was highest in Hot Springs County. The percentage of people aged 65 and over is higher in all four counties than the state or national average. However, in Big Horn and Washakie counties, the percentage of people under 18 was slightly higher than the national and state averages; in these counties, relatively low percentages of people aged 18 to 44 is reflected in the higher median age. In Hot Springs and Park counties, there is also a relatively low percentage of people under the age of 18, as well as a relatively low percentage of people aged 18 to 44.

Table 3-59. Age Distribution by County, 2012

Area	Median Age	Percent of People by Age Category				
		Under 18	18-24	25-44	45-64	65 and Over
Big Horn County	41.8	25%	8%	21%	28%	19%
Hot Springs County	49.2	19%	6%	20%	32%	23%
Park County	43.9	21%	9%	22%	30%	19%
Washakie County	42.0	25%	6%	22%	28%	19%
State of Wyoming	36.9	24%	10%	26%	27%	13%
United States	37.4	23%	10%	26%	26%	14%

Source: U.S. Census Bureau 2013c

Table 3-60 shows the same data for the year 2000, which helps establish the trend over time. The year 2000 and 2012 comparison shows that the population in all four counties is growing older, with an increasing median age and the expected changes in each age category (a smaller proportion of people in the younger categories, and a larger proportion in the older categories, in 2012 compared with 2000). At the national level, an aging population can create economic problems such as how to fund Social Security. At the local level, an aging population could reduce the supply of labor, particularly of young workers entering the labor market at relatively lower wages. Another concern would be that there would likely be an increased demand for hospital services; to the degree that people on fixed incomes contribute less to local tax revenues, this can create an imbalance of local government revenues and expenditures.

Table 3-60. Age Distribution by County, 2000

Area	Median Age	Percent of People by Age Category				
		Under 18	18-24	25-44	45-64	65 and Over
Big Horn County	38.7	29%	7%	23%	25%	17%
Hot Springs County	44.2	22%	6%	23%	29%	20%
Park County	39.8	24%	9%	25%	27%	15%
Washakie County	39.4	27%	6%	25%	25%	16%
State of Wyoming	36.2	26%	10%	28%	24%	12%
United States	35.3	26%	10%	30%	22%	12%

Sources: U.S. Census Bureau 2009a; U.S. Census Bureau 2009b; U.S. Census Bureau 2010a; U.S. Census Bureau 2010b; U.S. Census Bureau 2010c.

Table 3-61 provides a summary of educational attainment in each county within the Planning Area in 2011. The table shows that the percentage of high school graduates is comparable to the statewide level in all four Planning Area counties, and higher than the national average. Only Park County, however, has a level of 4-year college graduates that equals or exceeds the state or national average.

Table 3-61. Educational Attainment in 2011

Area	Percent of people age 25 and over:	
	With a high school diploma	With a 4-year college degree
Big Horn County	90%	19%
Hot Springs County	88%	20%
Park County	93%	28%
Washakie County	89%	23%
State of Wyoming	92%	24%
United States	85%	28%

Source: U.S. Census Bureau 2011a

Table 3-62 shows data on gender distribution by counties. Gender distribution is very close to 50 percent male and 50 percent female in all four counties.

Table 3-62. Gender in 2010

Area	Percent of people who are:	
	Male	Female
Big Horn County	50%	50%
Hot Springs County	49%	51%
Park County	50%	50%
Washakie County	50%	50%
State of Wyoming	51%	49%
United States	49%	51%

Source: U.S. Census Bureau 2013c

Because people of all ages and all levels of educational attainment, and both men and women, use BLM lands, the variation in these demographic groups is not a driver for BLM's management actions in the Planning Area. However, the demographic data provides a backdrop of the human communities that will be affected by BLM's decisions.

Transient and Seasonal Populations

Another demographic variable of interest relates to the transience and permanence of populations. Table 3-63 shows data from the 2000 Census on where people lived 5 years prior to the Census (i.e., in 1995). The data show the population of the study area counties is relatively stable: in all four counties, over half of the residents lived in the same residence 5 years prior, and about 75 to 80 percent of the residents lived in the same county. These percentages, which are comparable to state and national averages, show a substantial degree of stability in the population.

Table 3-63. Residence in 1995, as Tabulated in 2000

Residence	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming	United States
Same house	58%	54%	51%	59%	51%	54%
Different house, same county	19%	21%	23%	20%	24%	25%
Different county, same state	9%	11%	8%	11%	8%	10%
Other location	14%	14%	18%	10%	17%	11%

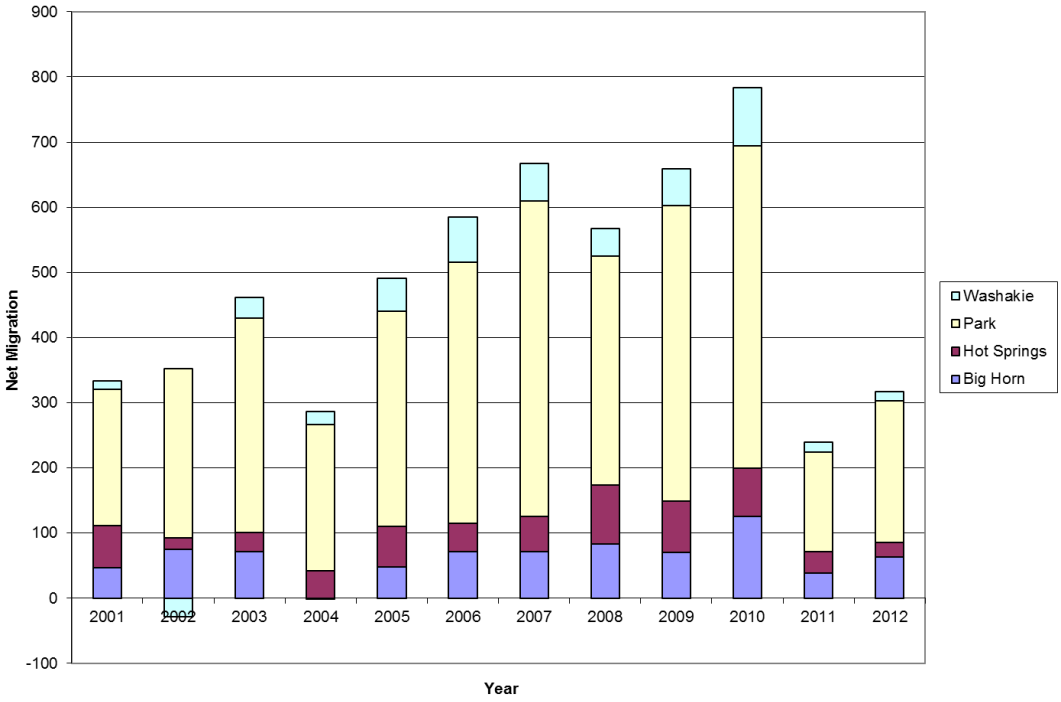
Source: U.S. Census Bureau 2000

The Wyoming Housing Database Partnership (WHDP 2013) analyzed data from driver's license exchanges to show the net movement of people into and out of the state. This data is more current than the Census data, and also shows the magnitude of net movements. The data account for people who transfer licenses from another state to Wyoming, and those who cancel their Wyoming license because they have moved out of state; however, it only tracks people with licenses, meaning that it does not include children. This analysis showed a net gain of about 56,000 people statewide from 2000

through the first half of 2012. The modal (i.e., most common) age bracket for in-migrants is between age 26 and 45. Driver's license transfer data shows that most individuals are coming from other western states and Michigan, with California accounting for the single largest share (about 21 percent).

The Wyoming Housing Database Partnership analysis shows that the largest share of migrants to the State of Wyoming from 2001-2012 moved to places other than the Planning Area. The counties that received the largest share of migrants are Laramie (15 percent), Campbell (12 percent), Natrona (11 percent), and Teton (9 percent). By comparison, Park County received 7 percent of the migrants (about 3,900 people from 2001 through 2012), and Big Horn, Hot Springs, and Washakie counties received between 0.8 and 1.4 percent each (761 people in Big Horn, 614 in Hot Springs, and 432 in Washakie, for a total of about 1,800 people). Figure 3-19 shows the trend of migration over time.

Figure 3-19. Net Migration 2001-2012



Sources: WHDP 2009a; WHDP 2013. Based on driver's license exchanges.

Note: In 2002, net migration to Washakie County was negative. In 2004, net migration to Big Horn County was negative.

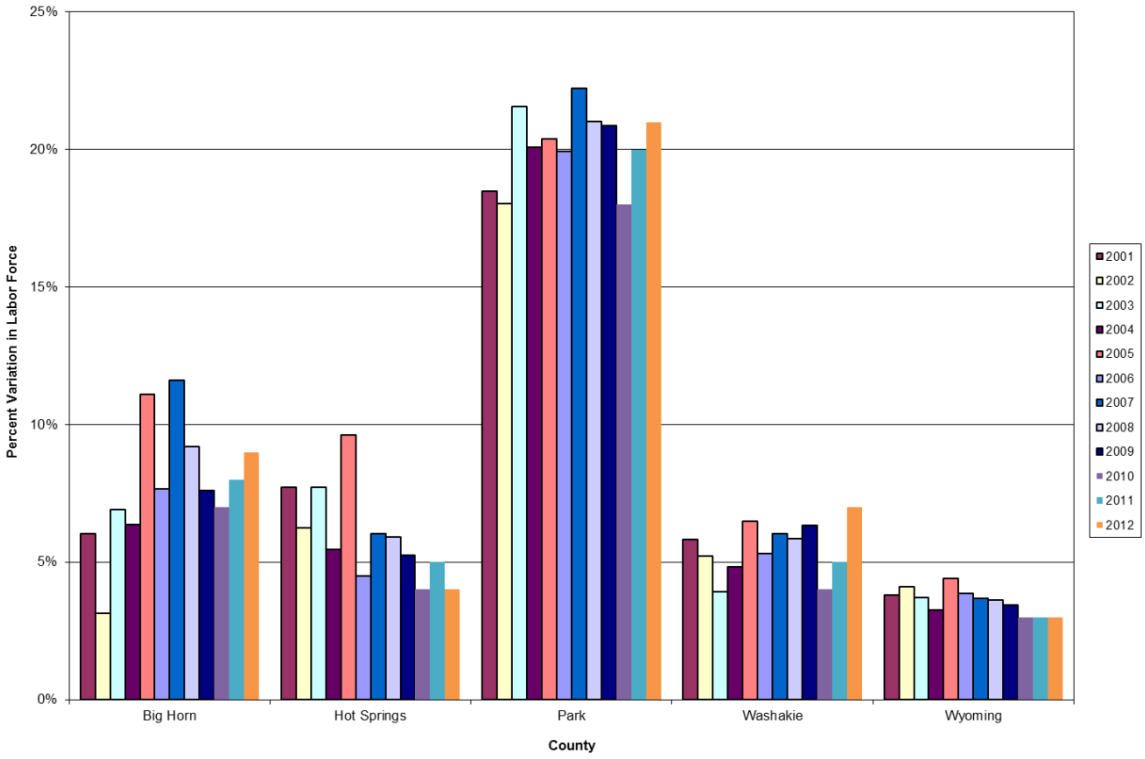
A common method for examining the degree of transience in the workforce is to analyze the variation in employment over a given year. If the size of the labor force (i.e., people with jobs or seeking jobs) does not change much over the year, this suggests the employment base is quite stable and few people move to the area on a temporary or seasonal basis to look for jobs. On the other hand, a relatively high magnitude of fluctuation in the labor force suggests an area undergoing change that is often marked by people moving temporarily from one area to another to seek employment.

Figure 3-20 shows the relative variation in the labor force for each county from 2001-2012. For each year and county, the values in the figure represent the difference in magnitude of the highest-month labor force versus the lowest-month labor force ("peak-to-trough"), divided by the average size of the labor force. For instance, in Park County in 2012, the labor force in the highest month (July) was 17,800,

in the lowest month (February) was 14,500, and the average for the year was 15,757. Thus, the relative variation in the labor force in Park County in 2007 was (17,800 – 14,500) / 15,757, or about 21 percent of the labor force (BLS 2013).

The figure shows that labor force fluctuations are greatest in Park County (between 20 and 22 percent of the labor force). Labor force fluctuations represent a smaller portion of the average labor force in Big Horn and Hot Springs counties (typically 5 to 10 percent) and Washakie County (about 5 percent). Labor force variations in Wyoming are typically on the order of 3 to 4 percent. Note, however, that the labor force variation at the county level includes people who move temporarily from one county to another seeking work (e.g., people who move from Laramie County to Park County seeking summer work would be included in the Park County labor force fluctuation, but not the statewide labor force fluctuation). For this reason, county-level variation is almost always greater than state-level variation.

Figure 3-20. Labor Force Variation, 2001-2012



Source: BLS 2013

Together, the three data sources presented above indicate that the residential population is quite stable, with about 75 to 80 percent of people who lived in the counties in 2000 having lived within the same county for at least 5 years. The Planning Area seems to attract net in-migration based on the driver's license exchange data, with Park County attracting the most by far. Seasonal variation in the labor force is largest in Park County and somewhat smaller in the other three counties. Because the highest labor force occurs in the summer months and the lowest in the winter months, it is reasonable to assume that most of the summer-month additional employment is related to outdoor work, either directly (e.g., outdoor guides) or indirectly (e.g., hotel workers supported by increased tourism). BLM management actions that affect the quality of and access to recreational resources, livestock grazing,

and oil and gas development areas therefore will affect the transient workforce as well as the permanent residents within the Planning Area.

Having a high proportion of transient workers can result in both beneficial and adverse effects on the social fabric of a community. Transient workers pay local sales taxes when they purchase goods and services, and help local business people by providing both a temporary workforce when needed and a consumer base for retail activity. They also fill rental housing, which helps landlords. However, transient workers can also contribute to social instability. If BLM actions were to contribute to an increase or reduction in the size of the transient workforce, whether this would be viewed as a beneficial or adverse impact would depend on individual perspective. Similarly, the fact that Park County is gaining population and attracting substantial in-migration is likely viewed as beneficial by some residents and adverse by others.

3.8.1.1 Custom, Culture, and Social Trends

This section describes the social development, culture, and history of the Planning Area to provide insight into how changes to the Planning Area might affect the livelihood and quality of residential life. The section addresses the history of human settlement in the Planning Area, with a particular focus on economic and social development; land use plans within the counties, focusing on issues the counties have identified that relate to new or planned infrastructure; and "non-market" economic and social values.

Economic and Social History

Throughout the history of the Planning Area, the use of natural resources on private, state, and federal land has provided the basis for continued social and economic stability in all four counties. Agriculture, mining, mineral development and production, and tourism are directly tied to the ability to use federal and state land. As a result, management decisions for federal (and state) land and natural resources will have a ripple effect throughout the social and economic climate of the Planning Area.

The communities of the Bighorn Basin emerged from ranching and agricultural centers; mining or oil field camps; stop over places between two larger communities; or unique recreational features, such as Thermopolis' hot springs. In general, the factors that contributed to the emergence of these communities are still evident and important in their current identities. Public lands and the policies exerted considerable influence on the formation of the communities in the Bighorn Basin and continue to play a large role in their social and economic fabric. The major uses of public land in these communities, both past and present, are open range grazing, development of irrigation waters, mining of minerals, drilling for oil and gas, and recreation.

The first known occupants of land in the Planning Area are members of various Native American tribes, including Shoshone, Crow, Blackfeet, A'aninin (Gros Ventre), Arapaho, Sioux, and Tsitsistas (Cheyenne) tribes. The first recorded European-American to enter the Bighorn Basin was John Colter, a member of the Lewis and Clark Expedition, who arrived in 1806 (Washakie County 2012). Other explorers and fur traders followed in the early and middle 1800s (Washakie County 2012, Hot Springs County 2002). Intensive European-American settlement began to occur to the 1870s and 1880s, primarily due to the development of cattle ranches and homesteads (Hot Springs County 2002).

By 1884, the Bighorn Basin was well stocked with cattle. From the time cattle ranches started in the Basin until the Extended Homestead Act of 1909 and the Taylor Grazing Act of 1934, most of the area was open grazing. During this open range period, range wars were common as large scale ranchers vied for control of the area. With passage of the Homestead Act, the range was divided and large ranchers

would homestead, using various methods, to ensure access to water sources and to landlock public lands with their own lands. The Taylor Grazing Act established grazing permits to combat range wars and overgrazing.

A number of factors contributed to the rapid deterioration of western agricultural lands during the early 1930s. The application of poor farming procedures, misuse of range, and extreme lack of moisture were probably foremost in creating these adverse conditions. Recognizing the need to stop further degradation of these valuable lands, Senator Earl Bower, of Washakie County, introduced a bill establishing the Wyoming Soil Conservation Act in February 1941. This Act authorized the establishment of Soil Conservation Districts. These newly formed bodies were given the responsibility of natural resource conservation within their respective districts. As more resource conflicts arose, the role of conservation districts continued to expand. With the enactment of Federal Land Policy and Management Act of 1976, which included the term "multiple use" management and defined it as "management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people," the role of the conservation districts became even broader. Acting as local governments, the conservation districts strived to ensure sustainable use and conservation of local resources.

After the arrival of the cattle in the Basin, irrigation projects furthered the development of the Bighorn Basin. There have been both public land projects and private projects; however both have relied on access to public lands. The first attempt at large-scale irrigation using the waters of the Bighorn River in the southern portion of the Planning Area was first made in 1886. A group dug a diversion ditch about four miles south of Worland. However, no crops were grown as a result of this effort (Washakie County 2012). In what is now Park County, Colonel William F. "Buffalo Bill" Cody and some business partners established the Shoshone Irrigation Corporation in 1894. The federal government took over the project and began construction in 1904. The first water was available for irrigation in 1908, in the vicinity of Powell.

Development of the Shoshone Project continued through 1947 and provided irrigation water and other benefits to an increasing area of the Bighorn Basin. In addition to irrigation, the project provides hydroelectric power, recreation opportunities in the Buffalo Bill Reservoir, and flood control. The U.S. BOR and other governmental agencies also dug several large ditches around Worland, and eventually developed the Boysen Reservoir to provide reliable irrigation water in Washakie County (Washakie County 2012).

Private irrigation developments, such as the Sidon canal, the Lower Shoshone River irrigation, the Greybull River system, and developments along the creeks coming out of the Big Horns, cover as much or more of the Basin than federal irrigation projects. These private irrigation projects depended on availability of federal land to start, and still depend on federal land or involvement in many ways (Kelso pers. comm.). Today, the Bighorn Basin is one of two irrigated cash crop regions in Wyoming, the other being Goshen and Platte Counties (Big Horn County 2009).

At about the same time as the construction of the irrigation projects, the railroad was also being developed through the Bighorn Basin. In 1906 the Chicago, Burlington, and Quincy railroad was completed. The railroad brought various changes, including the physical movement of the town of Worland from the west to the east side of the Bighorn River (Washakie County 2012).

Eight years after the completion of the railroad an "oil rush" in the Bighorn Basin started with the discovery of the Grass Creek Field in 1914. Grass Creek, Little Buffalo Basin and Elk Basin were all established as commercially important oil fields. The Hidden Dome field, which was discovered in 1917, was the earliest major oil field in Washakie County (Washakie County 2012). Petroleum quickly became

a central economic contributor: for instance, by 1916, 70 percent of the property taxes in Hot Springs County were paid by oil.

County and District Land Use Plans

The county and conservation district land use plans highlight the continued importance of the interrelationship between the local communities and public lands. The continued ability to pay to lease public lands is vital to the industries that create stability within the communities. Each county and associated conservation district is described briefly below and portions of their Land Use Plans are included to demonstrate the interconnectedness of their communities and public lands. In addition, the information below includes some county-specific history (in addition to the overall Planning Area history presented above) to provide context for the county and district land use plans.

All four counties in the Planning Area have comprehensive land use plans that address existing and planned or hoped-for future conditions of community infrastructure and other elements. The land use plans for the counties contain abundant information about policies and goals affecting development of industrial, residential, and commercial infrastructure, but they all generally support the continuation of balanced economic development along with the preservation, to the degree possible, of natural landscapes, wildlife habitat, and open space (Hot Springs County 2002; Hot Springs County 2005; Big Horn County 2009; Washakie County 2012; Park County 1998).

Big Horn County, Shoshone Conservation District, and South Big Horn Conservation District

Big Horn County, in the northeastern portion of the Bighorn Basin, is the oldest of the four counties in the Bighorn Basin. When it was originally formed in 1890 from portions of Fremont, Johnston, and Sheridan counties, it contained the entire Bighorn Basin. Portions were carved out to create Park County in 1909 and Washakie and Hot Springs Counties in 1911. Out of the four counties, Big Horn County has the largest number of small communities (Big Horn County 2009). There are thirteen communities, nine incorporated towns, and four unincorporated towns. The nine incorporated towns are: Basin, Burlington, Byron, Cowley, Deaver, Greybull, Frannie, Lovell, and Manderson. The largest community is the town of Basin, which is the county seat.

In 1879 Otto Franc brought a herd of cattle to the Greybull River Valley, about the same time Henry T. Lovell trailed two herds to the No Wood area. In 1881 John Luman trailed a herd to the Paint Rock Area (Grant pers. comm.). In 1895, the first irrigation project under the Carey Act was started on the Greybull River by the Bighorn Basin Development Company. The towns of Burlington and Otto were established that same year. In the spring of 1900, the Big Horn Colonization Company was formed and in the summer of 1900, construction of the Sidon Canal began and the town sites of Byron, Cowley, and Lovell were formed. Buffalo Bill Dam in Park County, completed in 1910, provided a more reliable source of water for irrigation.

The flanks of the Big Horn Range are one of three areas of bentonite production in Wyoming. With Wyoming containing 70 percent of the world's bentonite, this industry is economically important to Big Horn County, the state of Wyoming, and the nation. Wyo-Ben is one of the region's bentonite producers and provides an example of the impact that public land use of the industry has on the local communities. Wyo-Ben's first plant went into production in 1951 at Greybull. The Lovell plant opened in 1970. Thermopolis, in Hot Springs County, opened in 1980, but has operated only intermittently until recently. Their claims (which include BLM lands) go back to the 1940s. The Greybull plant directly employs 57 people, the Lovell plant employs 30, and Thermopolis employs 23. Mining is all by contract through GK Construction, which provides mining services for several bentonite companies (Magstadt

pers. comm.). In addition to direct employment and contract services, there are general construction contractors, environmental contractors, and others who provide services to the industry intermittently.

The Big Horn County plan, which was adopted in January 2010, suggests that the county's physical infrastructure is generally adequate for the relatively slow pace of development that the county expects in the near future. For instance, discussing water supply and distribution infrastructure in detail for each of the county communities, the plan concluded that while localized problems such as undersized or antiquated water lines can hamper development in specific locations, overall supplies are adequate for the future (Big Horn County 2009). Similarly, the plan notes that electricity, high-speed internet, telephone, and cable television are available for every incorporated community, though not for all homes in unincorporated areas. The plan does note the need to protect its agricultural industry, for instance by adjusting county land use programs and policies to support sustained agricultural profitability. The plan notes an increase in the number of hobby farms and ranchettes and notes that these operations may not have the same level of profitability of larger operations, and may compete with larger operations for the same land and water resources. However, the plan notes, these operations do contribute to the agricultural character of the county (Big Horn County 2009). The Big Horn County land use plan also identifies a need to diversify the region's economy, as it relies relatively heavily on mining and public sector activities: education, government, and health care (Big Horn County 2009).

There are currently two conservation districts in Big Horn County, the Shoshone Conservation District and the South Big Horn Conservation District. The initial conservation districts in each of these areas were established in 1945. The Shoshone Conservation District is located in the Northern Portion of Big Horn County. The Shoshone Conservation District's 2006-2011 Land Use Plan describes the natural resources of the area and the importance of conserving natural resources for the stability of the economy. The Land Use Plan states that most of the rangeland in the district is controlled by the BLM and USFS, and ranchers are authorized grazing use through a grazing permit/lease. Therefore, continued access to these grazing lands is crucial to the economic viability of the ranch operations (Shoshone Conservation District 2005). The Land Use Plan also states the importance of wildlife to recreation (hunting and wildlife observation) and thus to economic conditions in the district. In addition, the presence of bentonite, oil, natural gas, gypsum, and uranium have contributed significantly to the economy of Big Horn County (Shoshone Conservation District 2005).

The South Big Horn Conservation District's 2007-2012 Land Use Plan explains that over 80 percent of the land within the district is federal land (South Big Horn Conservation District 2006). The Land Use Plan also states: "Generally, the Big Horn Basin is an economically depressed area of the state with agriculture, mining, oil and gas development and limited industry the primary land uses within the district. Cattle and sheep, sugar beets, malt barley, alfalfa seed and hay are the main crops produced here. Mineral production consists of mining of gypsum, gravel and bentonite. Recreation-based tourism, including hunting and fishing, is of great importance too."

Hot Springs County

Located in the southern portion of the Bighorn Basin, and formed in 1911, there are three main communities in Hot Springs County: Thermopolis, East Thermopolis, and Kirby. Hot Springs County is named for the hot springs located in Hot Springs State Park, which was Wyoming's first state park, established in 1897.

Mineral production has played a significant role in the culture and economy of Hot Springs County, starting with the discovery of coal in the late 1800s and of crude oil in the early 1900s. At one time, coal production was an important component of economic activity: the largest town in the county in 1920,

Gebo (population over 2,000), was the major work camp for coal mines in the northern portion of Hot Springs County (Wyoming Tales and Trails no date). However, the coal market collapsed after World War II with the advent of diesel-powered locomotives. By 1960, most of Gebo was abandoned. It has since been mostly demolished in an attempt to restore the land to its original condition (Hot Springs County 2002). Today, Hot Springs County produces a very small amount of coal, and none of the other counties produce any; however, petroleum production continues to this day in all four counties. The 2002 land use plan for the county indicated that crude oil production accounted for more than two-thirds of assessed county valuations since 1977 (Hot Springs County 2002).

The Hot Springs County plan notes a number of issues related to present and future desired infrastructure, including the need to develop an industrial park and a new airport to attract greater diversity of industries (Hot Springs County 2005). The plan also expresses concern about growing federal and state regulation, including on public lands, which may slow or hinder economic development. The plan also specifically identifies several needs for new or improved public infrastructure. These include improved hospital services, motivated partly by the need to ensure that the aging county population has access to excellent health care; enhancement of highways to promote recognition of historical and cultural landmarks (although the plan notes that the physical condition of government roads in the county is generally excellent); improved public transportation; and the development of a new airport, funded substantially by state and federal contributions (Hot Springs County 2005).

Park County, Cody Conservation District, Meeteetse Conservation District, and Powell-Clarks Conservation District

Park County, in the northwestern portion of the Bighorn Basin, is so named because most of Yellowstone National Park is located within its boundaries; Yellowstone National Park became the first national park in 1872. The county was formed in 1909 from portions of Big Horn County and communities of Park County, including Cody, Powell, Frannie, Meeteetse, Garland, and Ralston.

One of the purposes of Park County's Land Use Plan is to "Establish policies for greater County involvement in public land use decision making" (Park County 1998). Under the public land section, the plan notes that "The economy and aesthetic environment of Park County are dependent largely on its public lands, which comprise 85 percent of the county."

The Park County plan focuses primarily on goals and policies related to planning and, compared to the other county land use plans in the area, does not have as great a focus on identifying specific needs for physical infrastructure. However, the Park County plan does identify some key policies as being important for future planning, such as the revision of subdivision procedures and standards to facilitate minor subdivisions (i.e., those smaller than 35 acres). The plan also recommends various policies to promote the county's assets, such as incentives to developers to design projects that preserve scenic views (Park County 1998).

There are currently three conservation districts in Park County. The Cody Conservation District contains the western half of the county and the central portion of the eastern half of the county (Cody Conservation District 2007). The Meeteetse Conservation District (MCD) is located in the southeast portion of the county and the Powell-Clarks Fork Conservation District is in the northeast portion of the county (Powell-Clarks Fork Conservation District 2006). The MCD recently completed their Land Use Management and Resource Conservation Plan. This plan is intended to be a guide for the citizens of the MCD, and others, for identifying and respecting the customs, culture, economic viability, social stability and quality of life found in this unique area (Meeteetse Conservation District 2011).

One of the stated goals in the Meeteetse Conservation District Land Use Plan is to "support an agribusiness and agricultural science perspective for individual agricultural producers, agricultural communities and other agricultural entities, and other stakeholders involved with governmental agencies in the process of natural resource management and planning in order to provide for the economic and social stability of the MCD, the region, and the State of Wyoming." This goal is supported by the policies of the Plan, one of which is to "facilitate efforts to bring together individual agricultural producers, agricultural communities and other agricultural entities, other stakeholders, and governmental agencies to view natural resource management and planning from an agribusiness and agricultural science perspective in order to provide for the economic and social stability of the MCD, the region, and the State of Wyoming" (Meeteetse Conservation District 2011).

With respect to mining and the mineral industry, the MCD "recognizes the importance of the mineral industry, especially oil and gas, to its tax base and economy," including employment, flows of services and consumables, and custom and culture (Meeteetse Conservation District 2011).

With respect to culture and economic stability, the Plan states that "The economic stability of the MCD rests upon continued multiple use management of the federally or state managed lands…. The MCD relies on a one mill tax levy. While Park County and the town of Meeteetse receive a share of sales tax receipts, the MCD does not." The MCD Land Use Plan states that because the amount of private property is limited (approximately 23 percent of the county in 2008), the continued vitality of the private tax base depends upon continued multiple use of federal and state lands. The MCD Land Use Plan expresses concern that "if multiple use is restricted, business income will suffer and sales and property taxes will be affected. If grazing is restricted, financial pressure will be placed on the rancher, which may even result in his going out of business. When that happens, the tax base of the County suffers, and the business income is also reduced" (Meeteetse Conservation District 2011).

Washakie County and Washakie County Conservation District

Washakie County, formed in 1911, has two main communities, Worland and Ten Sleep. Worland is primarily a farming community and is the principal population center within Washakie County (Washakie County Conservation District 2010). However, the main source of revenue for Worland comes from oil and gas production on BLM lands. In 1903, a pioneer camp was established and Charles H. Worland selected the location as a halfway point between Basin City and Thermopolis and was an overnight stop for stagecoaches and freighters and provided them with supplies (Dietz pers. comm.).

Ten Sleep is primarily a ranching community whose ranchers utilize BLM lands for grazing in Washakie County, and also Big Horn, Hot Springs, and Park Counties. The first permanent settlement of the Ten Sleep area was around 1880 by cattlemen. The first large herds of cattle were brought in to the area by a group of local ranchers in 1886. During the 1890s, large numbers of sheep were brought into the area (Dietz pers. comm.).

Infrastructure needs identified in the Washakie County land use plan include several transportation related improvements, such as improvement of the Worland airport and upgrades to U.S. Highway 16; improved health care facilities; enhanced infrastructure for recreational opportunities; and improved infrastructure to accept the increasing amount of septic waste, due to increased residential construction in unincorporated areas. The plan also describes the recent history of the county's development, noting that the boom years of the late 1970s and early 1980s brought a steady increase in per capita income, and a number of rural subdivisions were laid out in response to the County's rapid growth. Since the boom years, the county's growth has been slower and the county has especially lost population between the ages of 25-34, which has resulted in lower school enrollment levels as well as an

increasingly aging population. This aging demographic, along with other trends, has resulted in static home values, which also affects the local tax base (Washakie County Conservation District 2010).

The Washakie County Conservation District was formed from two of the oldest conservation districts in Wyoming – Nowood Soil Conservation District, established in 1941, and Washakie County Conservation District, established in 1943. The Washakie County Conservation District 2010 Natural Resource Land Use Plan highlights the interrelationship between BLM public lands and the private landowners in the community (Washakie County Conservation District 2010). The plan states that "The County's custom and culture has been significantly influenced by the relationship of the citizenry to public land, and the economic benefits that derive from public land. The public lands and the rights and privileges residents have come to rely on in all of the public lands, are central to the custom and culture of the WCCD. The WCCD finds public land and natural resources management practices are both relevant and substantive to its custom and culture, its economy, its environment, its quality of life, and its ability to protect and enhance local resources in spite of potentially detrimental outside influences."

The plan describes a 1994 report prepared by the Department of Agricultural Economics of the College of Agriculture at the University of Wyoming on the economic contributions of the federally managed lands within the four county region of Johnson, Big Horn, Sheridan, and Washakie counties. As described in the plan, the report "…provided an in-depth view of the economic and fiscal interdependencies coexisting among the private land-users and public land-managers and the local governments. The report analyzed the economic effects of federal lands grazing, timber production, mineral development, and production of (oil, natural gas, bentonite, coal and uranium, mining and production of sand and gravel), irrigation water/crop value, tourism, and historical and recreational industries. The summaries of each section of the report provides the reader with an undeniable vision of the direct and indirect negative economic effects of reduced grazing opportunities and oil/gas seismic, exploration, development, and production opportunities. The report also depicted a continued reliance on the overall price controlled irrigated agricultural industry." The land use plan concludes that the "use of public lands for grazing, mineral development and other multiple uses by the Cooperators of the WCCD must be continued or steadily increased in the WCCD to sustain a viable natural resource and economic/fiscal future for the cooperators of the WCCD" (Washakie County Conservation District 2010).

Understanding land use plans in the counties and conservation districts is important for BLM's decision making in the RMP process, in part because federal law (43 CFR 1610.3) requires the BLM to prepare plans that are consistent with officially adopted local land use plans (to the extent consistent with federal laws and policies), identify inconsistencies with proposed BLM plans and local plans to the Governor, and take practical steps to resolve conflicts between federal and local plans. These requirements apply only if local governments notify BLM that a local land use plan has been adopted.

Population Forecasts

The Wyoming Economic Analysis Division (Wyoming Economic Analysis Division 2011) provides forecasts of population for Planning Area counties and some towns (Table 3-64). The data suggest that Park, Hot Springs and Washakie counties are all expected to grow at a 0.6 percent annual rate, and Big Horn will grow at a slightly slower rate of 0.4 percent a year.

Table 3-64. Population Forecasts through 2030

Area	Population (Actual or Forecasted)				Change 2012-2030	
	2010	2012	2020	2030	Overall	Average Annual
Big Horn County	11,668	11,794	12,350	12,740	8%	0.4%
Basin	1,285	1,292	1,360	1,403	9%	0.5%
Burlington	288	309	305	314	2%	0.1%
Byron	593	599	628	647	8%	0.4%
Cowley	655	694	693	715	3%	0.2%
Deaver	178	182	188	194	7%	0.4%
Frannie[1]	157	161	167	173	7%	0.4%
Greybull	1,847	1,853	1,955	2,017	9%	0.5%
Lovell	2,360	2,381	2,498	2,577	8%	0.4%
Manderson	114	115	121	124	8%	0.4%
Hot Springs County	4,812	4,822	5,310	5,390	12%	0.6%
East Thermopolis	254	253	280	285	13%	0.7%
Kirby	92	93	102	103	11%	0.6%
Thermopolis	3,009	3,019	3,320	3,370	12%	0.6%
Park County	28,205	28,702	30,440	32,080	12%	0.6%
Cody	9,520	9,689	10,274	10,828	12%	0.6%
Meeteetse	327	330	353	372	13%	0.7%
Powell	6,314	8,308	6,814	7,181	-14%	-0.8%
Washakie County	8,533	8,308	9,130	9,240	11%	0.6%
Ten Sleep	260	264	278	282	7%	0.4%
Worland	5,487	5,569	5,871	5,942	7%	0.4%
State of Wyoming	563,626	576,412	622,360	668,830	16%	0.8%

Sources: U.S. Census Bureau 2013a; Wyoming Economic Analysis Division 2011.

[1]Includes portions of Frannie located in Big Horn and Park counties.

Non-Market Economic and Social Values

Consistent with the social, economic, and cultural development of the area, many residents of the Planning Area continue to place high value on the open spaces and vistas, continuing operation of farms and ranches, livestock grazing, and the wide variety of recreational opportunities available in and near the Planning Area. Based on the information in county land use plans as well as the scoping comments the BLM has received during the RMP revision process, the value of these features may not be fully represented in the marketplace. There is thus a reasonable argument for the consideration of "non-market values" in the analysis. Well established in economic theory, non-market values refer to the "utility" or "happiness" that people obtain from tangible or intangible goods or services, but that is not reflected in the market price of those goods or services. Non-market values include some forms of direct use – whether consumptive, such as recreational fishing and hunting, or non-consumptive, such as hiking, boating, wildlife viewing, and viewing scenic vistas. Non-market values also include "indirect"

values, such as ecosystem services that support ecological resources, and "non-use" values, which include altruistic values (for others' enjoyment), bequest values (for the ability of future generations to use the resource), and existence values (satisfaction from knowing that a resource exists, independent of any predicted use of the resource by any human being).

The scoping comments from the RMP and EIS process suggest that non-market values are an important component of value for many residents of the Planning Area. Many individuals submitted comments suggesting that the BLM should prioritize actions that maintain open space, preserve unique landscapes, and protect scenic viewsheds. Several commenters mentioned specific areas and vistas, such as the McCullough Peaks area and the approach to the Big Horn Mountains through Ten Sleep that are most important to them. At least two commenters specifically stated concerns about nighttime visibility, which they feel is being degraded due to development in all forms (industrial, urban, and rural) contributing light pollution and air emissions. Some individuals recommended that the BLM minimize industrial development on public lands, such as oil and gas drilling, so as to preserve archeological and paleontological resources, open space, roadless areas, WSAs, and sagebrush steppe environment – even as some of these people also acknowledged the direct economic benefits of such industrial development. Several individuals commented that livestock grazing contributes to various values such as open space, wildlife habitat, buffers between federal lands and developed areas, and the traditional image and heritage of the historic rural landscapes of Wyoming and the Western United States. All of these comments can be considered as statements indicating non-market values that people hold.

In the context of the RMP and EIS, non-market values are implicitly included in the decision making context in the sense that market economic considerations, such as employment and tax revenues, are just one element affecting the development of the RMP alternatives, including the Agency Preferred Alternative. The RMP and EIS presents information about current conditions and potential impacts on a multitude of resources, including all of the resources that people value in a non-market context, such as open space, preservation and conservation of wildlife, and air quality. The present condition of these various resources, and the impacts on them from each of the alternatives, are evaluated within the RMP and EIS context, in concert with the analysis of market values as measured by employment, income, earnings, and tax revenues. Thus, although this RMP and EIS does not attempt to quantify the non-market values in dollar terms, the concepts that support non-market analysis – and the non-market values people hold – are built in to the RMP and EIS process and ultimately the development of the Proposed RMP.

3.8.2 Economic Conditions

Economic analysis is concerned with the production, distribution, and consumption of goods and services. This section provides a summary of economic information, including trends and current conditions. It also identifies and describes major economic sectors in the Planning Area that can be affected by BLM management actions.

Economic Activity and Output

This section provides detailed information about the industries that have the greatest potential to be directly affected by BLM policies and programs in the Planning Area. These industries include mining (including oil and gas); travel, tourism and recreation; and livestock grazing. The sections below on personal income, employment, and tax revenues provide information and data about jobs, earnings, and tax revenues contributed by these economic sectors, as well as other economic sectors, such as construction and manufacturing, that may be indirectly affected by BLM actions.

Economic Activity: Mining, Including Oil and Gas

Table 3-65 provides a summary of the quantity and value of mining production in the counties in the Planning Area, and for the state as a whole. Economically, the largest contributors to mining activity in all four counties are oil and gas; bentonite is also important in Big Horn County. Of the Planning Area counties, Park County has the greatest value of mineral production. Park County produces over 10 percent of the state's oil, while Big Horn County produces over half the bentonite in the state. Section 3.2 *Mineral Resources* contains additional information about mineral resources in the Planning Area.

Table 3-65. Mineral Production and Value by County in the Planning Area

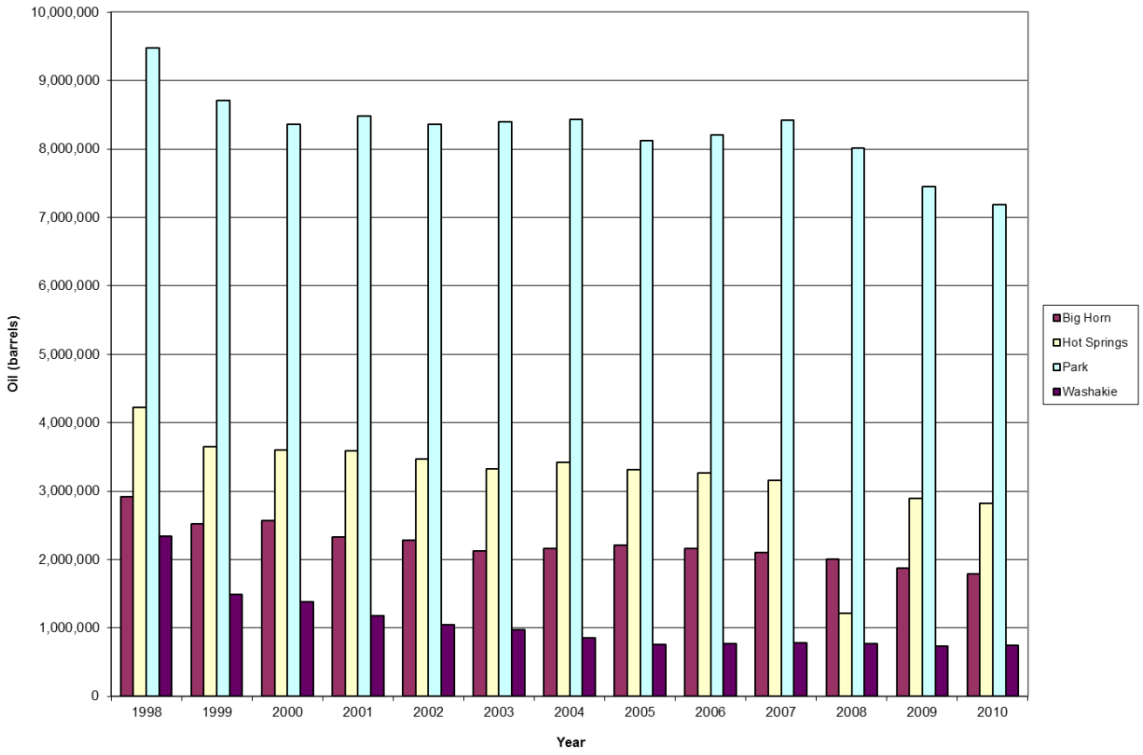
Mineral	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
Production or Sales (units)					
Oil (barrels sold)	1,787,640	2,824,859	7,190,490	744,250	52,220,583
Gas (mcf sold)	2,126,856	128,975	9,616,074	1,991,028	2,429,249,686
Coal (tons)	0	25,913	0	0	438,751,440
Gypsum (tons)	283,755	0	42,126	0	325,881
Sand and Gravel (tons)	164,568	32,079	427,880	92,801	11,993,124
Bentonite (tons)	2,476,862	154,018	0	131,831	4,453,282
Taxable Valuation ($ millions)					
Oil	$114	$168	$440	$45	$3,273
Gas	$7	$1	$31	$7	$7,601
Coal	$0	$0.39	$0	$0	$4,020
Gypsum	$1	$0	$0.8	$0	$1.8
Sand and Gravel	$0.3	$0.05	$0.7	$0.1	$22.9
Bentonite	$35	$1.3	$0	$3.1	$64

Source: Wyoming DOR 2012. Data are for production year 2010.

mcf thousand cubic feet

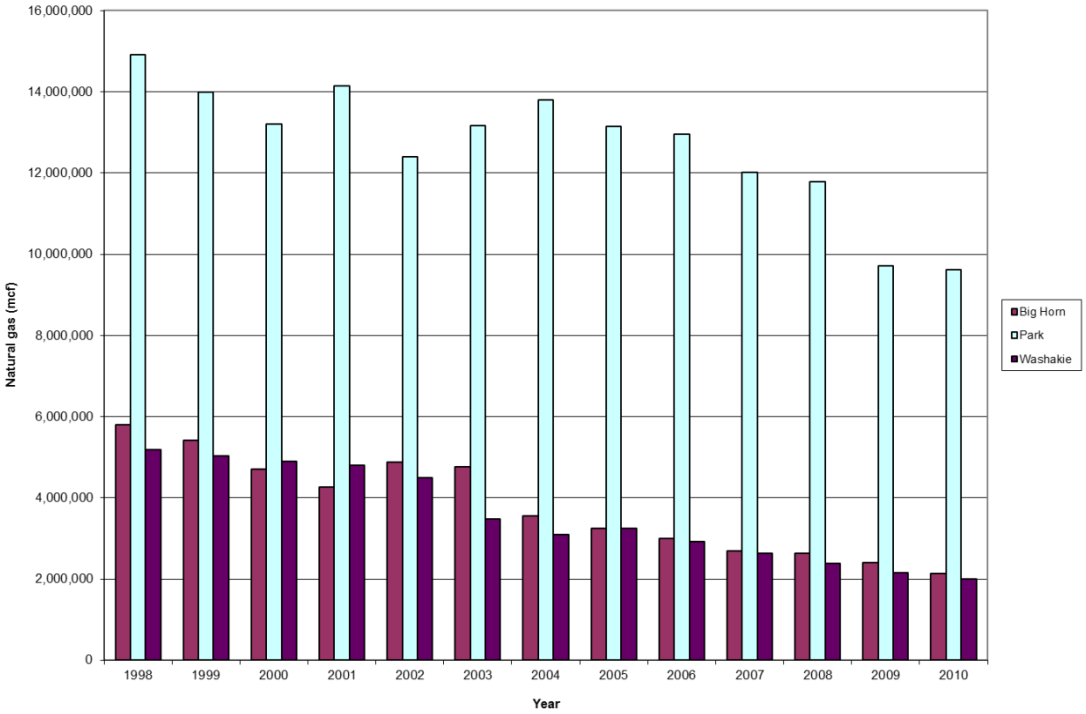
A trend analysis of production data suggests that oil and gas production generally decreased from 1998 to 2010, while bentonite production generally increased from 2002 to 2007 and dropped somewhat after 2007. Figures 3-21, 3-22, and 3-23 provide production trends for 1998-2010 for each of these.

Figure 3-21. Oil Production Trend, 1998-2010



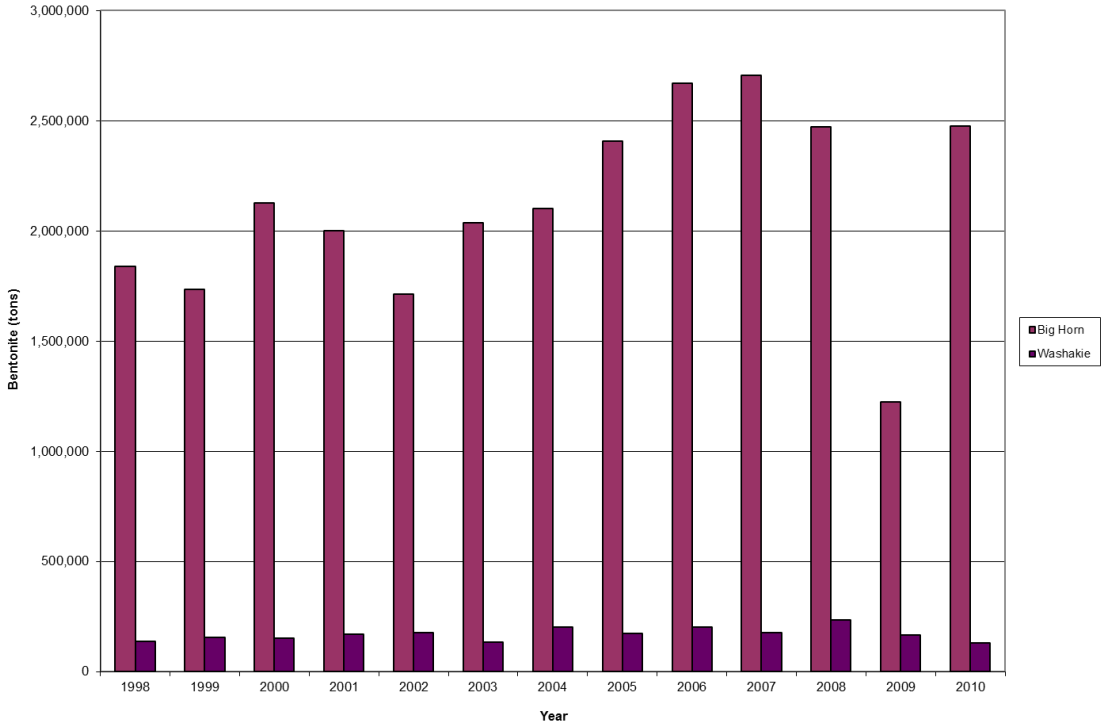
Sources: Wyoming DOR 1999; Wyoming DOR 2000; Wyoming DOR 2001; Wyoming DOR 2002; Wyoming DOR 2003; Wyoming DOR 2004; Wyoming DOR 2005; Wyoming DOR 2006; Wyoming DOR 2007; Wyoming DOR 2008; Wyoming DOR 2009; Wyoming DOR 2010; Wyoming DOR 2011; Wyoming DOR 2012.

Figure 3-22. Natural Gas Production Trend, 1998-2010



Sources: Wyoming DOR 1999; Wyoming DOR 2000; Wyoming DOR 2001; Wyoming DOR 2002; Wyoming DOR 2003; Wyoming DOR 2004; Wyoming DOR 2005; Wyoming DOR 2006; Wyoming DOR 2007; Wyoming DOR 2008; Wyoming DOR 2009; Wyoming DOR 2010; Wyoming DOR 2011; Wyoming DOR 2012. Note: Hot Springs County is not shown due to very low production.

Figure 3-23. Bentonite Production Trend, 1998-2010



Sources: Wyoming DOR 1999; Wyoming DOR 2000; Wyoming DOR 2001; Wyoming DOR 2002; Wyoming DOR 2003; Wyoming DOR 2004; Wyoming DOR 2005; Wyoming DOR 2006; Wyoming DOR 2007; Wyoming DOR 2008; Wyoming DOR 2009; Wyoming DOR 2010; Wyoming DOR 2011; Wyoming DOR 2012. Note: Only Big Horn and Washakie counties are shown; production is zero in Park County and very low in Hot Springs County.

Because the BLM manages subsurface mineral resources in excess of the surface lands it administers, its decisions can have a potentially large effect on mining in the Planning Area (see Section 3.2 *Mineral Resources* for more detail). From an economic perspective, mining is a key contributor to the economic well-being of the Planning Area, and therefore BLM's management decisions in this area could have a potentially large effect on economic conditions.

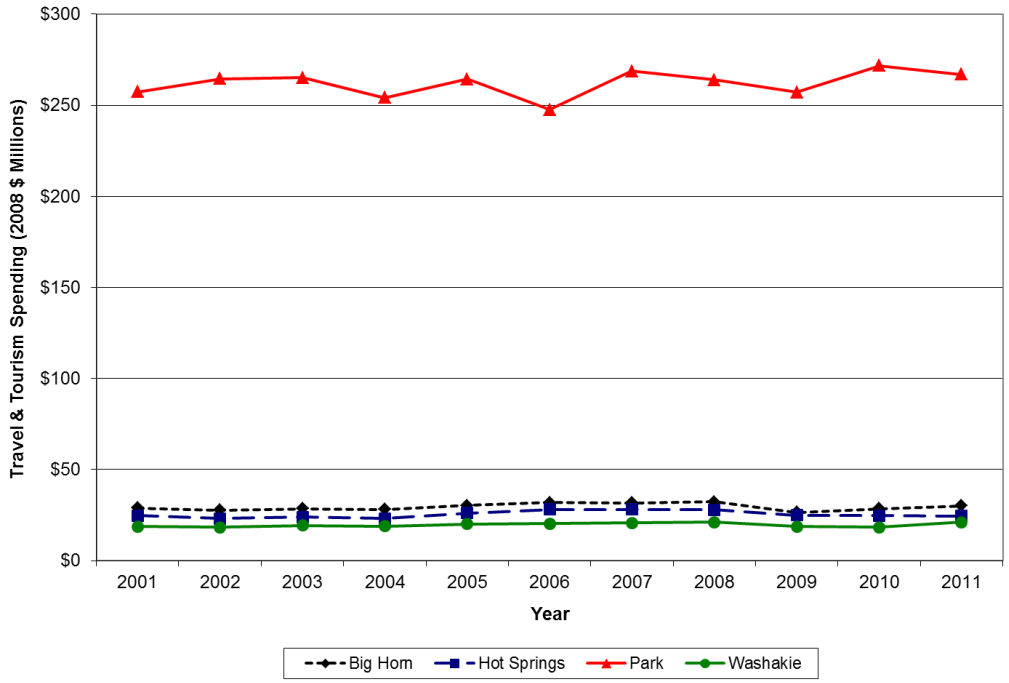
Economic Activity: Recreation

Federal lands within the Planning Area provide a broad spectrum of outdoor opportunities for Planning Area residents and visitors. Recreation on public lands also provides economic benefits. Recreation service providers (hotels, outfitters, equipment manufacturers and dealers, restaurants) depend on public lands, in part, for their livelihood.

Recreation visits are commonly measured in recreation visitor-days (RVDs). For several years, the WGFD estimated recreation patterns on BLM-administered land by field office, statewide. Based on the latest data available (2007), the WGFD estimated that the WFO received 123,600 RVDs for hunting and fishing on BLM-administered lands, and the CYFO received 60,034, for a total of 183,634 for the Planning Area. This represents about 18 percent of the hunting and fishing RVDs on BLM-administered land in Wyoming, and 5 percent of the hunting and fishing RVDs in Wyoming as a whole. Other popular recreation activities include camping and picnicking, driving for pleasure, nonmotorized travel, and motorized vehicle use (BLM 2009a). These recreational opportunities on BLM-administered lands contribute to economic values in the Planning Area in terms of both providing income from outsiders (visitors from outside the region who spend time and money in the region) and local residents.

Figure 3-24 shows travel and tourism spending in the Planning Area. In real terms, travel and tourism spending was essentially steady from 2001 to 2011 in all four counties in the Planning Area. Spending was much higher in Park County than the other three counties, presumably due to its proximity to Yellowstone National Park. The figure does not distinguish travel for business from travel for pleasure; however, a study by the Wyoming Office of Travel and Tourism indicates that statewide the great majority of trips (e.g., 98 percent, in 2006) are due to tourism for pleasure (Wyoming State Office of Travel and Tourism 2007). According to a report prepared by Dean Runyan Associates for Wyoming Travel and Tourism, travel and tourism related spending reached $364 million in the Planning Area in 2011 supporting over 4,400 jobs (Dean Runyan Associates 2012).

Figure 3-24. Travel and Tourism Spending in the Planning Area



Sources: Dean Runyan Associates 2007; Dean Runyan Associates 2008; Dean Runyan Associates 2010; Dean Runyan Associates 2012; adjusted for inflation using Wyoming Economic Analysis Division 2012a.

Economic Activity: Livestock Grazing

The BLM is responsible for administering livestock grazing on public lands across the Planning Area. Livestock grazing on public lands consists primarily of cattle, but also includes sheep, domestic horses, and small numbers of bison. In addition, goats and sheep are sometimes authorized for the purpose of suppressing weeds. The BLM administers 687 grazing allotments covering 3.2 million acres in the Planning Area. The majority of the allotments in the Planning Area operate under grazing strategies incorporating rest, seasonal rotations, deferment, and prescribed use levels that provide for adequate plant recovery time to enhance rangeland health (BLM 2009a).

According to data from the Rangeland Administration System, there are 78,324 active (use) AUMs in the Cody Field Office Planning Area and 226,522 active (use) AUMs in the Worland Field Office Planning Area, for a total of 305,264 active (use) AUMs. Whereas active (use) AUMs represent the maximum amount of forage generally available in any given year under a permit or lease, authorized AUMs

represent the total forage the BLM will allow the permittee to use in a given year. The BLM adjusts grazing use on an annual basis to account for the actual forage value of the land in a given year, based on climatic conditions (e.g., drought), as well as taking into account the needs of the land and the ranch operators. The number of AUMs actually used varies every year; from 1988 through 2012, the lowest number was 131,346 and the highest was 241,333. The average for these years was 194,672 AUMs, which is about 64 percent of the authorized AUMs (BLM 2010a, BLM 2014c).

BLM-administered grazing fees are calculated annually using a formula established by the Public Rangelands Improvement Act of 1978. These fees are lower on average than state or private lands because of the formula established by Congress. In addition, state and private land lease rates reflect the amount of control over the leased land exercised by the lessee, responsibility for maintenance of facilities, and services provided by the lessor. Federal grazing fees in Wyoming were $1.35 per AUM in 2013 and 2014 (BLM and USFS 2014). For comparison, grazing fees on state land were $5.13 in 2013 and 2014 (Wyoming SBLC 2014). The average grazing rate on privately owned nonirrigated land in Wyoming was $16.60 per AUM in 2010, $17.60 in 2011, and $18.70 in 2012 (NASS 2013).

Taylor et al. (2004) analyzed the importance of BLM-administered land for livestock grazing in nearby Fremont County using a simulated enterprise level ranch budget. They pointed out that most ranches are typically only partially dependent on federal land grazing for forage, but this forage source is a critical part of their livestock operation because of the seasonal dependency, even when the proportion of acres of AUMs contributed by federal land grazing is relatively small for the operation. Much of a ranch's private land is used as hay ground to produce hay for winter feeding. Using hay acreage to feed cattle during the summer means a ranch has to purchase hay for the winter. The rigidity of seasonal forage availability means that the optimal use of other forages and resources are impacted when federal AUMs are not available (Taylor et al. 2004). These authors, as well as many others in studies they reviewed from 1975 through 2002, found that potential reductions in income and net ranch returns are greater than the direct economic loss from reductions in federal grazing.

The USDA conducts a comprehensive national survey of agricultural operations every 5 years, the Census of Agriculture, which provides a rich source of data on agricultural operations down to the county level. The USDA maintains on an ongoing basis a list of agricultural operators who receive the Census of Agriculture survey in the mail, and follows up with various forms of outreach to ensure a high response rate. Data from the 2012 Census of Agriculture were released at the state level in February 2014, but the latest county-level information is still from 2007. The response rate for the 2007 survey was 85.2 percent. The USDA also adjusts the data to account for non-response, using well-established statistical methods (USDA 2009).

In 2007, there were 1,797 agricultural operations in the Planning Area counties according to the Census of Agriculture, which defines an agricultural operation (or "farm") as a place from which $1,000 worth of agricultural products is sold within a year (USDA 2009). Together, these farms and ranches encompassed about 2.3 million acres. The combined gross revenue of these operations, including agricultural products sold, government support payments, and other farm-related income, was $200 million. (This figure does not include income generated by employment or business activities which are separate from the farm business.) The net income aggregated across the 1,797 operations in the four Planning Area counties, according to the Census of Agriculture, was about $37.5 million.

Table 3-66 provides these data for individual counties in 2007, as well as data from the two most recent prior Census of Agriculture surveys (2002 and 1997). The table also provides state-level data for comparison. Table 3-66 shows a trend of increase in the number of farms with decrease of land in farms.

Table 3-66. Number of Farms, Land in Farms, Revenue, and Income, 1997-2007

Variable/Year	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
Number of farms, 2007	621	180	782	214	11,069
Number of farms, 2002	501	147	711	184	9,422
Number of farms, 1997	495	147	588	205	9,232
Land in farms, 2007 (acres)	438,033	547,084	881,736	469,804	30,169,526
Land in farms, 2002 (acres)	411,782	876,560	810,302	426,500	34,402,726
Land in farms, 1997 (acres)	443,434	944,205	1,011,425	450,036	34,088,692
Total farm revenue, 2007	$57.2	$15.0	$85.9	$41.9	$1,245.8
Total farm revenue, 2002	$41.4	$8.9	$55.8	$26.8	$933.6
Total farm revenue, 1997	$45.0	$9.7	$67.9	$29.3	$932.6
Net farm income, 2007	$8.3	$4.5	$11.3	$13.3	$275.7
Net farm income, 2002	$4.4	$0.8	$9.0	$5.2	$115.3
Net farm income, 1997	$13.3	$2.1	$18.7	$8.6	$242.2

Sources: USDA 2009; USDA 2004; USDA 1999.

Note: Farm revenue and net farm income are in millions of current-year dollars (that is, not adjusted for inflation).

The U.S. Bureau of Economic Analysis (BEA) also provides data on farm income, which is presented below in Table 3-67. The most recent BEA data are from 2011, but 2007 data are also included in the table to facilitate comparison with the Census of Agriculture data. The 2007 data from BEA is somewhat different from that provided by the Census of Agriculture; for example, BEA's figures for gross income and net income are somewhat lower than those from the Census. For two of the four counties, this difference results in a negative value for net income reported by BEA, even as the Census reports a positive value for net income. However, the percentage breakouts for percent of income from livestock, crops, other farm-related sources, and government payments are very close to those from the USDA data.

Table 3-67. Farm Income in 2007 and 2011 from the U.S. Bureau of Economic Analysis

Data Item	Big Horn County	Hot Springs County	Park County	Washakie County
Farm Income in 2007 (2007 $ thousands)				
Gross Income	$53,944	$14,052	$78,848	$37,333
Percent of Income from Livestock	46%	77%	56%	58%
Percent of Income from Crops	38%	9%	35%	36%
Percent of Income from Other Sources[1]	12%	12%	7%	4%
Percent of Income from Government Payments	4%	2%	1%	2%
Net Income	-$6,465	$312	-$8,490	$3,199
Net Income Including Inventory Change	-$10,800	-$1,683	-$13,047	$442
Farm Income in 2011 (2011 $ thousands)				
Gross Income	$92,937	$17,456	$118,910	$55,773
Percent of Income from Livestock	32%	74%	43%	46%
Percent of Income from Crops	58%	14%	50%	49%
Percent of Income from Other Sources[1]	8%	11%	5%	3%
Percent of Income from Government Payments	2%	1%	1%	2%
Net Income	$16,771	$445	$9,234	$13,242
Net Income Including Inventory Change	$18,639	$1,803	$11,051	$15,561

Source: BEA 2012

[1]Includes the value of home consumption and other farm related income components, such as machine hire and custom work income and income from forest products. This category also includes royalty payments from oil and gas producers to farmers when oil/gas development occurs on farm lands (Kennedy 2008).

The difference between the BEA and Census (USDA) gross and net income estimates is attributable to different methods and data sources. USDA's Census data are based on the comprehensive survey of all farm operations that is conducted every 5 years, as described above. BEA annual farm income data (and also farm employment data) are based on county data from the 2002 and 2007 Censuses of Agriculture, annual county data from state offices that are affiliated with the NASS, and data from other sources within the USDA, such as the Farm Service Agency. The BEA generally uses the most detailed information available from the USDA Census of Agriculture; sometimes, this means beginning with data that is tabulated at the state level for a detailed range of commodities, and apportioning it to the county level using data for a less detailed range of commodities, because the county-level data is not available for the more detailed range. Where necessary, the 2003-2006 BEA data use interpolation between the 2002 and 2007 Census of Agriculture, and the data after 2007 are based partly on extrapolation (BEA 2010b).

Table 3-68 provides additional information from the 2007 Census of Agriculture on the estimated number of farm employees. The Census of Agriculture provides data on the number of farms with hired workers and, for those farms, the total workers hired and worker payroll. However, the Census does not attempt to calculate total farm employment. The table below shows a series of calculations to estimate farm employment; it makes the key assumption that farms without hired workers have one employee (that is, the farmer). Based on this method, total estimated farm employment in 2007 ranges from about 250 workers in Hot Springs County to 1,700 in Park County. This method produces employment

estimates that are greater than those provided in the annual BEA data release for 2007. As described in the paragraph immediately above, this is in part due to different methods and data sources. However, it may also be partly due to different definitions of employment: for instance, people employed for as little as 1 week during the year may be counted as employees for USDA purposes, whereas this arguably should not be considered a job per se. Finally, the assumption that every farm has at least one employee may be somewhat misleading. For instance, some people may argue that the proprietor of a very small operation, such as a market garden or home processing facility, with annual sales just over $1,000 should not be considered to have an employee.

Table 3-68. Estimated Number of Farm Employees, 2007

Variable	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
Number of farms, 2007	621	180	782	214	11,069
Farms with hired labor	170	35	240	85	2,716
Farms without hired labor	451	145	542	129	8,353
Total workers hired, on farms with hired labor	621	106	1,158	315	9,826
Estimated total farm employment1	1,072	251	1,700	444	18,179
Worker payroll (for farms with hired labor)	$6.2	$1.2	$10.3	$3.8	$97.8

Source: USDA 2009, plus additional calculations to estimate total farm employment.

Note: Farm revenue and net farm income are in millions of current-year dollars (that is, not adjusted for inflation).

[1]Total farm employment is estimated based on the assumption that farms without hired labor have one employee (the farmer). See text for additional information.

Personal Income

This section describes personal income within the Planning Area. Table 3-69 provides a summary of the sources of personal income by place of work and county in the Planning Area. The table highlights county-level differences in the importance of various economic sectors, as well as the contribution of nonwage income, specifically dividends, interest, and rent, to personal income.

The BEA data that are used to create Table 3-69 do not readily distinguish recreation earnings because these earnings can occur in a variety of sectors, including retail trade, accommodation and food services, and hunting, fishing, and trapping (included in the same row as logging and agricultural services). Subsequent tables and text provide available information on expenditures and sales tax receipts from activities related to travel and tourism, which serve as the closest approximation for recreation.

Table 3-69. Personal Income and Earnings by Place of Work, 2011

Item/Sector	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming	United States
Population	11,759	4,799	28,592	8,487	568,158	311,591,917
Total personal income ($ millions)	$396	$209	$1,309	$355	$27,214	$12,949,905
Dividends, interest, and rent as a proportion of total personal income[1]	19%	21%	29%	23%	24%	16%
Dividends, interest, rent, and net transfer payments as proportion of total personal income[1]	33%	38%	39%	33%	30%	27%
Earnings by place of work ($ millions)[1]	$265	$124	$822	$241	$19,112	$9,454,199
Percent of total earnings by place of work (by sector)						
Farming	8%	2%	2%	6%	1%	1%
Fishing, logging, and related activities, including agricultural services[2]	N/A[3]	N/A[3]	0%	N/A[3]	0%	0%
Mining	17%	N/A[3]	10%	7%	16%	1%
Utilities	1%	N/A[3]	1%	2%	2%	1%
Construction	9%	4%	11%	9%	9%	5%
Manufacturing	5%	2%	3%	12%	4%	10%
Wholesale trade	3%	N/A[3]	2%	2%	3%	5%
Retail trade	N/A[3]	4%	8%	5%	6%	6%
Transportation and warehousing	5%	4%	2%	5%	5%	3%
Information	2%	1%	1%	2%	1%	3%
Finance and insurance	2%	2%	3%	4%	3%	8%
Real estate and rental and leasing	1%	1%	1%	2%	2%	2%
Professional and technical services	N/A[3]	N/A[3]	4%	3%	4%	10%
Management of companies and enterprises	N/A[3]	N/A[3]	1%	N/A[3]	1%	2%
Administrative and waste services	3%	N/A[3]	1%	N/A[3]	2%	4%
Educational services	0%	0%	0%	1%	0%	2%
Health care and social assistance	2%	10%	10%	11%	7%	11%
Arts, entertainment, and recreation	0%	2%	2%	1%	1%	1%
Accommodation and food services	1%	4%	6%	2%	4%	3%
Other services, except public administration	3%	3%	3%	3%	3%	4%
Government and government enterprises	30%	24%	26%	21%	24%	18%
Categories for which data were not disclosed	9%	37%	0%	4%	0%	0%

Source: BEA 2013

[1]Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment.
[2]"Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.
[3]Data were not disclosed due to confidentiality reasons (Bureau of Economic Analysis does not report data when there are three or fewer employers in a sector). The line item "Categories for which data were not disclosed" shows the total income attributable to these categories for each county.

N/A Not available

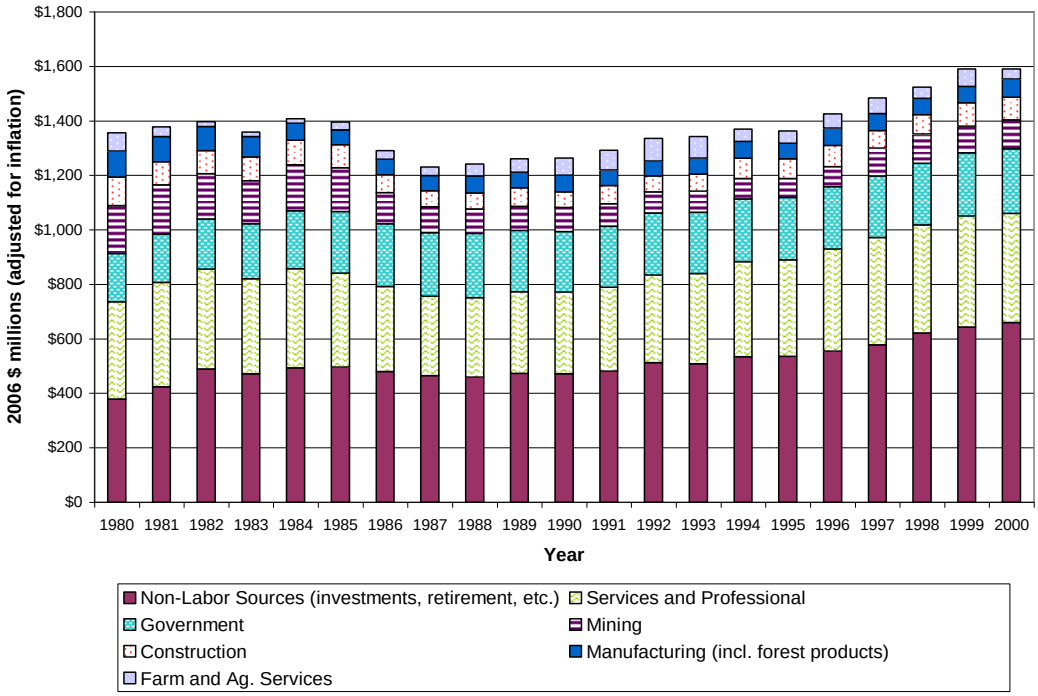
Figure 3-25 shows historic trend information on sources of income for the four Planning Area counties, aggregated. (Historic trend information for individual counties is available in the profiles from Headwaters Economics [Headwaters Economics 2007a, Headwaters Economics 2007b; Headwaters Economics 2007c; Headwaters Economics 2007d], which are on the RMP website.) The figure shows trends for 1980 through 2000. Because of a change in the industrial classification system in year 2000, it is not possible to construct a single continuous data set that would provide sector-level data both before and after year 2000.

Figures 3-26 through 3-29 show trend information on sources of income for the Planning Area counties from 2001 through 2011. The counties are not aggregated together for this trend data because of the issue of non-disclosure of data. Federal non-disclosure policies prohibit the BEA from releasing earnings data for counties where there are three or fewer employers in a given sector. If there is only one sector in this situation, BEA must also hide data for another sector so as to avoid effective disclosure of the data of concern (since BEA provides sum-of-sectors data as well as individual sectors). The problem of non-disclosure for individual sectors is compounded when attempting to assemble a series across different years and different counties. For instance, while BEA disclosed data for sixteen of the 21 main sectors for Big Horn County in 2001, it disclosed data for only twelve of the 21 sectors for Big Horn County continuously from 2001-2011. With similar disclosure policies applied to the other counties, there are only five sectors for which BEA disclosed data continuously from 2001-2008 for all four counties. Thus, the figures shown here are for each individual county and show the magnitude of the sectors for which BEA did not disclose data in each year.

(Note that the Headwaters Institute has developed a special algorithm to estimate earnings for these "non-disclosed" sectors for the data series between 1980 and 2000, but has not developed an algorithm to estimate earnings for the data series after 2000).

Figure 3-25 shows that the change in income from 1980 to 2000 (adjusted for inflation) is largely driven by changes in non-labor income, such as investment income and Social Security payments. The magnitude of income from other sources, adjusted for inflation, remained relatively constant within each sector from 1980 to 2000.

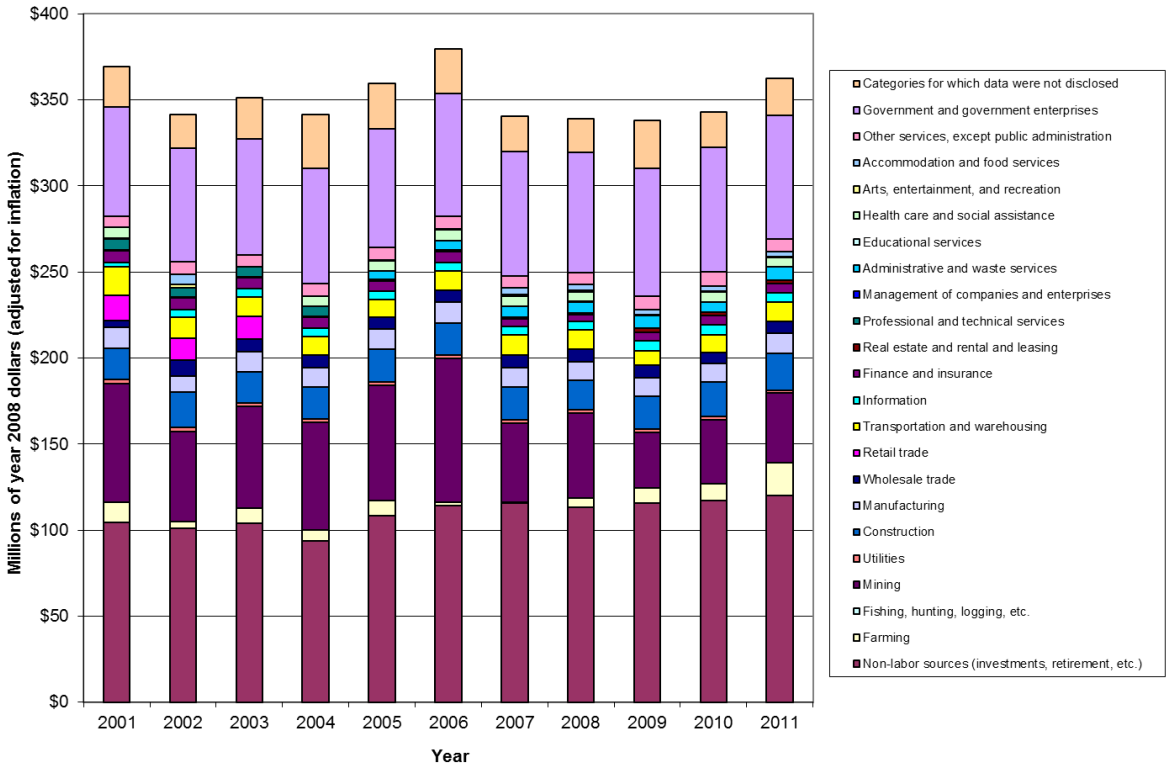
Figure 3-25. Income by Sector within Planning Area Counties, 1980-2000



Source: BEA 2010a

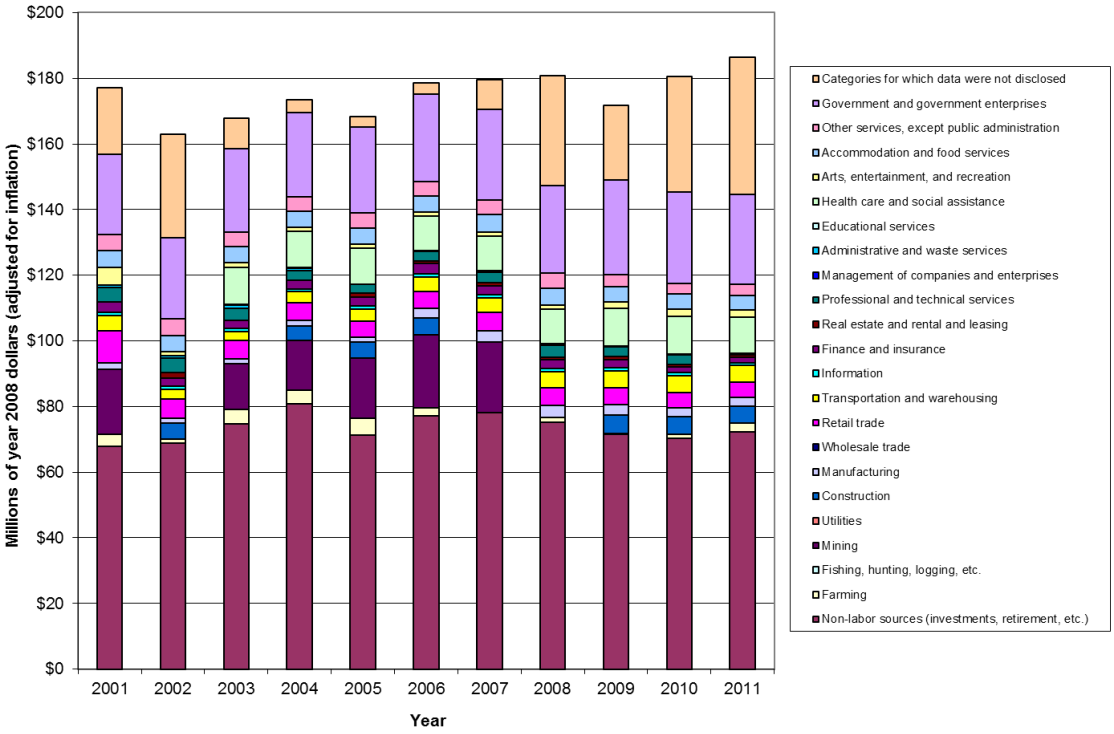
Ag. Agricultural
incl. including

Figure 3-26. Income by Sector within Big Horn County, 2001-2011



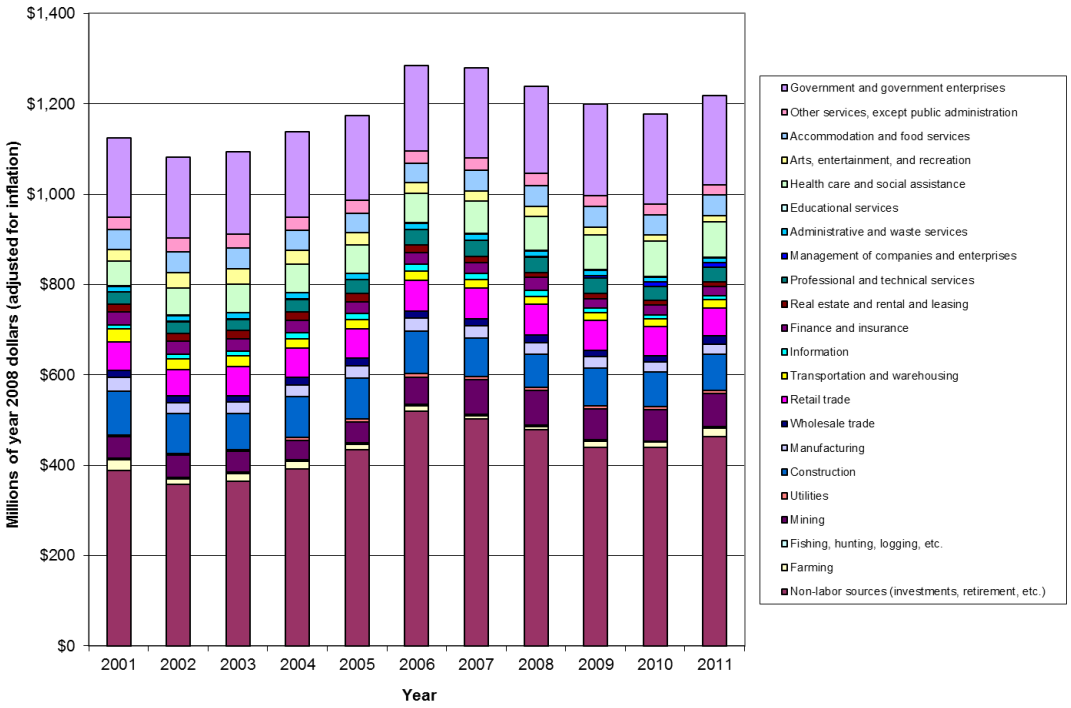
Sources: BEA 2010a; BEA 2012; adjusted for inflation using Wyoming Economic Analysis Division 2012a.

Figure 3-27. Income by Sector within Hot Springs County, 2001-2011



Sources: BEA 2010a; BEA 2012; adjusted for inflation using Wyoming Economic Analysis Division 2012a.

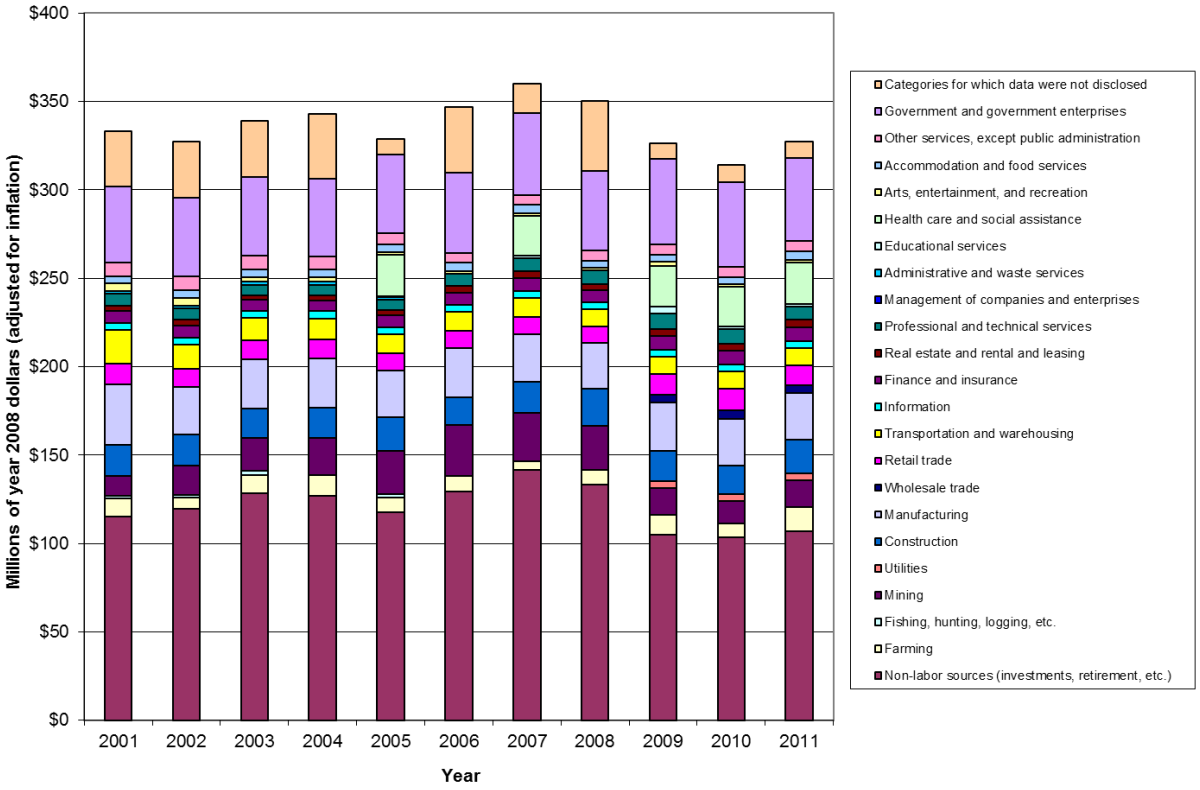
Figure 3-28. Income by Sector within Park County, 2001-2011



Sources: BEA 2010a; BEA 2012; adjusted for inflation using Wyoming Economic Analysis Division 2012a.

Note: Data were disclosed for all sectors in Park County continuously from 2001 to 2011.

Figure 3-29. Income by Sector within Washakie County, 2001-2011



Sources: BEA 2010a; BEA 2012; adjusted for inflation using Wyoming Economic Analysis Division 2012a.

Although there are particular circumstances in each county, there are some common threads in the four figures above showing income data from 2001 through 2011. Non-labor income sources represent a substantial share of income in all four counties. The variation in non-labor income over time is generally the biggest influence on total income. Mining is also a sector for which there is both a substantial amount of variation over time, and the mining sector contributes to changes in total income in all four counties. Other sectors, most notably construction, retail trade, health care and social assistance, accommodation and food services, and government, contribute a noticeable share in all or virtually all years, but these tend to be fairly steady over time. Note that the effects of non-disclosure are readily visible in the charts above: for instance, mining earnings were not disclosed in Hot Springs County in 2002 or 2008. These and other variations in disclosure are evident when a sector has widely divergent earnings in different years in the same county.

Table 3-70 provides a summary of mining-related earnings and employment for the Planning Area counties for detailed sub-industry sectors, for the latest year these data are available (2011). The table shows that oil and gas mining and support activities related to oil and gas contribute the majority of mining employment and payroll in Hot Springs, Park, and Washakie counties. In Big Horn County, a sizable amount of mining-related employment is also attributable to the mining of non-metallic minerals (e.g., bentonite). The data in Table 3-70 reflect workers by their place of employment, which means that employees within "general contracting" industries – such as construction workers or environmental contractors who sometimes work for mining companies, but also have other clients – are not included in the category of support activities. Thus, the regional contribution of the mining industry is somewhat more than is shown in the table.

Table 3-70. Earnings and Employment for Mining Activities (2011)

Source	Big Horn County		Hot Springs County		Park County		Washakie County	
	Employees	Payroll ($000)[1]	Employees	Payroll ($000)[1]	Employees	Payroll ($000)[1]	Employees	Payroll ($000)[1]
Mining	418	22,712	228	15,072	250-499	N/A[2]	100-249	6,617
Oil and Gas Extraction	0-19	N/A[2]	20-99	N/A[2]	100-249	N/A[2]	20-99	N/A[2]
Mining (Except Oil and Gas)	250-499	N/A[2]	0	0	0-19	N/A[2]	0-19	N/A[2]
Coal Mining	0-19	N/A[2]	0	0	0	0	0	0
Metal Ore Mining	0	0	0	0	0-19	N/A[2]	0	0
Nonmetallic Mineral Mining and Quarrying	250-499	N/A[2]	0	0	0	0	0-19	N/A[2]
Mining Support Activities	100-249	N/A[2]	187	12,002	252	15,200	20-99	N/A[2]
Drilling Oil and Gas Wells	0-19	N/A[2]	100-249	9,374	100-249	N/A[2]	22	963
Oil and Gas Operations Support Activities	100-249	N/A[2]	20-99	N/A[2]	20-99	N/A[2]	20-99	N/A[2]
Support Activities for Coal Mining	0	0	0	0	0	0	0	0
Support Activities for Metal Mining	0	0	0	0	0	0	0	0
Nonmetallic Minerals Support Activity (Except Fuels)	0	0	0	0	0	0	0-19	N/A[2]

Source: U.S. Census Bureau 2011b. Number of employees is for week ending March 12, 2011. Payroll data (in thousands of dollars) are for the entire year.

[1]For most sectors, the data source reveals a range rather than an exact number of employees so as not to disclose confidential business information (because there are relatively few employers in the sector).
[2]The data source does not reveal data on payrolls for this sector due to confidentiality requirements.

$000 $ thousands
N/A not available

Employment

Table 3-71 provides a summary of employment by sector for the counties in the Planning Area. The breakout is comparable to the earnings table above; in most of the counties, substantial portions of employment are derived from mining, construction, retail trade, and government. However, the differences between the two tables highlight the divergence in earnings per job in different sectors. For example, whereas mining contributes 17 percent of earnings in Big Horn County, it contributes proportionally fewer jobs (10 percent), which illustrates the relatively high wages per job in the mining sector. Similarly, retail trade accounts for 11 percent of jobs in Park County and 8 percent of jobs in each of Hot Springs and Washakie counties, but contributes just 8 percent of earnings in Park County, and 4 to 5 percent in Hot Springs and Washakie. This divergence indicates that wages per job in this sector are relatively low, either because of lower wages per hour or because some jobs in the sector are seasonal or part-time. For information on seasonal variations in employment, see the discussion of Transient and Seasonal Populations in Section 3.8.1 *Social Conditions*.

Note that the data in the table below are from BEA. As noted above under the "Economic Activity: Livestock Grazing" header in this section, BEA's data on agricultural operations differ from USDA Census of Agriculture data. As relates to employment, the number of farm employees reported by BEA is generally lower than that reported in the Census of Agriculture. According to the estimates in Table 3-68, Big Horn County had 1,072 farm employees, Hot Springs had 251, Park had 1,700, and Washakie had 444, in 2007. As noted, the 2012 Census of Agriculture is still being conducted and the latest data available are for 2007.

Table 3-71. Employment by Sector, 2011

Sector	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming	United States
Farm employment	11%	6%	5%	5%	3%	1%
Fishing, hunting, logging, and related activities, including agricultural services[1]	N/A	N/A	1%	N/A	0.7%	0.5%
Mining	10%	N/A	5%	4%	9%	0.8%
Utilities	0.3%	N/A	0.4%	0.8%	0.7%	0.3%
Construction	7%	4%	8%	7%	7%	5%
Manufacturing	4%	3%	3%	8%	3%	7%
Wholesale trade	2%	N/A	2%	2%	3%	3%
Retail trade	N/A	8%	11%	8%	10%	10%
Transportation and warehousing	3%	4%	2%	4%	4%	3%
Information	2%	2%	1%	2%	1%	2%
Finance and insurance	3%	4%	4%	4%	4%	5%
Real estate and rental and leasing	3%	4%	5%	5%	5%	4%
Professional and technical services	N/A	N/A	4%	4%	4%	7%
Management of companies and enterprises	N/A	N/A	0.6%	N/A	0.3%	1%
Administrative and waste services	6%	N/A	3%	N/A	3%	6%

Table 3-71. Employment by Sector, 2011 (Continued)

Sector	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming	United States
Educational services	0.5%	1%	1%	0.8%	0.9%	2%
Health care and social assistance	4%	11%	8%	11%	7%	11%
Arts, entertainment, and recreation	1%	3%	3%	1%	2%	2%
Accommodation and food services	4%	9%	11%	6%	8%	7%
Other services, except public administration	4%	6%	5%	5%	5%	6%
Government and government enterprises	23%	18%	18%	16%	19%	4%
Categories for which data were not disclosed	12%	19%	0%	5%	0%	0%
Total employment (number of jobs)	**7,020**	**3,399**	**20,915**	**5,732**	**391,484**	**75,834,700**

Source: BEA 2012

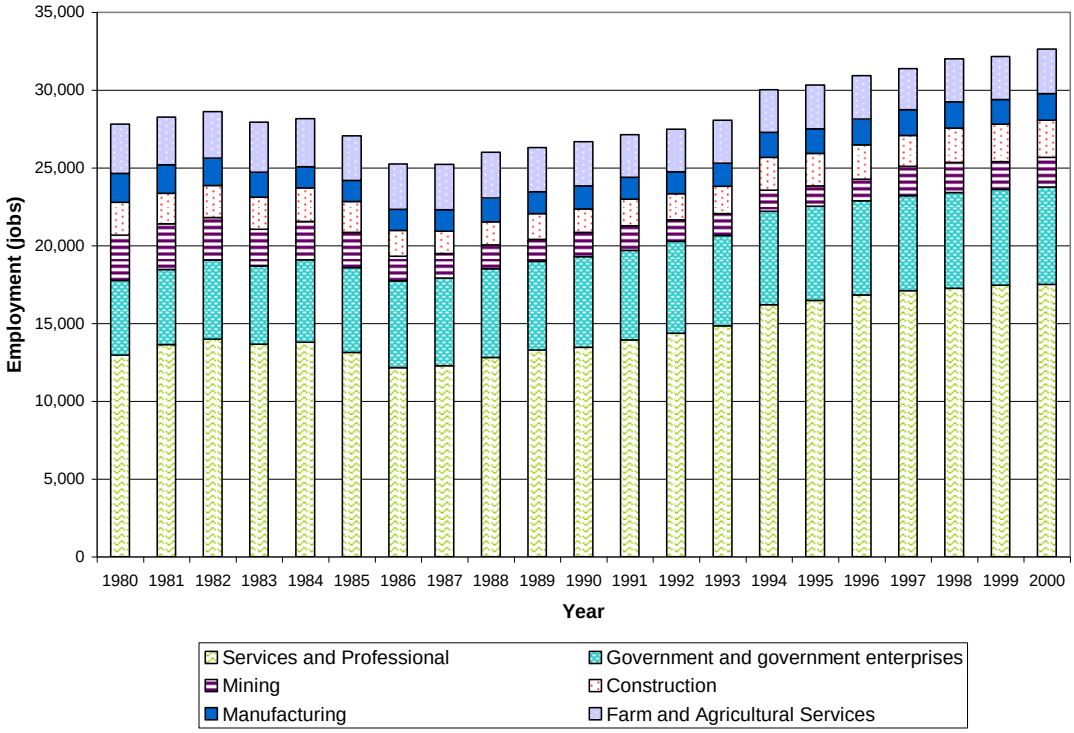
[1]Related activities includes hunting and trapping, as well as agricultural services such as custom tillage.

N/A not available

Figure 3-30 shows historical employment trends for the four Planning Area counties, aggregated. (Trend information for individual counties is available in the profiles from Headwaters Economics (Headwaters Economics 2007a; Headwaters Economics 2007b; Headwaters Economics 2007c; Headwaters Economics 2007d), which are on the RMP website.) The figure shows trends for 1980 through 2000. As noted above, due to a change in the industrial classification system in year 2000, and federal non-disclosure policies, it is not possible to construct a table or graph with meaningful trend information after year 2000. The data in the figure indicate that the number of jobs in the services and professional sectors accounted for the majority of changes in employment from 1980 to 2000. Mining jobs were higher in the early 1980s and mid to late 1990s, while government sector jobs grew somewhat starting in the mid to late 1980s. The number of jobs in other sectors remained relatively stable from 1980 to 2000.

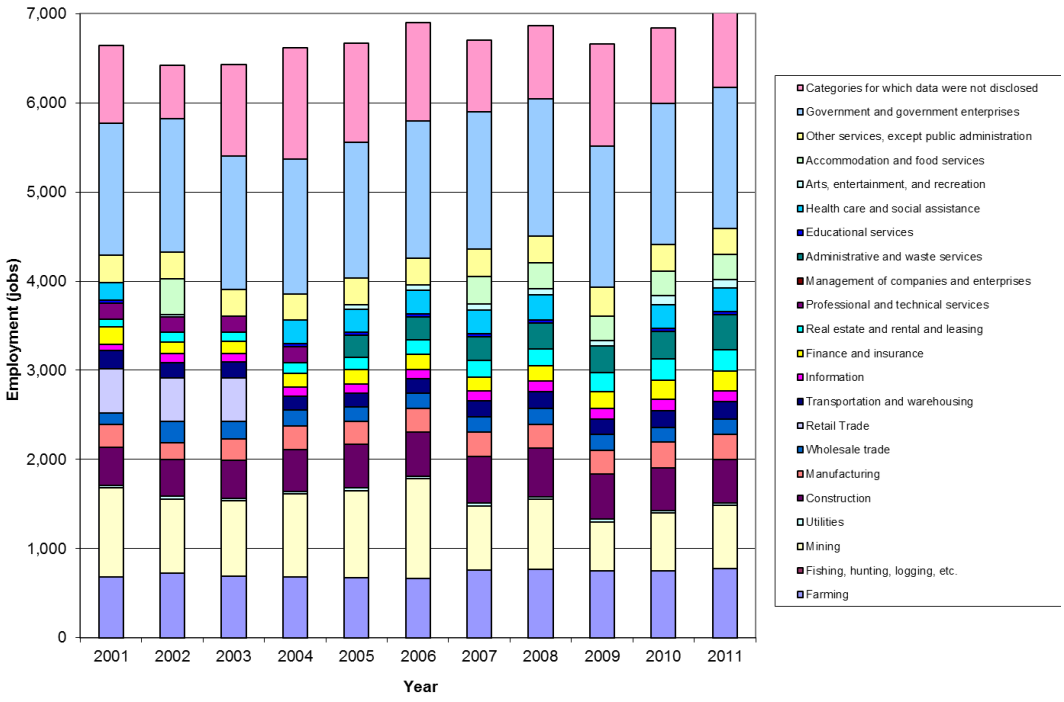
Figures 3-31 through 3-34 show trend information on sources of employment from 2001 through 2011. Similar to the income figures above, and for the same reasons, the counties are not aggregated for this trend data because of the issue of non-disclosure of data. The figures shown here are for each individual county, and show the magnitude of the sectors for which BEA did not disclose data in each year.

Figure 3-30. Employment by Sector within Planning Area Counties, 1980-2000



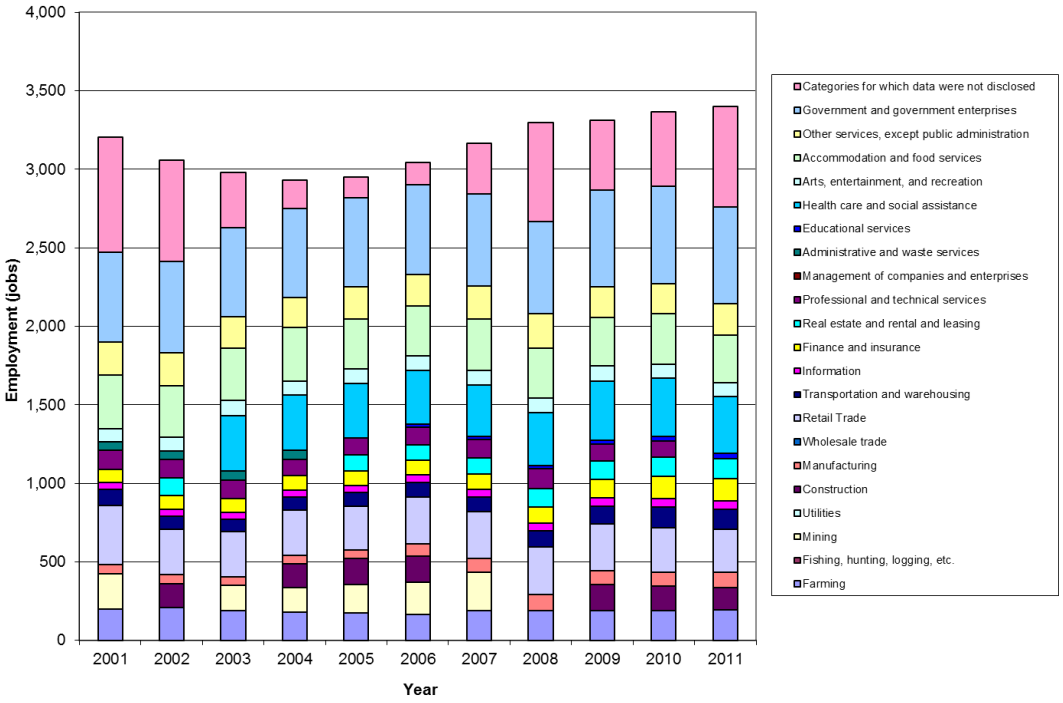
Source: BEA 2010a

Figure 3-31. Employment by Sector within Big Horn County, 2001-2011



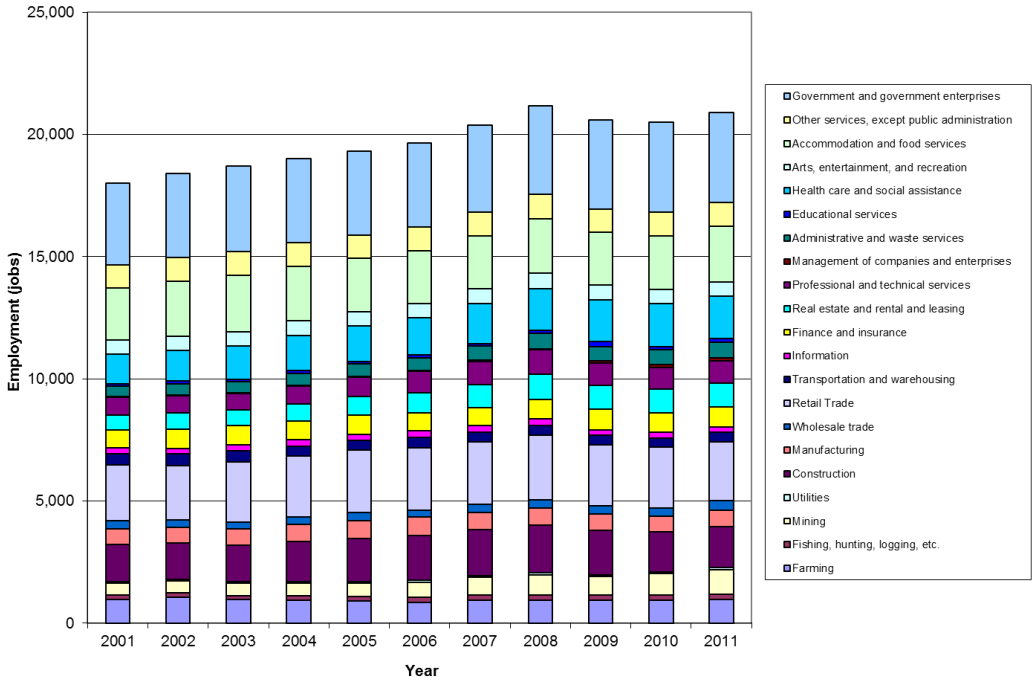
Sources: BEA 2010a; BEA 2012.

Figure 3-32. Employment by Sector within Hot Springs County, 2001-2011



Sources: BEA 2010a; BEA 2012.

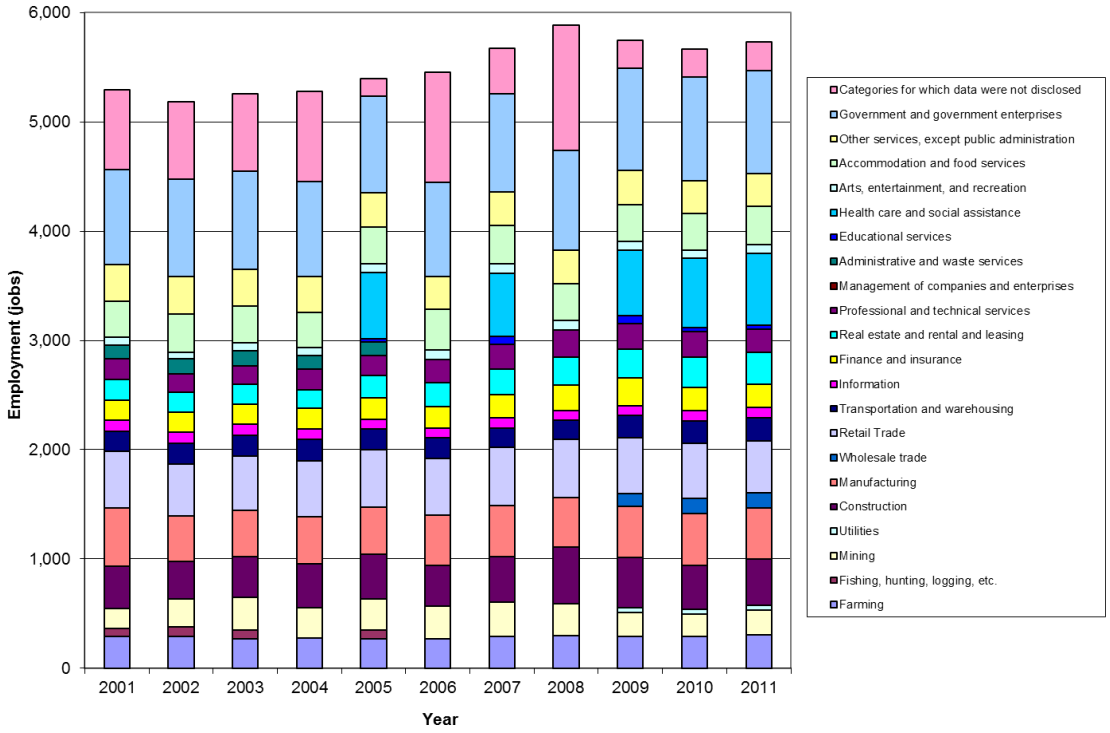
Figure 3-33. Employment by Sector within Park County, 2001-2011



Sources: BEA 2010a; BEA 2012.

Note: Data were disclosed for all sectors in Park County continuously from 2001 to 2011.

Figure 3-34. Employment by Sector within Washakie County, 2001-2011



Sources: BEA 2010a; BEA 2012.

Like the income figures, there are particular circumstances in each county but there are some common threads in the 2001-2011 employment trends. In general, certain sectors provide a steady source of employment with little variation over time: farming, accommodation and food services, retail trade, construction, manufacturing, and government. In Park County, the increase in employment over time is attributable to slight increases in construction, retail trade, and health care and social assistance. Park, Washakie, and Hot Springs counties all saw small, steady increases in employment for 2002-2008, but there is no obvious driver (partly because the intermittent nondisclosure makes it difficult to determine trends over time, but partly because there were no large jumps in employment for any sector during that period). In 2009, employment declined slightly a result of the housing market decline and the nationwide recession, but has returned to a trajectory of growth since then. Note that, like the income figures, the effects of non-disclosure are readily visible when a sector has widely divergent employment numbers in different years within the same county.

Table 3-72 shows three different measures of earnings and income for the Planning Area counties, using the most recent available data. On all three earning and income measurements, income and earnings in the Planning Area counties are lower than for the state as a whole. In addition, median household income and average earnings per job are lower in the Planning Area counties than in the United States. Per capita income is lower than the national average in Big Horn County, but greater than the national average in the other three counties. The relative difference between average earnings per job (which measures employment income only) and per capita income (which also includes dividends, interest, rent, and transfer payments such as Social Security) in Hot Springs, Park, and Washakie counties underscores the importance of nonwage income in these counties, which is also identified above in the earnings data.

Table 3-72. Average and Median Income; Average Earnings per Job

Area	Per Capita Income (2011)	Average Earnings Per Job (2011)	Median Household Income (2011)
Big Horn County	$33,682	$37,683	$49,929
Hot Springs County	$43,615	$36,580	$41,845
Park County	$45,799	$39,292	$50,141
Washakie County	$41,837	$41.972	$49,747
State of Wyoming	$47,898	$48,820	$56,044
United States	$41,560	$53,768	$50,502

Sources: BEA 2010a (per capita income and average earnings per job); BEA 2012 (median household income).

Table 3-73 shows the unemployment rate for counties in the Planning Area compared to state and national levels. As the table shows, unemployment in the Planning Area counties from 2006 through April 2012 has been lower than in the United States, though greater than the statewide rate in 2006-2008. While the national unemployment rate ticked up in 2008, unemployment remained steady in the Planning Area counties. Between 2008 and 2009, unemployment in the Planning Area counties increased, as in the State of Wyoming and in the country as a whole, declining slightly after 2010.

Table 3-73. Unemployment Rate in 2006-2012

Area	2006	2007	2008	2009	2010	2011	2012
Big Horn County	4.3%	4.2%	4.2%	8.7%	8.0%	7.1%	6.2%
Hot Springs County	3.7%	3.4%	3.4%	6.0%	5.6%	5.2%	4.7%
Park County	3.7%	3.2%	3.7%	6.2%	6.9%	6.3%	5.8%
Washakie County	3.7%	3.6%	3.7%	6.2%	6.6%	6.0%	5.4%
State of Wyoming	3.2%	2.9%	3.2%	6.4%	7.0%	6.1%	5.4%
United States	4.6%	4.6%	5.8%	9.3%	9.6%	8.9%	8.1%

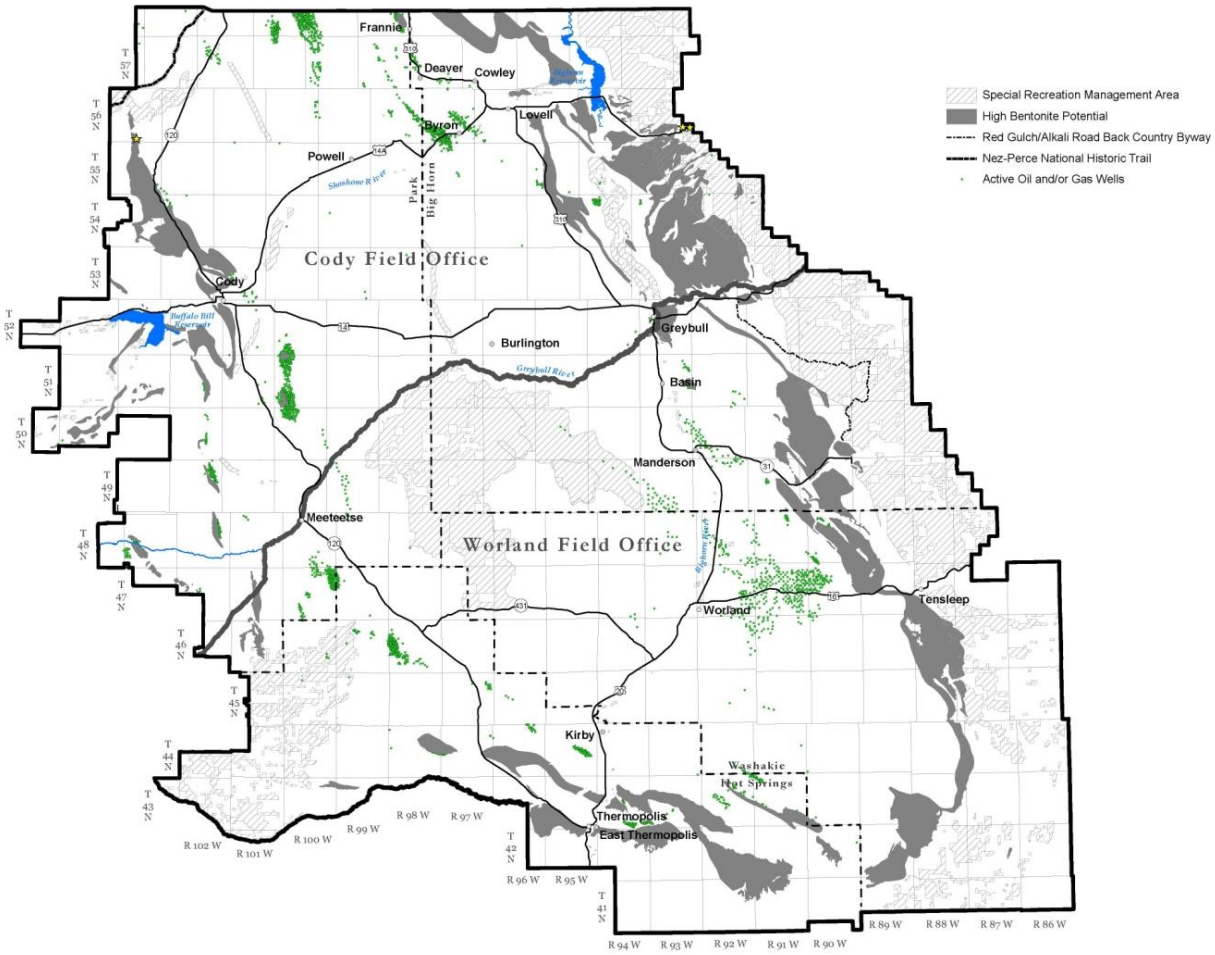
Sources: BLS 2010a; BLS 2010b; BLM 2013a.

Note: figures presented are annual averages.

Spatial Distribution of Employment

Some features of the economic landscape are common to the communities within the Planning Area, while in other ways the communities vary in their employment base. In all the communities, BLM land influences employment (directly, indirectly, or both) as well as other quality of life factors. To elucidate the geo-spatial employment patterns, Figure 3-35 shows the geographic dispersion of certain critical BLM uses, including SRMAs, areas of high bentonite potential, and active oil and gas wells. The Planning Area is authorized for livestock grazing, except for the areas shown on Map 81.

Figure 3-35. Geographic Dispersion of Selected Features



Source: BLM 2013a

Oil and gas deposits occur throughout the basin. Nearly every community lies within twenty miles from at least one cluster of active oil and gas wells; Powell and Burlington are the only exceptions. The largest clusters of oil and gas wells are proximate to Worland, Cody, and the towns in the northwest corner of Big Horn County (Byron, Lovell, Cowley, Deaver, and Frannie). Livestock grazing, as it is coterminous with BLM-administered surface, also occurs throughout the Planning Area, and all the communities are located very close to some area used for grazing. SRMAs, representing key recreational areas administered by the BLM, are concentrated in the center of the basin (near Burlington, Meeteetse, Manderson, and Kirby) and on the eastern edge (the Big Horn Mountains, near Lovell, Greybull, Worland, and Ten Sleep). Areas of high bentonite potential occur on the edges of the basin, particularly in Big Horn and Washakie counties (which together account for a large portion of the state's bentonite production).

To supplement the figure, Table 3-74 shows the distribution of employment for the larger communities in the Planning Area. Unfortunately, the only data source that provides information about sector-level employment at the resolution of individual communities is the 2000 Census, which means these data are relatively old. In addition, the Census tabulation for this data item is based on a 1-in-6 sample,

which means that data tabulated for very small communities has a substantial amount of error. For instance, a community with 300 residents would have about 50 people responding to the survey; if only 35 of those people are of working age, and they work in fifteen different employment sectors, then an aberration in the sample (e.g., three people who work in the construction industry, and none who work in mining) can suggest a population-level effect that does not actually hold true. For this reason, Table 3-74 shows only data for towns with greater than 600 employed people in the year 2000.

As expected, the data show some similarities in employment patterns. The service sectors, especially education, health care, and social assistance, and the retail trade sector contribute a sizable proportion of employment in all of the communities shown. Among sectors that are influenced directly by BLM actions, mining is most important in Greybull and Lovell; agriculture provides a small but important contribution to employment in all of the communities (with Worland and Powell having the largest shares), and recreation, accommodation, and food services, which is combined with arts and entertainment in the Census tabulation, provides a sizable share of employment in all of the communities (12 to 16 percent in all of the communities shown except Lovell).

Table 3-74. Employment by Sector, 2000

Sector	Cody	Greybull	Lovell	Powell	Thermo-polis	Worland
Agriculture, forestry, fishing and hunting	3%	2%	4%	5%	2%	5%
Mining	3%	9%	10%	3%	3%	8%
Construction	8%	8%	10%	4%	8%	6%
Manufacturing	7%	2%	9%	4%	3%	9%
Wholesale trade	1%	2%	1%	4%	1%	3%
Retail trade	15%	15%	11%	11%	7%	12%
Transportation and warehousing, and utilities	4%	9%	3%	5%	6%	4%
Information	2%	3%	1%	3%	3%	2%
Finance, insurance, real estate and rental and leasing	6%	6%	4%	6%	5%	4%
Professional, scientific, management, administrative, and waste management services	8%	3%	2%	6%	2%	5%
Educational services	7%	10%	12%	15%	13%	6%
Health care and social assistance	13%	8%	17%	15%	22%	13%
Arts, entertainment, recreation, accommodation and food services	13%	14%	7%	12%	16%	12%
Other services (except public administration)	6%	4%	6%	4%	6%	6%
Public administration	4%	5%	4%	2%	4%	5%
Total employment (number of jobs)	**4,266**	**808**	**959**	**2,413**	**1,525**	**2,422**

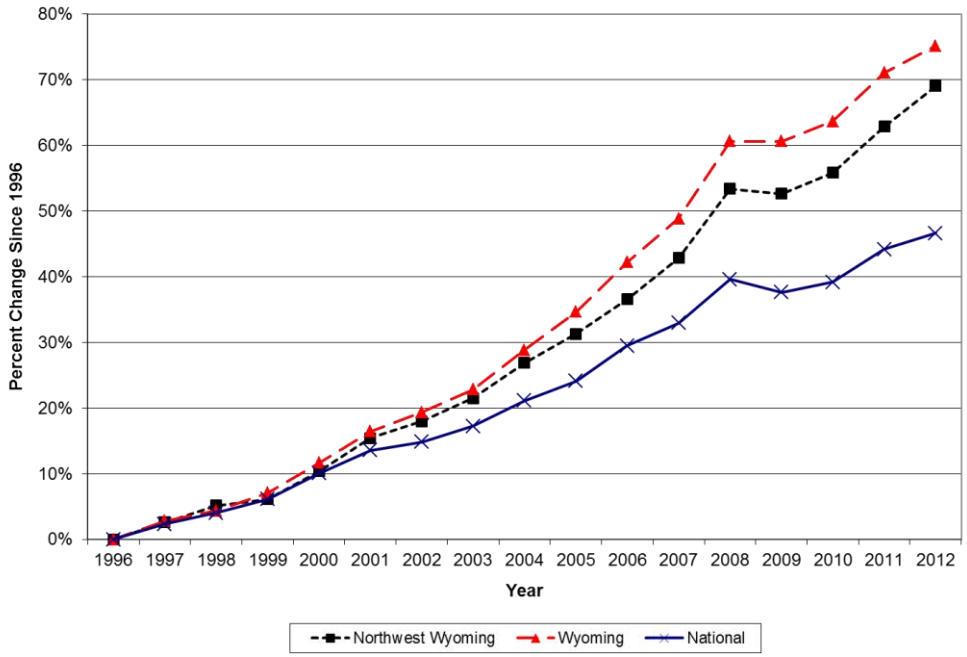
Source: U.S. Census Bureau 2000

Cost of Living

One factor that affects economic and social trends within the communities is the cost of living. The Wyoming Economic Analysis Division calculates relative changes in cost of living over time by estimating the cost of a set of goods and services that represents the average consumer's purchases for housing, food, health care, travel costs, and other items. If the cost of living for a particular area increases faster than average income, that may mean that long-time residents, especially those on fixed incomes, may find their lifestyle less affordable over time. Over a long period of time, a higher cost of living may encourage people to relocate from a community and discourage migration into a community by households not seeking to relocate in conjunction with employment opportunities. Overall migration into the area will likely decrease, and the demographic and socioeconomic characteristics of those who move in will be determined partially by the cost of living in the area.

The Wyoming Economic Analysis Division (Wyoming Economic Analysis Division 2012a) calculates the change in the cost of living over time for a five-county region in northwest Wyoming, consisting of Big Horn, Hot Springs, Park, Teton, and Washakie counties. Figure 3-36 shows how the cost of living in northwest Wyoming has changed relative to the cost of living in Wyoming generally and in the United States. Starting around 2000, the cost of living in the northwest region and Wyoming as a whole began to increase at a greater rate than the nation. The cost of living in the northwest region has risen slightly more slowly than for the state as a whole. By 2008, compared to 1996, the cost of living in northwest Wyoming had risen by about 55 percent, compared to 60 percent statewide and 40 percent for the United States. It is worth noting that the inclusion of Teton County in the five-county region may bias the results upward, due to the higher cost of living in Jackson and other portions of Teton County. In other words, the rise in the cost of living for the four counties of the combined Cody and Worland Planning Area is likely to be lower than that suggested by the five-county region that also includes the affluent Teton County. In 2009, the cost of living declined slightly for all three geographic regions shown in the figure, as a result of the housing market decline and the nationwide recession. Since 2010, the trend of increase in the cost of living has resumed.

Figure 3-36. Cost of Living Trends in the Planning Area



Source: Wyoming Economic Analysis Division 2012a

Housing

Housing stock within the Planning Area grew steadily in all four counties from 2001 to 2008, particularly in Park County, with a somewhat less steady growth after 2008 (see Table 3-75). Data on vacancy rates for all housing are presented in Table 3-76, which also provides data on the percentage of housing that is occupied by renters and owners. This section also presents, later, updated data on rental vacancy rates.

Table 3-75. Housing Units, 2001-2011

County	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Big Horn	5,131	5,144	5,163	5,196	5,227	5,227	5,240	5,253	5,278	5,378	5,376
Hot Springs	2,548	2,552	2,558	2,571	2,578	2,580	2,585	2,589	2,589	2,580	2,572
Park	12,041	12,151	12,310	12,499	12,716	12,881	13,108	13,320	13,491	13,588	13,666
Washakie	3,670	3,675	3,682	3,687	3,697	3,701	3,707	3,724	3,724	3,832	3,822

Sources: U.S. Census Bureau 2010d; U.S. Census Bureau 2013d.

Table 3-76 shows that about 70 to 75 percent of housing is owner occupied in all four counties. Vacancy rates in 2010 were highest in Big Horn and Hot Springs counties, where about one in six houses were vacant, and lowest in Washakie County, where about one in ten houses were vacant. The year 2010 vacancy rates suggest there was sufficient housing stock to accommodate new residents, at least in the aggregate.

Table 3-76. Housing Occupancy Status in 2010

County	Number of Housing Units	Percent Occupied	Percent Vacant	Percent Owner Occupied	Percent Renter Occupied
Big Horn	5,379	85%	15%	75%	25%
Hot Springs	2,582	85%	15%	70%	30%
Park	13,562	88%	12%	71%	29%
Washakie	3,833	91%	9%	73%	27%

Source: U.S. Census Bureau 2010e

Table 3-77 shows average housing prices for the Planning Area counties from 1998-2012, based on sales of existing, detached single family homes on 10 acres or less sold during the previous calendar year (WHDP 2009b; WHDP 2009a). Figure 3-37 shows the same information graphically. The table and figure show that housing prices in the Planning Area counties have increased in generally parallel fashion (i.e., growing at about the same rate) until 2008, although with prices consistently higher in Park County than the other three counties. The 2008 data show a dip in housing prices statewide due to the economic contraction. This dip continued in 2009, when it was also evident in Big Horn and Park counties, with less clear trends since then.

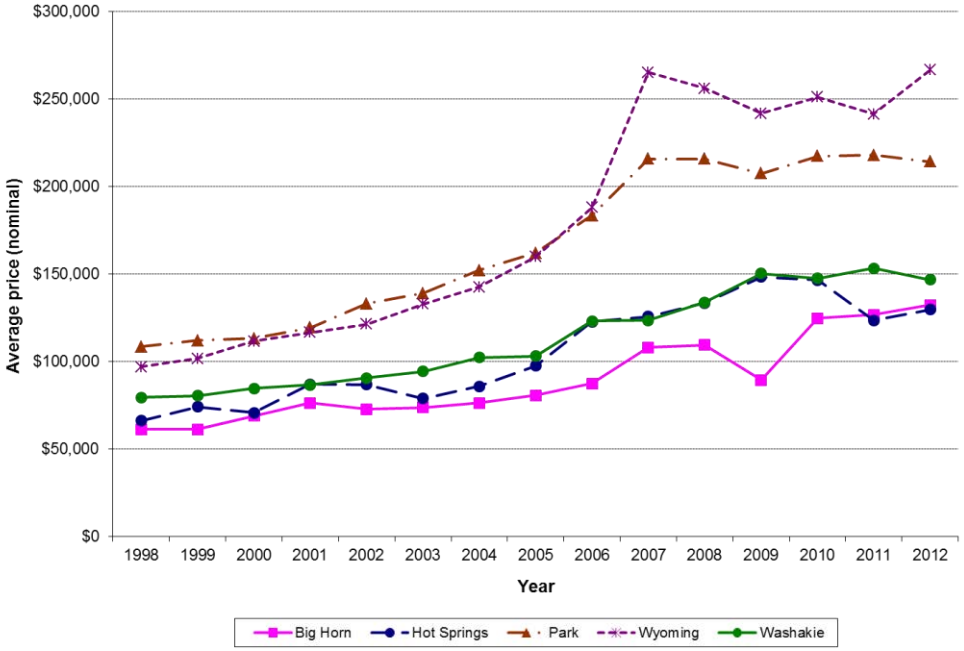
Table 3-77. Average Housing Price, 1998-2012

Year	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
1998	$61,088	$66,044	$108,286	$79,433	$96,906
1999	$61,022	$74,022	$111,893	$80,338	$101,517
2000	$68,816	$70,625	$113,178	$84,564	$111,437
2001	$76,263	$86,840	$119,233	$86,412	$116,469
2002	$72,670	$86,625	$132,854	$90,405	$121,140
2003	$73,526	$78,705	$138,941	$94,206	$132,708
2004	$76,279	$85,615	$151,921	$102,144	$142,501
2005	$80,607	$97,453	$161,866	$102,948	$159,776
2006	$87,384	$122,544	$183,326	$123,072	$187,869
2007	$107,966	$125,576	$215,697	$123,363	$265,044
2008	$109,295	$133,421	$215,692	$133,754	$256,045
2009	$89,239	$148,296	$207,333	$150,202	$241,622
2010	$124,608	$146,474	$217,191	$147,467	$250,958
2011	$126,574	$123,438	$217,902	$153,093	$241,301
2012	$132,077	$129,612	$214,019	$146,557	$266,406
Number of Sales in 2012	13	45	188	81	662

Sources: WHDP 2009b; WHDP 2009a; WHDP 2013.

Note: Prices are the average for all existing detached single family homes on 10 acres or less sold during the previous calendar year, and are not adjusted for inflation.

Figure 3-37. Average Housing Price, 1998-2012



Sources: WHDP 2009b; WHDP 2009a; WHDP 2013.

Table 3-78 shows information about rental housing availability (i.e., rental vacancy rates) since 2001. Vacancy rates in all four counties were somewhat volatile between 2001 and 2012, with some low years and some higher years. In 2007, vacancy rates in Big Horn, Park, and Washakie counties were generally low, except in December in Washakie County, but in 2008 they rose again. This increase generally continued in 2009 and 2010, with some exceptions. As of 2012, vacancy rates were highest in Hot Springs County and lowest in Washakie County.

Table 3-78. Rental Housing Availability

Year	Big Horn County		Hot Springs County		Park County		Washakie County	
	June/July	December	June/July	December	June/July	December	June/July	December
2001	12.2	12.1	5.4	6.4	3.6	6.4	4.9	9.5
2002	4.4	4.7	11.0	11.7	5.8	4.5	10.2	6.3
2003	6.9	5.0	10.6	9.9	2.5	6.9	5.9	6.3
2004	8.6	11.0	6.8	4.7	5.4	10.7	1.6	1.1
2005	6.2	8.4	8.3	6.8	3.3	5.2	3.1	1.6
2006	6.8	3.3	4.4	8.5	1.6	3.3	1.5	0.0
2007	2.1	1.5	5.4	5.3	1.0	2.7	1.0	7.3
2008	3.0	4.7	9.3	5.9	2.9	3.4	3.7	2.7
2009	4.9	14.2	5.9	8.1	2.8	3.5	3.9	3.5
2010	10.0	13.7	8.3	5.5	2.8	4.2	3.7	5.0
2011	4.4	5.7	10.8	7.6	2.7	2.8	3.6	2.1
2012	6.1	6.8	8.2	2.8	2.6	3.6	2.5	2.3

Sources: WHDP 2009b; WHDP 2009a; WHDP 2013.

Note: Availability is measured in percentage terms (percent of units that are vacant) based on a survey of rental agencies.

Table 3-79 provides some additional economic variables of interest. The ratio of relatively low-income households to relatively high-income households, which provides an indication of income inequality, is higher in Big Horn and Hot Springs counties than the median for all U.S. counties (indicating a more unequal income distribution), and lower in Park and Washakie counties (indicating a more equal distribution of income). The index of employment specialization is substantially higher in Big Horn and Hot Springs counties than the median for all U.S. counties, which indicates that employment in these counties is relatively concentrated in a small number of industry sectors. The same index shows that employment in Park and Washakie counties is slightly more diversified than in the United States as a whole. This kind of diversification can help to moderate boom and bust cycles when those cycles affect particular industries more than others. Finally, the net residential adjustment shows the degree to which commuting across county borders affects work-related earnings. Hot Springs County had a positive residential adjustment in 2005, indicating that more people commuted out of the county to work (the county is a "bedroom community"). The other counties in the Planning Area had negative residential adjustments, indicating that more people commuted into the county to work.

Table 3-79. Poor-Rich Ratio, Employment Specialization, and Residential Adjustment

Area	Poor-Rich Ratio (1999)[1]	Employment Specialization Index (2005)[2]	Net Residential Adjustment (2005)[3]
Big Horn County	11.8	267	-2.0%
Hot Springs	11.9	321	4.2%
Park County	7.8	146	-1.0%
Washakie County	6.0	139	-1.1%
Median of United States counties[4]	9.0	155	N/A

Sources: Headwaters Economics 2007a; Headwaters Economics 2007b; Headwaters Economics 2007c; Headwaters Economics 2007d.

[1]Measures the ratio of households with income less than $30,000 to those with income exceeding $100,000 (in year 1999). For instance, a ratio of 10 indicates there are 10 households with income less than $30,000 for every household with income over $100,000.
[2]A relative measure of the diversity of the employment base of a county compared to the employment base of the United States as a whole. A lower index indicates a more diverse employment base; a higher index indicates greater specialization (employment is more concentrated in a few economic sectors).
[3]A positive residential adjustment indicates that more people commute out of the county to work, while a negative adjustment indicates that more people commute into the county to work. The numeric value is the net proportion of total personal income that is earned across county lines.
[4]Represents the median for all counties in the United States (not the median value for the United States as a whole).

Tax Revenues

Economic activities on BLM-administered land and mineral estate contribute to the fiscal well-being of local governments, as well as to state and federal governments. The BLM's management actions have the potential to affect tax revenues from mining and mineral production; travel, tourism, and recreation; and livestock grazing and ranching.

Mineral Severance Taxes

The mining industry contributes substantially to state and local tax revenues. For example, the Wyoming State Auditor (Wyoming State Auditor 2012) reported that state mineral severance taxes and federal mineral royalties returned to the state represented 37 percent of total state revenues in Fiscal Year 2012 – a total of $1.58 billion. Table 3-80 shows estimated state severance tax collections for the Planning Area counties and Wyoming for production year 2010.

Table 3-80. Estimated State Severance Tax Collections in the Planning Area Counties, for Production Year 2010

Mineral	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
Crude and Stripper Oil	$5,139,113	$7,607,647	$20,318,620	$1,960,048	$151,674,247
Natural Gas	$424,737	$35,696	$1,846,938	$433,986	$456,086,175
Coal	$0	$27,459	$0	$0	$281,395,969
Gypsum	$19,886	$0	$16,491	$0	$36,376
Sand and Gravel	$5,499	$1,059	$13,926	$2,806	$457,265
Bentonite	$697,849	$26,681	$0	$61,073	$1,283,195
Additional Minerals	$0	$0	$0	$0	$19,927,798
Total	**$6,287,083**	**$7,698,541**	**$22,195,975**	**$2,457,912**	**$910,861,025**

Source: Wyoming DOR 2012

Note: The application of various tax incentive statutes resulted in a reduced severance tax collection for oil (Wyoming DOR 2012). The figure for oil was calculated using the average of the actual severance tax rate in the previous two years (4.89 percent).

Federal mineral royalties are levied at 12.5 percent of the value of current oil and gas and coal production, after allowable deductions. Half the royalties collected are returned to the state of Wyoming, and a portion of the royalties received by the state are disbursed to cities and towns (State of Wyoming 2004). According to the Wyoming Consensus Revenue Estimating Group (CREG), federal mineral royalties for production in the state were $879 million in Fiscal Year 2010, $942 million in Fiscal Year 2011, and $955 million in Fiscal Year 2012 (CREG 2013). This includes royalties from oil, gas and gas plant products, and coal, including coal lease bonuses. Royalty revenues were lower than in previous years due to reduced drilling activity from the national recession and other factors. CREG projects a slight increase in the next few years (CREG 2013).

Local counties and communities receive severance taxes and federal mineral royalties. Table 3-81 lists the federal mineral royalties disbursements received by the Planning Area counties between 2004 and 2009, and Table 3-82 lists severance tax disbursements to these counties between 2004 and 2012. Small amounts of state severance taxes are also distributed to towns, but are not included in these figures.

Table 3-81. Disbursements of Federal Mineral Royalties by Planning Area Counties, for Production Years 2004-2009

Fiscal Year	Big Horn County	Hot Springs County	Washakie County	Park County	Total
2004	$2,555,612	$3,327,735	$1,491,388	$9,220,666	$16,595,401
2005	$4,656,727	$4,470,292	$1,651,277	$12,243,560	$23,021,856
2006	$4,945,953	$6,025,658	$4,659,127	$19,098,545	$34,729,283
2007	$3,688,612	$7,249,080	$3,302,493	$15,814,298	$30,054,483
2008	$6,127,423	$11,510,917	$4,568,479	$24,614,706	$46,821,524
2009	$4,163,525	$7,614,451	$2,485,727	$15,301,272	$29,564,975

Source: Schaeffer 2010

Table 3-82. Disbursements of Severance Tax by Planning Area Counties, for Production Years 2004-2012

Fiscal Year	Big Horn County	Hot Springs County	Washakie County	Park County	Total
2004	$176,732	$133,476	$169,798	$289,455	$769,461
2005	$164,947	$106,791	$150,672	$303,648	$726,057
2006	$173,411	$115,818	$163,855	$312,518	$765,602
2007	$178,450	$117,265	$174,591	$317,072	$787,378
2008	$169,861	$108,850	$163,584	$306,868	$749,163
2009	$156,170	$94,806	$146,158	$291,446	$688,580
2010	$160,673	$92,283	$154,392	$299,481	$706,829
2011	$157,206	$89,636	$149,965	$291,595	$688,402
2012	$149,931	$84,085	$141,686	$277,107	$652,809

Sources: Wyoming State Treasurer's Office 2010; Wyoming State Treasurer's Office 2011; Wyoming State Treasurer's Office 2012; Wyoming State Treasurer's Office 2013.

Property Tax and Sales Tax Base (Tax Revenues)

Another way to look at the contributions of different industries in the Planning Area is to consider how different economic sectors contribute to local and state property values for the purpose of property tax levies, and also to local and state sales taxes. The fiscal stability of local and state government, as well as the economic viability of communities themselves, depends on the viability and stability of local industry and commerce. Table 3-83 shows local and state assessed property valuation in 2012 for the Planning Area counties and Wyoming. Table 3-84 shows local and state sales tax revenues by sector for each of the counties.

Table 3-83. Local and State Assessed Property Valuation, 2012

County	Total ($ millions)	Agricultural	Residential	Commercial	Mineral	Industrial
Local Assessed Valuation						
Big Horn County	$90	17%	59%	15%	5%	5%
Hot Springs County	$45	8%	58%	17%	15%	2%
Park County	$336	5%	73%	16%	4%	2%
Washakie County	$78	10%	59%	16%	5%	10%
State of Wyoming	$7,640	3%	55%	15%	24%	2%
State Assessed Valuation						
Big Horn County	$192	0%	0%	0%	94%	6%
Hot Springs County	$203	0%	0%	0%	95%	5%
Park County	$563	0%	0%	0%	97%	3%
Washakie County	$70	0%	0%	0%	84%	16%
State of Wyoming	$17,602	0%	0%	0%	92%	8%
Total (State and Local) Assessed Valuation						
Big Horn County	$282	5%	19%	5%	66%	5%
Hot Springs County	$248	1%	11%	3%	81%	4%
Park County	$899	2%	27%	6%	62%	3%
Washakie County	$148	5%	31%	8%	43%	13%
State of Wyoming	$25,243	1%	17%	5%	71%	6%

Source: Wyoming DOR 2012

Table 3-84. State and Local Sales Tax Collections by Sector, 2012

Sector	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
Agriculture, Forestry, Fishing, and Hunting	0.03%	0%	0.1%	0.1%	0.04%
Mining	17%	12%	6%	9%	19%
Utilities	8%	9%	6%	7%	4%
Construction	2%	1%	1%	1%	2%
Manufacturing	3%	1%	3%	3%	3%
Wholesale Trade	15%	9%	6%	9%	11%
Retail Trade	27%	35%	41%	35%	31%
Transportation and Warehousing	0.1%	-1%	-0.1%	0.03%	0.1%
Information	4%	4%	2%	6%	2%
Financial Activities	3%	2%	3%	4%	5%
Professional and Business Services	1%	0.3%	1%	1%	1%
Educational and Health Services	0.01%	0.03%	0.1%	0.01%	0.1%
Leisure and Hospitality	5%	14%	18%	9%	10%
Other Services	6%	4%	3%	5%	5%
Public Administration	8%	9%	9%	10%	6%
Total ($ millions)	**$8.2**	**$4.6**	**$23.2**	**$8.2**	**$857.8**

Source: Wyoming Economic Analysis Division 2012b

Note: A negative value indicates a refund larger than collections.

Together, the data on sales tax collections and that on property tax valuations by sector provide insight into the economic base of the counties. Retail trade contributes the largest share of sales tax revenues in all four counties. Large shares are also contributed by several other sectors: wholesale trade, utilities, mining, leisure and hospitality, and public administration. Mineral and mining-related property provides the most important contributor to state and local assessed valuation for property taxes, with residential property the second most important contributor.

Separate data on sales tax revenues from retail trade, accommodation, and food sales (Table 3-85) provide some additional insight into the contribution from elements related to travel and tourism, specifically: eating and drinking places and lodging. (A portion of tax collections from eating and drinking places also accrue from local residents, and a portion of gasoline station tax collections would also accrue from tourists and business travelers.) These data suggest that travel and tourism provide an important contribution to sales tax collections in the Planning Area counties.

Dean Runyan Associates, working for the Wyoming Office of Travel and Tourism, estimated that statewide in 2011, travel and tourism from business and recreational visitors accounted for $68 million in state sales, use, and lodging tax revenues and $52 million in local sales, use, and lodging tax revenues, not including property tax collections related to recreation infrastructure (Dean Runyan Associates 2012). This estimate is based on the data above, as well as additional survey data from a variety of sources. Table 3-86 shows tax receipts due to travel and tourism for the counties in the Planning Area.

Local taxes include room taxes, local sales taxes, and the local share of state taxes. State taxes include the state share of the sales tax and the state motor fuel tax (Dean Runyan Associates 2012).

Table 3-85. Retail, Accommodation, and Food Sales: State and Local Sales Tax Collections, 2012

Sector	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
Auto Dealers and Parts	10%	2%	5%	13%	10%
Building Material and Garden Supplies	19%	37%	14%	18%	15%
Clothing and Shoe Stores	1%	1%	3%	2%	3%
Department Stores	1%	0.2%	2%	0.4%	3%
Eating and Drinking Places	12%	16%	18%	14%	16%
Electronic and Appliance Stores	5%	2%	3%	4%	4%
Gasoline Stations	18%	6%	4%	4%	7%
General Merchandise Stores	5%	7%	14%	11%	13%
Grocery and Food Stores	9%	4%	5%	7%	3%
Home Furniture and Furnishings	2%	1%	2%	3%	2%
Liquor Stores	0.5%	1%	2%	1%	2%
Lodging Services	4%	11%	12%	5%	8%
Miscellaneous Retail	14%	11%	19%	18%	15%
Total ($ millions)	**$2.7**	**$2.2**	**$13.6**	**$3.6**	**$351.6**

Source: Wyoming Economic Analysis Division 2012b

Table 3-86. Local and State Tax Receipts Due to Travel and Tourism in Wyoming, 2012 ($ millions)

Locality	Local Tax Receipts	State Tax Receipts
Big Horn County	$0.3	$0.8
Hot Springs	$0.4	$0.7
Park County	$3.7	$5.6
Washakie County	$0.2	$0.5
State of Wyoming	$52.0	$68.0

Source: Dean Runyan Associates 2012

Table 3-87 provides trends of local and state tax receipts due to travel and tourism for the Planning Area counties from 2004 through 2011. Note that the data in the table are in current dollars, that is, are not adjusted for inflation. The table shows that local and state tax receipts rose slowly between 2004 and 2008 for all four Planning Area counties and for the state, then dipped slightly in 2009 for the state (but generally remained stable in the four Planning Area counties) and has remained relatively stagnant since, with the exception of a small increase in Park County. Among the four counties, tax receipts are also consistently highest in Park County.

Table 3-87. Local and State Tax Receipts Due to Travel and Tourism, 2004-2011 ($ millions)

County	2004	2006	2008	2009	2010	2011
Local Tax Receipts						
Big Horn	$0.2	$0.3	$0.3	$0.3	$0.3	$0.3
Hot Springs	$0.3	$0.4	$0.5	$0.4	$0.5	$0.4
Park	$2.4	$2.7	$3.3	$3.3	$3.6	$3.7
Washakie	$0.1	$0.1	$0.2	$0.2	$0.2	$0.2
Wyoming	$33.0	$41.0	$45.0	$43.0	$45.0	$52.0
State Tax Receipts						
Big Horn	$0.7	$0.7	$0.8	$0.8	$0.8	$0.8
Hot Springs	$0.5	$0.7	$0.7	$0.7	$0.7	$0.7
Park	$4.2	$4.4	$5.3	$5.3	$5.6	$5.6
Washakie	$0.4	$0.4	$0.5	$0.5	$0.5	$0.5
Wyoming	$53.0	$63.0	$71.0	$66.0	$65.0	$68.0

Source: Dean Runyan Associates 2012

Note: Data are in current dollars (i.e., are not adjusted for inflation).

3.8.3 Health and Safety

The BLM's Hazard Management and Resource Restoration Program addresses a variety of hazards on public surface to reduce risks to visitors and employees. Hazards may include hazardous materials; mine shafts and adits; abandoned equipments and structures; explosives and munitions; and spills from pipelines, tankers, and storage tanks. Activities directed toward health and safety concerns in the Planning Area primarily encompass AMLs, natural geologic hazards, and hazardous wastes and materials.

Natural geologic hazards include landslides and earthquakes. A wide range of permitted uses that occur on BLM-administered public lands have the potential to introduce hazardous substances and petroleum products into the environment.

Abandoned Mine Lands

Extreme physical hazards are common at abandoned mine sites, and for visitors, these hazards are not always apparent. Abandoned mine sites have proven to be a luring and sometimes life-threatening attraction for both children and adults. Serious injury or death can occur at these sites. The presence of such sites can compromise other land uses and land quality. The following paragraphs identify some of the common physical hazards posed by AML sites (Wyoming DEQ, Abandoned Mine Land Division 2009a).

Horizontal openings: The mine opening (known as a portal or adit) might seem stable, but rotting timbers and unstable rock formations make cave-ins a real danger. The darkness and debris in old mines make identification of the hazards difficult.

Vertical shafts: These can be hundreds of feet deep. At the surface, openings can be hidden by vegetation or covered by rotting boards or timbers. Inside old mines, shafts can be camouflaged by debris or hidden by darkness in the mine.

Explosives and toxic chemicals: Blasting caps, dynamite, and chemicals were often left behind when the mine workings were abandoned. Explosives become unstable with age, and can be detonated by the vibration of footsteps. Abandoned chemicals such as cyanide, arsenic, mercury, and other deadly toxins could be present in leaking and deteriorating containers.

Dangerous gases: Lethal concentrations of CH_4, CO, CO_2, and H_2S (to name a few) can accumulate in underground passages. Oxygen-deficient air can cause suffocation. People have died within a few feet of the mine openings.

Water: Impounded water can be highly alkaline or acidic (resulting in skin burns), and deep and cold (contributing to hypothermia).

Spoil (rock and dirt) piles: These loose piles can collapse or slide, burying an unsuspecting victim.

Equipment and buildings: Abandoned surface structures and old mine equipment can collapse on bystanders.

Highwalls: These are the excavated vertical cliffs in surface pits and quarries. They can be unstable and prone to collapse. Highwalls might not be visible from the top, presenting a danger to off-road drivers.

Radon: Radon is a natural radioactive decay product and is known to be a factor in some lung cancers. Radon can accumulate in high concentrations in poorly ventilated mines.

Wildlife: Rattlesnakes, bears, cougars, and other wildlife frequent old mine sites.

Disorientation: There is no natural light inside mine workings. Many mine workings meandered as miners followed an ore vein. It is easy to get lost and become disoriented in a maze of mine workings, especially if lighting equipment fails.

Mine fire areas: Mine fires create surface hazards in abandoned coal mine areas. As fires burn within the seam, fissures can open to the surface and deliver deadly gases into the atmosphere. The area around the fissure might not be capable of supporting the weight of a human or vehicle, and could collapse into the burning coal or the mine void.

Abandoned mines are a common feature on BLM-administered lands. Approximately 380 potential AML sites have been identified in the Planning Area based on site data from a Wyoming DEQ, AML Division, database; more than 30 of those sites were visited and found to have no trace of past mining activity (Wyoming DEQ, Abandoned Mine Land Division 2008). Map 95 identifies potential AML sites in the

Planning Area. Potential sites are identified using published information, maps, aerial photography, and reporting by the public and surface management agencies. The Wyoming DEQ, AML Division, is performing a quality assurance review to update information on AML sites that have undergone reclamation; therefore, the location and number of reclaimed sites in the Planning Area cannot be accurately assessed at this time.

The BLM Wyoming State Office has a prioritized list of AML sites that pose the greatest risk to people and the environment. AML sites affecting water quality are addressed using the watershed approach. Using this approach accomplishes the following objectives:

- Allows for mitigation to be risk-based by identifying priority sites first.
- Fosters collaborative efforts across federal, state, and private administrative boundaries.
- Considers all issues important to water resource protection.
- Reduces the cost of mitigation.
- Provides the most efficient method of remediating AML sites by utilizing a wide range of available resources.

Recently, several AML sites in the Planning Area were identified, inventoried, and reclaimed. Abandoned sulfur mine workings, and a dangerous embankment related to pre-law gypsum mining, were reclaimed in 2006 and 2007. A current AML project involves identifying and inventorying old coal mine workings in the Bighorn Basin. In 1999, the BLM and the Wyoming DEQ, AML Division, signed a cooperative agreement that further facilitated the reclamation of AML sites on BLM-administered lands. The state program, as required by the Surface Mining Control and Reclamation Act of 1977, focuses on public safety hazards. In addition, the BLM has received some funding for its soil, water, and air program to address site-specific environmental hazards and watershed concerns associated with abandoned mines. By combining available funding, the BLM can continue to comprehensively address safety hazards and environmental impacts to water quality and watershed function at priority AML sites. In this collaborative partnership approach, the BLM and the Wyoming DEQ, AML Division, are undertaking several AML reclamation projects on public lands in the Planning Area.

The Wyoming DEQ, AML Division, works closely with federal land management agencies, private land owners, and the general public to ensure that the views of all interested parties are considered in the reclamation process. According to an August 2007 fact sheet, the Wyoming DEQ, AML Division, operated with an approximately $109 million budget in 2008, and a projected $69 to $149 million annual budget for calendar years 2009 through 2015 (Wyoming DEQ, Abandoned Mine Land Division no date). The Wyoming DEQ, AML Division, will use these funds to identify and reclaim AMLs and to construct public works projects in communities adversely affected by mining activities. According to the Wyoming DEQ, AML Division, Coordinator, the state AML program will focus on abandoned coal mines in the foreseeable future (Wyoming DEQ, Abandoned Mine Land Division 2009b). The BLM will continue to identify and remediate the hazards of abandoned mines, in concert with the Wyoming DEQ, AML Division and on its own.

Natural Geologic Hazards

Natural geologic hazards (geo-hazards) include active fault or seismic zones; areas prone to landslides; subsidence due to coal fires; over-pressured subsurface oil, gas, or groundwater zones; and potentially toxic minerals and assemblages such as selenium; and shrinking and swelling clay soils. There are several naturally occurring geologic hazards in the Planning Area. These include primarily down-slope

movements such as slumps, landslides and rock-fall, and flood-related hazards, shrinking and swelling clays, and potentially seismic zones.

Earthquakes and landslides are generally identified and forecast through USGS earthquake and landslide hazards programs. The Wyoming Geological Survey Surficial Processes/Geological Hazards Section is dedicated to the study and publication of information about geologic hazards in the state of Wyoming. There is a large amount of information about the likelihood of numerous natural geological hazards on the Wyoming Geological Survey and USGS websites.

Gravity influences soils and loose rock or colluvium on slopes in the Planning Area. When these materials are saturated with water, they can creep slowly down slopes or move suddenly with devastating results. Rapidly moving landslides can be triggered by a rainstorm or a seismic event such as an earthquake. Earthquakes of varying magnitude have affected the Bighorn Basin over time. Other types of natural geologic hazards affecting the Planning Area include active faults, shrinking and swelling soils, and flooding.

The occurrence of landslides depends directly on slope stability and precipitation quantities (normal versus drought conditions). Therefore, the recent drought has led to a decrease in landslides in the Planning Area.

Hazardous Wastes and Materials

The BLM investigates spills, illegal dumping, and hazardous materials releases to determine the need for immediate cleanup or other long-term remediation actions. This often involves working with the EPA, the Wyoming DEQ, and potentially responsible parties to fund and expedite the cleanup of hazardous sites and disposal activities that result from recreational use and industrial activities such as oil and gas development. The field offices in the Planning Area have an effective hazard management and resource restoration program.

There have been 31 response actions on public lands in the Planning Area since 1993 – 8 incidents involving the illegal disposal of unknown substances, more than 12 incidents of wire burns, 5 incidents involving abandoned facilities with the potential for the release of hazardous substances, 1 polychlorinated biphenyl spill, 2 incidents involving the discovery of explosives, and 3 incidents involving potential unexploded seismic charges.

Landfill management also has been a health and safety priority for the last 20 years. Six permitted municipal landfills in the Planning Area (Burlington, Hyattville, Manderson, Thermopolis, Shell, and Westside) have closed during this period, as have three industrial landfills (two permitted to the Marathon Oil Company in Grass Creek and Gebo for oil field refuse and one permitted to Georgia-Pacific Corporation for a bentonite mine and sheet rock manufacturing facility near Lovell). Three operating landfills (Worland, South Bighorn, and Ten Sleep) have transferred from federal to local ownership. The Cody landfill is in the process of transfer to Park County. The Wyoming DEQ, Hazardous and Solid Waste Division, is investigating all operating and closed landfills for groundwater contamination.

Due to the pollution hazards associated with shooting ranges, ranges permitted on public lands in the Planning Area are also being transferred out of federal ownership. The Worland shooting range was transferred into private ownership in 2000. Additionally, the Cody Shooting Complex was transferred to Park County in 2010, and the Powell Shooting Complex was transferred to the Powell Recreation District in 2014.

Increased awareness has led employees and the public to report more hazmat incidents. This awareness and reporting has led to the cleanup of old dump sites and abandoned facilities.

3.8.4 Environmental Justice

Minority Populations

BLM IM 2002-164, Guidance to Address Environmental Justice in Land Use Plans and Related NEPA Documents provides policy and guidance for addressing environmental justice in BLM land use planning (BLM 2002b). IM 2002-164 defines minority persons as "Black/African American, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, and other non-white persons." Furthermore, IM 2002-164 states that an area should be considered to contain a minority population where the minority population of the affected area exceeds 50 percent, or the percentage of minority population in the affected area is meaningfully greater than the percentage in the general population.

Populations of the four counties in the Planning Area are predominantly white and non-Hispanic. Table 3-88 lists the percentage of minority population in the counties in the Planning Area in 2000 and 2010, and the percentage of people in poverty in 2000 and in the 2007-2011 five year period. This five year period was used because poverty data for towns (discussed further below) is only available from the five-year American Community Survey. Although minority populations increased slightly from 2000 to 2010, three of the four counties have a larger proportion of non-Hispanic white residents than do the state or the country. Washakie County is the sole exception; it has a slightly higher proportion of non-Hispanic white residents than the state, although a lower proportion than the United States. Poverty data are discussed later in this section.

Table 3-88. Minority Populations in 2000 and 2010; Low-Income Populations in 2000 and 2007-2011 by County

County	Percent Minority Population in 2000	Percent Minority Population in 2010	Percent in Poverty in 2000	Percent in Poverty in 2007-2011
Big Horn County	8	11	14	9
Hot Springs County	5	5	11	14
Park County	5	7	13	9
Washakie County	14	16	14	9
State of Wyoming	11	14	11	10
United States	31	36	12	14

Sources: U.S. Census Bureau 2000; U.S. Census Bureau 2010f; U.S. Census Bureau 2011c.

Table 3-89 lists population by race and ethnicity by town in the Planning Area in 2000 and 2010. The table shows that there is important variation in minority population percentages in the counties, because some individual towns have higher (and lower) percentages of minority residents compared to their respective counties. In 2000, Worland, Burlington, Powell, Greybull and Byron had the largest percentages of minority residents, and Ten Sleep, Meeteetse, and Kirby had the smallest percentages. The table also shows that in eleven of the seventeen towns in the Planning Area, the percent of minority residents increased between 2000 and 2010.

Table 3-89. Minority and Low-Income Populations in 2000 and 2010 by Counties and Towns in the Planning Area

County/Town	Percent Minority Population in 2000	Percent Minority Population in 2010	Percent in Poverty in 2000	Percent in Poverty in 2010
Big Horn County	8	11	14	9
Basin	5	9	12	6
Burlington	12	15	15	11
Byron	15	13	23	21
Cowley	4	5	7	5
Deaver	10	7	10	9
Frannie	8	12	7	28
Greybull	7	13	15	11
Lovell	11	13	15	7
Manderson	8	11	14	13
Hot Springs County	5	5	11	14
East Thermopolis	9	7	17	14
Kirby	9	4	12	0
Thermopolis	6	5	10	19
Park County	6	7	13	9
Cody	4	6	14	11
Meeteetse	4	4	11	10
Powell	8	13	20	11
Washakie County	14	16	14	9
Ten Sleep	1	3	7	13
Worland	16	19	15	11
State of Wyoming	11	14	11	10

Sources: U.S. Census Bureau 2000; U.S. Census Bureau 2010f; U.S. Census Bureau 2011c.

Table 3-90 lists population by race and ethnicity in the Planning Area for major racial and ethnic groups. The largest ethnic or racial group other than non-Hispanic whites in any of the counties is Hispanic or Latino (of any race). In all four counties in the Planning Area, the percent of people in this ethnic group is lower than for the state as a whole. Most ethnic and racial groups other than non-Hispanic white comprise a very small proportion of populations in Planning Area counties. Note that Hispanic/Latino denotes an ethnicity, and people of this ethnic background can be of any race.

Table 3-90. Racial and Ethnic Groups in Planning Area Counties and Wyoming, 2010 (percent)

Race or Ethnicity	Big Horn County	Hot Springs County	Park County	Washakie County	State of Wyoming
Non-Hispanic, White	89	95	93	84	86
Non-Hispanic, Black	0.2	0.2	0.2	0.3	1
Non-Hispanic, American Indian/ Alaska Native	1	1	1	1	2
Non-Hispanic, Asian, Native Hawaiian, or Other Pacific Islander	0.3	0.4	1	1	0.1
Non-Hispanic, two or more races	1	1	1	1	2
Hispanic or Latino (of any race)	8	2	5	14	16

Source: U.S. Census Bureau 2010f

Low-Income Populations

BLM IM 2002-164 states that low-income populations can be identified according to poverty thresholds published by the U.S. Census Bureau. In addition, the IM notes that "when considering these definitions, it is important to recognize that some low-income and minority populations may comprise transitory users of the public lands and thus not associated with a particular geographic area" (BLM 2002b).

The Council on Environmental Quality (CEQ) guidance for environmental justice analysis under NEPA defines a "low-income population" as "either a group of individuals living in geographic proximity to one another, or a set of individuals (e.g., migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect" (CEQ 1997a). Although CEQ guidance does not provide a quantitative threshold (e.g., a limit on the percent of persons in poverty) for determining whether a population should be considered low-income, typically the percent of persons in poverty in the Planning Area is compared to that in a larger area such as the state. CEQ and BLM guidance do not specify quantitative criteria for what constitutes a low-income population.

As Table 3-88 shows, the percentage of people with income below the poverty level ranged between 9 and 14 percent for all counties in the Planning Area in the 2007-2011 period, and three of the four counties saw a reduction in poverty from 2000 to 2007-2011 (all except Hot Springs, in which the percent of people in poverty increased). In all but Hot Springs County, the percentage of people in poverty in 2007-2011 was slightly lower than in the state as a whole. In Hot Springs County the percentage of people in poverty in 2007-2011 was higher than in the state as a whole and similar to that in the United States as a whole.

The town-level data in Table 3-89 also show reductions in the percentage of people living in poverty in most towns between 2000 and 2007-2011. Because town-level data have a considerable margin of error, these data must be understood as the best data available, but very imprecise indicators of the actual poverty levels in towns. Based on these data, concentrations of people living in poverty were present in Byron, Frannie, and Thermopolis where the percentage of people in poverty exceeded averages for both the United States and the State of Wyoming.

3.8.5 Tribal Treaty Rights

Tribal roles and responsibilities are not well defined in the Planning Area. The Wind River Reservation, Wyoming's only reservation, houses two federally recognized tribes, the Eastern Shoshone and the Northern Arapaho. Although the modern boundaries of the reservation do not coincide with the Planning Area, historically, reservation boundaries entered into the Planning Area. The Wind River Reservation formerly extended along Owl Creek to its confluence with the Bighorn River in what is now Hot Springs County. The Crow Reservation in Montana formerly extended south to Shell Creek in what is now Big Horn County. At present, there are no identified treaty rights in the Planning Area. The BLM is committed to working with tribes as cooperating agencies and in formal consultations.

Judicially established lands are defined based on information provided by the Indian Claims Commission and approximating tribal lands that are determined by ethnographic and historic literature. The National Park Service (NPS 1993) indicates that the Crow judicially established lands encompass the Planning Area. Other tribes have judicially established land near, but outside, Planning Area boundaries. Although tribes have not explicitly identified traditional use areas in the Planning Area, this does not mean that such areas do not exist. Some site types present in the Planning Area, including rock art, form an integral part of traditional practices.

The following tribal political entities have expressed interest in consulting with the CYFO and the WFO regarding Native American issues and concerns. In some cases, if the tribe is willing, the BLM is developing MOUs regarding consultation for activities in the Planning Area.

- Blackfeet, living on the Blackfeet Reservation, Browning, Montana.
- Crow, living on the Crow Reservation, Crow Agency, Montana.
- Nez Perce, living on the Nez Perce Reservation, Lapwai, Idaho.
- Northern Arapaho, living on the Wind River Reservation, Fort Washakie, Wyoming.
- Northern Cheyenne, living on the Northern Cheyenne Reservation, Lame Deer, Montana.
- Salish and Kootenai, living on the Flathead Reservation, Pablo, Montana.
- Shoshone, represented by two tribes (Eastern Shoshone, living on the Wind River Reservation, Fort Washakie, Wyoming; Shoshone Bannock, living on the Fort Hall Reservation, Fort Hall, Idaho).
- Sioux, represented by three tribes (Cheyenne River Sioux living on the Cheyenne River Reservation, Eagle Butte, South Dakota; Oglala Sioux, living on the Pine Ridge Reservation, Pine Ridge, South Dakota; Rosebud Sioux, living on the Rosebud Reservation, Rosebud, South Dakota).

There are no trust lands, reservation lands, or tribal properties in the Planning Area. A number of treaties and policies did affect tribes in the region, but existing conditions do not reserve any lands or rights in the Planning Area. Treaties and policies included the First Treaty of Fort Laramie, the Blackfeet Treaty of 1855, the Hellgate Treaty, the Homestead Act of 1862, the Second Treaty of Fort Laramie, the Sioux Act of 1888, the Dawes Act, and the Indian Reorganization Act of 1934.

Trust Responsibilities

Secretarial Order No. 3215, "Principles for the Discharge of the Secretary's Trust Responsibility" (April 28, 2000) defines trust responsibility as responsibility toward Indian trust assets, which it defines as "lands, natural resources, money, or other tangible assets held in trust for Indian tribes and individual Indians or restricted against alienation." Therefore, the BLM "has overall responsibility for establishing, implementing, and evaluating policy for meeting…tribal consultation responsibilities" (BLM 2004e). This obligation requires a reasonable and good faith effort to identify and consider, and to carry out programs in a manner sensitive to and consistent with, Native American concerns and tribal government planning and resource management programs.

Treaty Rights and Trust Responsibilities Policy

A treaty is a formal agreement between the U.S. Government and a Native American tribe or tribes that cede land or reserve rights to the tribe(s). Executive Order 13084, Consultation with Indian Tribal Governments, and Executive Order 13007, Indian Sacred Sites, provide the framework for involving Native American tribes in the BLM planning process. BLM Manual 8120, Tribal Consultation Under Cultural Resource Authority, provides additional guidance (BLM 2004e).

Although there are no tribal government lands in the Planning Area, the BLM consults with tribes who have expressed interest in or concerns about the Planning Area to determine which groups intend to continue with government-to-government consultations. This process is ongoing.

3.9 Climate Change

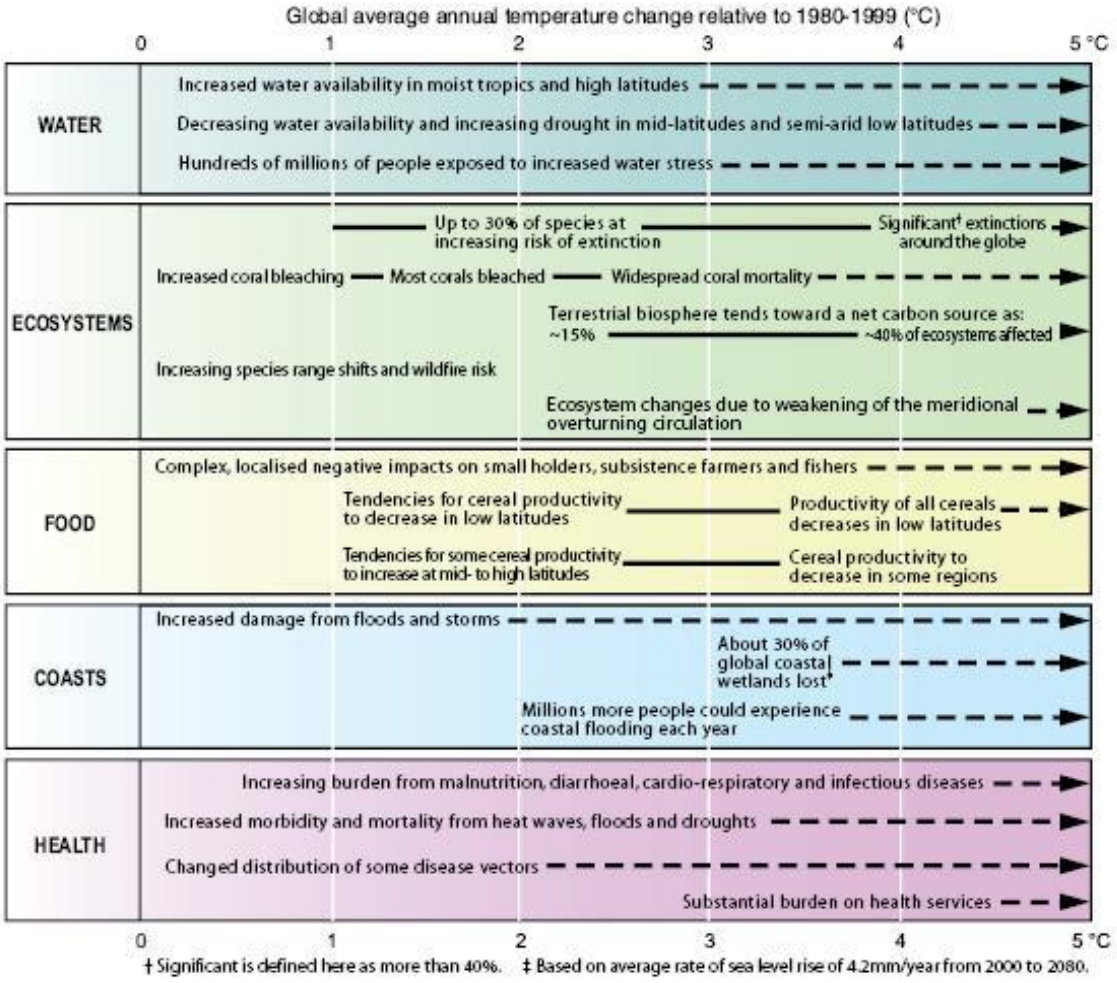
A growing body of evidence indicates that Earth's atmosphere is warming. Records show that surface temperatures in the Wyoming region have risen approximately 1.5°F since the 1960 to 1979 baseline years (Global Change Research Program 2009). The largest increase in average temperature has occurred in the winter months in the northern portions of the region. Relatively cold days in the region are becoming less frequent and relatively hot days are becoming more frequent (Global Change Research Program 2009). Observed changes in oceans, ecosystems, and ice cover are consistent with this warming trend (National Academy of Sciences 2006). Ongoing scientific research has identified the potential impacts of GHG emissions, including CO_2, CH_4, nitrous oxide (N_2O), water vapor and several trace gases, on global climate change. Through complex interactions at regional and global scales, these GHG emissions cause a net warming of the atmosphere (which makes surface temperatures suitable for life on Earth), primarily by decreasing the amount of heat energy Earth radiates back into space. Although GHG concentrations in the atmosphere and climatic conditions have varied throughout Earth's history, recent industrialization and burning of fossil fuels has caused global atmospheric CO_2 concentration to increase dramatically; this most recent CO_2 increase is likely to contribute to overall climatic changes (National Academy of Sciences 2006).

Global atmospheric concentrations of CO_2, CH_4, and N_2O have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values (as determined from ice cores spanning many thousands of years). The global increase in CO_2 concentrations is due primarily to fossil fuel use and land use change, while those of CH_4 and N_2O are due to agricultural soil management, animal manure management, sewage treatment, and mobile and stationary combustion of fossil fuels (IPCC 2007a, EPA 2009).

According to climate change researchers, the effects of climate change are expected to vary by region, season, and time of day (National Academy of Sciences 2006, Global Change Research Program 2009). Computer model forecasts indicate that increases in temperature will not be evenly or equally distributed, but are likely to be accentuated at higher latitudes. Warming during winter is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures (National Academy of Sciences 2006). Within a given region, increasing temperatures also could affect the amount of water vapor in the atmosphere, the timing and amount of precipitation, the intensity of storm systems, snow melt, and soil moisture. All of these factors can affect climate, day-to-day weather conditions, and air quality in the Planning Area.

Based on research compiled for the International Panel on Climate Change Fourth Assessment Report, 2007, (IPCC 2007a) potential effects of climate change on resources in the affected environment are likely to be varied. Figure 3-38, taken from the Fourth Assessment Report indicates varying responses of the natural world to increasing temperatures as a result of increasing global temperatures.

Figure 3-38. Examples of Impacts Associated with Global Average Temperature Change



Source: IPCC 2007a

Within North America, the report specifically forecasts that: warming in western mountains is projected to cause decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition for over-allocated water resources; in the early decades of the century, moderate climate change is projected to increase aggregate yields of rain-fed agriculture by 5 to 20 percent, but with important variability among regions; major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilized water resources; cities that currently experience heat waves are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts; and coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Specific modeling and/or assessments of the potential effects for the Bighorn Basin and for the state of Wyoming currently do not exist.

All of North America is likely to experience an increase in average temperature during the next 100 years, and annual mean warming is likely to exceed global mean warming in most areas (IPCC 2007a). Temperatures in the Planning Area are projected to increase substantially by the end of this century

(Global Change Research Program 2009). Summer temperatures in the Planning Area are expected to increase between approximately 7°F and 10+°F by 2080 to 2099. Overall, temperature in the region that includes the Planning Area is projected to increase between 2.5°F to more than 13°F compared to the 1960 to 1979 baseline, depending on future GHG emissions (Global Change Research Program 2009). This range of temperature increase reflects the current uncertainty in climate change modeling and represents the likely range of model projections, although lower or higher outcomes are possible.

The lack of scientific tools (models with sufficient spatial and temporal resolution) to forecast climate change even at regional scales limits the ability to quantify current and future impacts of climate change in the Planning Area. The following paragraphs describe potential future effects of climate change that can be reasonably anticipated for the Planning Area; however, some of these effects might already be occurring in the area.

Increasing temperatures in the Planning Area are likely to contribute to increased evaporation, drought frequencies, and declining water quantity. The warming of lakes and rivers will adversely affect the thermal structure and water quality of hydrological systems, which will add additional stress to water resources in the region (IPCC 2007b). The Planning Area depends on temperature-sensitive springtime snowpack to meet demand for water from municipal, industrial, agricultural, recreational uses and BLM-authorized activities. The USGS notes that mountain ecosystems in the western United States are particularly sensitive to climate change, especially in the higher elevations, where much of the snowpack occurs, which have experienced three times the global average temperature increase over the past century (USGS 2010). Higher temperatures are causing more winter precipitation to fall as rain rather than snow, which contributes to earlier snowmelt. Additional declines in snowmelt associated with climate change are projected, which would reduce the amount of water available during summer (Global Change Research Program 2009). Rapid spring snowmelt due to sudden and unseasonal temperature increases can also lead to greater erosive events and unstable soil conditions.

Increases in average summer temperatures and earlier spring snowmelt in the Planning Area are expected to increase the risk of wildfires by increasing summer moisture deficits (Global Change Research Program 2009). Studies have shown that earlier snowmelts can lead to a longer dry season, which increases the incidence of catastrophic fire (Westerling et al. 2006). Together with historic changes in land use, climate change is anticipated to increase the occurrence of wildfire throughout the western United States.

There is evidence that recent warming is impacting terrestrial and aquatic biological systems (IPCC 2007b). Warming temperatures are leading to earlier timing of spring events such as leaf-unfolding, bird migration, and egg-laying (IPCC 2007b). The range of many plant and animal species has shifted poleward and to higher elevation, as the climate of these species' traditional habitat changes. As future changes in climate are projected to be even greater than those in the recent past, there will likely be even larger range shifts in the coming decades (Lawler et al. 2009). Warming temperatures are also linked to earlier "greening" of vegetation in the spring and longer thermal growing seasons (IPCC 2007b). In aquatic habitats, increases in algal abundance in high-altitude lakes have been linked to warmer temperatures, while range changes and earlier fish migrations in rivers have also been observed (IPCC 2007b). Climate change is likely to combine with other human-induced stress to further increase the vulnerability of ecosystems to other pests, invasive species, and loss of native species. Climate change is likely to affect breeding patterns, water and food supply, and habitat availability to some degree. Sensitive species in the Planning Area, such as the sage-grouse, which are already stressed by declining habitat, increased development and other factors, could experience additional pressures as a result of climate change.

More frequent flooding events, erosion, wildfires and hotter temperatures all pose increased threats to cultural and paleontological sites and artifacts. Heat from wildfires, suppression activities and equipment, as well as greater ambient daytime heat can damage sensitive cultural resources. Similarly, flooding and erosion can wash away artifacts and damage cultural and paleontological sites. However, these same events may also uncover and lead to discoveries of new cultural and paleontological localities.

Climate change also poses challenges for many resource uses on BLM-administered land. Increased temperatures, drought and evaporation may reduce seasonal water supplies for livestock and could impact forage availability. However, in non-drought years, longer growing seasons resulting from thermal increases may increase forage availability throughout the year. Shifts in wildlife habitat due to climate change may influence hunting and fishing activities, and early snowmelt may impact winter and water-based recreational activities. Drought and resulting stress on vegetation could increase the frequency and intensity of mountain bark beetle and other insect infestations, which further increases the risk of fire and reduces the potential for sale of forest products on BLM-administered lands.

A variety of activities in the Planning Area currently generate GHGs. Fuels combustion, industrial processes and any number of other activities on public lands result in direct emissions of GHGs. Direct emissions in the Planning Area include those related to current and ongoing oil and gas and other minerals development, fire events, motorized vehicle use (e.g., OHVs), livestock grazing, facilities development, and other fugitive emissions. Indirect GHG emissions in the Planning Area include the demand for electricity generated outside the area. Contributions to climate change also result from land use changes (conversion of land to less reflective surfaces that absorb heat, such as concrete or pavement), and soil erosion (which can reduce snow's solar reflectivity and contribute to faster snowmelt).

Climate change science and projections of climate change is a continually growing and emerging science. Additional and recent information on climate change and regional projections of climate change for the Planning Area can be found through the following links:

- U.S. Global Change Research Program: http://www.globalchange.gov/
- Intergovernmental Panel on Climate Change (IPCC): http://www.ipcc.ch/

Several federal initiatives have been launched to improve the ability to understand, predict, and adapt to the challenges of climate change. The Secretary of the Interior signed Secretarial Order 3289 on February 22, 2010, establishing a Department-wide, scientific-based approach to increase understanding of climate change and to coordinate an effective response to impacts on managed resources. The order reiterated the importance of analyzing potential climate change impacts when undertaking long-range planning issues, and also established several initiatives including the development of eight Regional Climate Science Centers. Regional Climate Science Centers would provide scientific information and tools that land and resource managers can apply to monitor and adapt to climate changes at regional and local scales (DOI 2010). The North Central Climate Science Center, which will incorporate the Planning Area, has a target establishment date of 2011.

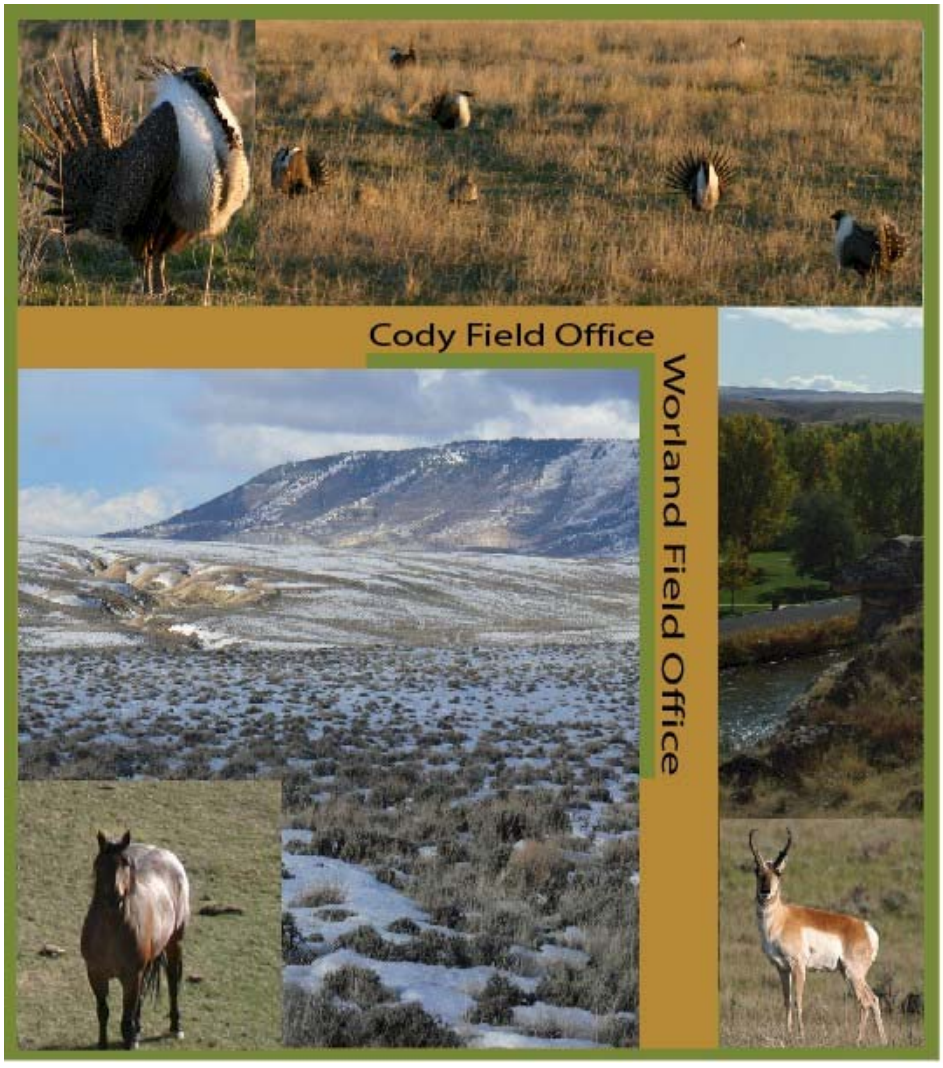
Given the broad spatial influence of climate change which requires response at the landscape-level, the DOI also established Landscape Conservation Cooperatives which are management-science partnerships that help to inform management actions addressing climate change across landscapes. These Cooperatives are formed and directed by land, water, wildlife and cultural resource managers and interested public and private organizations, designed to increase the scope of climate change response beyond federal lands.

Rapid ecoregional assessments are one of the tools the BLM uses to monitor and respond to the effects of climate change. Ecoregional assessments are geospatial landscape evaluations that are designed to identify areas of high ecological value within an ecoregion that may warrant conservation, adaptation, or restoration. These assessments can help to identify resources that are being impacted by climate change and provide information to facilitate the subsequent development of an ecoregional conservation strategy for plants, wildlife and fish communities on public lands. Ecoregional assessments can identify areas, species, and ecological features and services that are sensitive to ecosystem instability and changes in climatic conditions. One of the objectives of the BLM rapid ecoregional assessments is to provide guidance for adaptation and mitigation planning in response to climate change.

In addition to efforts being undertaken to better respond and adapt to climate change, other federal initiatives are being implemented to mitigate climate change. The Carbon Storage Project was implemented to develop carbon sequestration methodologies for geological (i.e., underground) and biological (e.g., forests and rangelands) carbon storage. The project is a collaboration of federal agency and external stakeholders to enhance carbon storage in geologic formations and in plants and soils in an environmentally responsible manner. The Carbon Footprint Project is a project to develop a unified GHG emission reduction program for the DOI, including setting a baseline and reduction goal for the Department's GHG emissions and energy use. More information about DOI's efforts to respond to climate change is available at: www.doi.gov/archive/climatechange/.

Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement



Volume 2 of 4
Chapter 4

May 2015

BLM

Wyoming - Cody & Worland Field Offices

The BLM's multiple-use mission is to sustain the health and productivity of public lands for the use and enjoyment of present and future generations.

The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

BLM/WY/PL-15/013+1610
Volume 2 of 4

Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement

Volume 2 of 4
Chapter 4

U.S. Department of the Interior
Bureau of Land Management
Cody Field Office, Wyoming

and

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Bureau of Land Management
Worland Field Office, Wyoming

May 2015

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CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

This chapter describes environmental consequences that may result from implementing the six alternatives described in Chapter 2. The purpose of this chapter is to determine the potential impacts of the federal action on the human environment. As defined by the Council on Environmental Quality (CEQ) the "human environment" shall be interpreted to include the natural and physical environment and the relationship of people with that environment (40 Code of Federal Regulations [CFR] 1508.14). The federal action is the Bureau of Land Management (BLM) selection of a resource management plan (RMP) on which to base future land use actions.

The analysis of environmental consequences focuses on key planning issues (see Chapter 1) raised during the scoping process rather than providing an encyclopedic discussion of all possible consequences. The organization of Chapter 4 follows the same order as Chapter 3 and allows the reader to compare existing resource conditions (Chapter 3) to potential impacts (Chapter 4) for the same resource. The following describes the organization of information for the analysis of each resource or resource use.

Introduction

The discussion of environmental consequences for each resource program begins with a brief definition of an impact for the resource. When applicable, definitions of the following types of impacts also are included:

Adverse or Beneficial Impacts. When applicable, this chapter differentiates beneficial and adverse impacts. For example, an alternative that increases the number of water sources away from existing rivers and streams is expected to have a beneficial impact on livestock grazing and riparian/wetland areas; however, if this alternative also increases livestock concentration around new water sources, it may adversely impact grassland and shrubland communities by degrading vegetation and compacting soil in these areas. The purpose of presenting both beneficial and adverse impacts for key planning issues is to help the BLM decision maker and readers understand the multiple-use tradeoffs associated with each alternative. However, this chapter does not describe all possible impacts and, unless otherwise stated, assume that impacts described in this chapter would be adverse.

Direct or Indirect Impacts. In general, direct impacts result from BLM-authorized activities and generally occur at the same time and place as the management activity or action causing the impact. For example, for the action of building a road, a direct adverse impact is surface disturbance. Surface disturbance is the impact (the effect) of heavy equipment (the cause) removing existing vegetation as it grades the proposed road location. Indirect impacts often occur at some distance or time from the action. In the example above, an indirect impact could occur days after the surface is disturbed and some distance from the disturbance. Heavy precipitation following vegetation removal and ground disturbance could erode soil and transport sediment into streams. Therefore, the impact to stream water quality would be an indirect adverse impact.

Short- or Long-term Impacts. Where applicable, this chapter describes the short-term or long-term aspects of impacts. For purposes of this RMP, short-term impacts occur during or after the activity or action and may continue for up to 5 years. For example, for the action of a prescribed fire, a short-term adverse impact is loss of vegetative cover. Long-term impacts occur beyond the first 5 years, an approximation of the time required to restore or reclaim an area following surface disturbance. Long-term beneficial impacts of prescribed fire include diversifying vegetation structure and restoring fire-adapted ecosystems to prevent larger, more damaging wildland fires.

Methods and Assumptions

This section describes the methods and assumptions used in the impact analysis for each resource or resource use. Due to the programmatic and strategic nature of the RMP alternatives, the timing and specific location of project-specific actions that could affect resource values are not defined. Moreover, the relationship between cause (future actions) and effect (impact on resources) is not always known or quantifiable. For these reasons, alternative analyses are both qualitative and quantitative, and based on a series of assumptions. The methods and assumptions listed for each section, and in the general assumptions presented below, provide a basis for the conclusions reached in this chapter.

Summary

The summary section for each resource program briefly discusses the overall impacts resulting from implementation of the alternatives and compares the alternatives in terms of their anticipated impact intensity (from greatest to least). The summary section compares impacts among the Action Alternatives (alternatives B, C, D, E, and F) and the No Action Alternative (Alternative A). In some cases, there are no discernible differences in impacts among the alternatives.

Detailed Analysis of Alternatives

The detailed analysis of alternatives describes how each alternative could affect baseline conditions of individual resources on BLM-administered land in the Cody Field Office and Worland Field Office (Planning Area). The alternatives analyses typically describe impacts grouped into broad topic areas and in the following order: surface disturbance, resource uses, special designations, resources, and proactive management actions. Proactive management actions include management actions included to protect or enhance the resource of interest. For example, proactive management actions for soils include requiring topsoil salvage and segregation for all surface-disturbing activities. If an impact analysis does not discuss the effect of a particular allowable use or management action on a given resource, it is because the BLM does not expect impacts or expects impacts to be minimal, or the anticipated impact is outside the scope of this analysis, as described in Chapter 1 of this document.

Cumulative Impacts

Cumulative impacts combine the past and present impacts encompassed in existing conditions described in Chapter 3 with the anticipated incremental impacts of alternatives described in the sections of this chapter and the impacts of reasonable foreseeable actions. The *Cumulative Impacts* section, which appears at the end of this chapter, also includes anticipated incremental impacts of non-BLM reasonable foreseeable actions.

Assumptions Common to All Analyses

The list below identifies assumptions common to all alternatives and all resources. Individual resource sections list assumptions unique to specific resources and resource uses.

- Key planning issues identified in Chapter 1 provide the focus for the scope of impact analyses in this chapter.
- In general, the BLM considers adverse impacts described in this chapter important if they result from or relate to the key planning issues described in Chapter 1 and their context or intensity (see *Glossary*) indicate that they may result in impacts to public health and safety; a potential

for violating legal standards, laws, or protective status of resources; or potential impacts to unique resources.

- The analysis of impacts focuses on the anticipated incremental and meaningful impact of management actions and allowable uses proposed for each alternative. The description of existing conditions in Chapter 3 encompasses the impacts of past and present actions.
- The purpose of the comparison of impacts among resources is to provide an impartial assessment to inform the decision maker and the public. The impact analysis does not imply or assign a value or numerical ranking to impacts. Actions resulting in adverse impacts to one resource may impart a beneficial impact to other resources.
- When adverse impacts to other resources would occur, "on a case-by-case basis" means an action would only be allowed when impacts can be adequately mitigated consistent with other resource goals and objectives.
- For impact analysis, short-term is generally defined as being less than 5 years and long-term as being greater than 5 years, unless otherwise noted for a specific resource; the life of the plan is assumed to be 15 to 20 years.
- Existing state and federal environmental legislation and regulatory programs would remain relatively unchanged and in effect (i.e., analyses are based on current, rather than projected, future regulations).
- To the extent possible and within legal and regulatory parameters, BLM management and planning decisions will be consistent with the planning and management decisions of other agencies, state and local governments, and Native American tribes with jurisdictions intermingled with the Planning Area.
- Funding would be available to implement the alternatives described in Chapter 2.
- The BLM would implement any of the alternatives in compliance with standard practices, best management practices (BMPs) and required design features in Priority Habitat Management Areas (PHMAs) and General Habitat Management Areas (GHMAs) for greater sage-grouse (Appendix L), guidelines for surface-disturbing activities, and mitigation guidelines (Appendix H). The practices and guidelines included in Appendices H and L are a component of each alternative. Appendix H lists standard practices used in the Planning Area to mitigate adverse impacts caused by surface-disturbing activities *(Wyoming BLM Mitigation Guidelines for Surface-disturbing and Disruptive Activities).*
- The *Glossary* (in Volume 3) defines surface-disturbing activities employed in the analyses. The BLM typically describes surface disturbance in terms of the total acres of short- or long-term disturbance from BLM actions, as shown in Table 4-1. Appendix T lists projected surface disturbance associated with individual reasonable foreseeable actions, including surface disturbance for new wells that are subsequently abandoned and reclaimed. For analysis purposes, the acreage of surface disturbance for new well pads and associated facilities varies with the fields, areas, structures, and formations developed, and assumes there will be one well pad per producing well. See Appendix H for the Wyoming BLM Mitigation Guidelines for Surface-disturbing and Disruptive Activities.
- Concentrated livestock and native ungulate grazing, off-highway vehicle (OHV) use, and fire may remove vegetation and expose the soil surface leading to increased erosion.
- Ongoing natural and human-caused changes to vegetation communities would continue in the absence of management intervention.

- Vegetation treatments would be performed only in habitats that would benefit from such treatments.
- The successful application of treatments to specific areas/watersheds would result in the maintenance or reestablishment of the desired range of conditions for the major vegetation communities in approximately the desired proportions.
- Mitigation requirements would prevent or limit direct impacts associated with land use activities, including reclamation of land after completion of the activity.
- For purposes of analysis, it is assumed that lands identified for withdrawal under each alternative would be withdrawn. Where not otherwise noted, discussions of areas withdrawn under the various alternatives are assumed to include existing withdrawals, existing withdrawals where the withdrawals would be extended, and areas that would be recommended for withdrawal. While an RMP can make recommendations, closing areas to operation of the mining laws (i.e., withdrawing) occurs outside of the RMP revision process. Table 4-27 identifies existing and proposed withdrawals under the alternatives.
- An oil and gas lease grants the lessee the "right and privilege to drill for, mine, extract, remove and dispose of all oil and gas deposits" in the leased lands, subject to the terms and conditions incorporated in the lease (BLM Form 3100-11, Lease for Oil and Gas). Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, the BLM imposes restrictions on the lease terms. Lease stipulations are only subject to change prior to lease issuance. Once a lease has been issued, stipulations will not be modified absent voluntary agreement by the lessee.
- The United States (U.S.) Court of Appeals for the D.C. Circuit in *Sierra Club v. Peterson*, 717 F.2d. 1409 (D.C. Cir. 1983) found that "on land leased without an NSO stipulation, the DOI (U.S. Department of the Interior) cannot deny the permit to drill…once the land is leased the DOI no longer has the authority to preclude surface-disturbing activities even if the environmental impact of such activity is significant. The Department can only impose mitigation upon a lessee who pursues surface-disturbing exploration and/or drilling activities." The court goes on to say "notwithstanding the assurance that a later site-specific environmental analysis will be made, in issuing these leases the DOI has made an irrevocable commitment to allow some surface-disturbing activities, including drilling and road building."
- Provisions in leases that expressly provide Secretarial authority to deny or restrict development in whole or in part depend on an opinion provided by the U.S. Fish and Wildlife Service (USFWS) regarding impacts to endangered or threatened species or habitats of plants and animals listed or proposed for listing. If the USFWS concludes that the development likely would jeopardize the continued existence of any endangered or threatened plant or animal species, then the development may be denied in whole or in part.
- The BLM cannot predict the exact locations of future surface-disturbing activities at the RMP level. Unless a management action for a vegetation type specifies otherwise, surface-disturbing activities are assumed to occur in vegetation types in proportion to their availability within the Planning Area. Impact acreage for vegetation types are not absolute, but serve as a relative comparison among alternatives.

Table 4-1. Total Projected Surface Disturbance from BLM Reasonable Foreseeable Actions in the Bighorn Basin Planning Area

Action	Alternative A	Alternative B	Alternative C	Alternative D (Proposed RMP)	Alternative E	Alternative F
Total Acres Short-Term Disturbance from BLM Actions	136,253	73,940	245,642	140,175	71,829	137,065
Total Acres Reclaimed from BLM Actions	120,607	63,047	204,157	121,869	62,008	119,384
Total Acres Long-Term Disturbance from BLM Actions	15,646	10,893	41,485	18,306	10,802	17,663

Source: Appendix T

BLM Bureau of Land Management
RMP Resource Management Plan

4.1 Physical Resources

4.1.1 Air Quality

For the Planning Area, air resources were evaluated to examine how potential BLM initiatives, decisions, and alternatives would affect air quality in the region ("region" includes the Planning Area [Map 1] and federal Class I areas within 100 miles). Adverse impacts to air quality are those that increase emissions (air pollutants, hazardous air pollutants [HAPs], and sulfur and nitrogen compounds) that affect visibility, air pollutant concentrations, and atmospheric deposition. Beneficial impacts are those that decrease emissions, from either control measures or a reduction in activities that generate emissions. Direct impacts result from management that may increase or reduce emissions from a source or resource use. Indirect impacts result from management that affects subsequent activities that may increase or reduce emissions. This section describes the expected qualitative impacts of each alternative on air quality in terms of short-term and long-term impacts.

4.1.1.1 Methods and Assumptions

Emissions were estimated for the proposed management actions in each alternative for particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), nitrogen oxides (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOCs), Hazardous Air Pollutants (HAPs), and greenhouse gases (Carbon Dioxide [CO_2], Methane [CH_4], and N_2O). The BLM estimated emissions for the base year (2008) corresponding to Alternative A. This year was selected for the base year because it was the closest year with the most complete information. The BLM also estimated emissions for two future years (2018 and 2027) to examine potential impacts mid-way through the 20-year plan and at the end of the plan. The analysis compares operational emissions for 2018 and 2027 to base-year emissions to determine the expected future change in emission levels for each alternative. Given the uncertainties concerning the number, nature, duration, and specific location of future emission sources and activities, the emission comparison approach provides an appropriate basis for comparing the potential impacts under each alternative.

Activity data used to estimate emissions for proposed emission sources were obtained from the BLM Resource Specialists in the Cody and Worland field offices (CYFO and WFO). Emission factors used to estimate proposed emissions were obtained from (1) the U.S. Environmental Protection Agency (EPA) NONROAD2008a Emissions Model (EPA 2008), (2) Wyoming Department of Environmental Quality (DEQ) best available control technology (BACT) levels for natural-gas-fired internal combustion engines, and (3) the EPA MOBILE6.2.03 mobile emissions factor model for on-road motor vehicles (EPA 2003). The Technical Support Document for Air Quality (Appendix U) includes more information regarding the data and assumptions used to estimate emissions for each project alternative and the detailed emission totals for each activity per year.

Methods and assumptions used in this impact analysis include the following:

- Stationary sources associated with oil and gas development would operate at emission levels based on currently observed BACT levels.
- Activity data associated with management actions other than those related to conventional natural gas and oil wells were averaged over the entire analysis period to produce annual average emissions. Oil and gas activity follows reasonable foreseeable development (RFD) projections in both time and duration. Estimation of activity for each resource is sufficient for base year and future year emission projections.
- EPA off-road emission standards were used to estimate emissions for nonroad sources in project years 2008/2018/2027. This approach simulates the replacement of existing sources by new lower-emitting equipment with future EPA off-road emission standards.
- The analysis in this section estimated only emissions from permitted activities that would occur on federal lands within the Planning Area.
- Recognizing site-specific and season-specific variations, the use of water application as a BMP would reduce fugitive dust emissions from ground-disturbing activities during construction/reclamation and maintenance of roads by 50 percent from uncontrolled levels.

Analysts calculated emissions for the following types of development and use activities: (1) oil development, (2) natural gas development, (3) salable minerals development, (4) locatable minerals development, (5) renewable energy development, (6) livestock management activities, (7) vegetation management, (8) vegetation management of invasive species, (9) fire management (including prescribed fire), (10) forests, woodlands, and forest products activities, (11) rights-of-way (ROW) and corridors, (12) OHV use, and (13) resource road maintenance. Emission estimates are provided for all of the alternatives. Because of the inherent uncertainty in developing appropriate and accurate emission factors for a variety of the equipment and activities, fugitive VOC emissions from oil and gas development operations have not been estimated in this analysis. Due to the lack of available peer reviewed science on biogenic emissions created from prescribed burning and wildfire and carbon uptake by plants after these events, the BLM was unable to determine the net loss or gain of carbon from fire activities within the planning area; as a result, only the emissions from equipment used in prescribed fires, rather than the emissions from the fires themselves, are included. In addition, activities related to the management of cultural resources, paleontology, recreation, and fish and wildlife would produce inconsequential amounts of emissions to the atmosphere, and are not included in the analysis. Only emissions from permitted activities that would occur on federal land within the Planning Area are included in this section. Cumulative effects of these activities are considered in Section 4.9 *Cumulative Impacts* and would also be addressed in subsequent project-specific analysis.

It should be noted that impacts for all alternatives have been analyzed herein using estimates of emissions only, rather than any type of air quality modeling. If a particular project is proposed under any of the alternatives, the BLM may require that a quantitative air quality modeling analysis be conducted to determine the potential effects from proposed emission sources and the effects of potential mitigation strategies for projects expected to approach or exceed the applicable standards. Appendix J provides a more detailed summary regarding why and when air quality modeling would be used to quantify air quality impacts for projects in the Planning Area.

4.1.1.2 Summary of Impacts by Alternatives for Criteria Pollutants

Impacts on air quality were assessed indirectly by calculating emissions by alternative for the various types of development and use activities for the criteria pollutants noted above. The BLM estimated emissions for the base year (2008) corresponding to Alternative A. The BLM also estimated emissions for two future years (2018 and 2027) to examine potential impacts mid-way through the 20-year plan and at the end of the plan. The analysis compares operational emissions for 2018 and 2027 to base-year emissions to determine the expected future change in emission levels for each alternative. The details of the methodologies for calculating emissions for each resource are included in Appendix U.

For each alternative, Table 4-2 presents a summary of criteria pollutant emission estimates for 2018 and 2027. Figures 4-1 and 4-2 present criteria pollutant emission estimates for 2018 and 2027, respectively. In general, air quality impacts would primarily result from minerals development and production, and oil and gas activities; emissions associated with these actions would outweigh those produced from other proposed activities. Alternative E would result in the lowest levels of emissions in 2018 and 2027. Alternatives A and C would result in increases for some pollutants (PM_{10}, CO) and decreases for all others compared to the 2008 base year. Alternative C would have the greatest potential to contribute to exceedances of the NAAQS or WAAQS of any alternative. Alternatives D and F would result in comparable impacts to the base level (year 2008), except that VOC emissions are expected to decrease slightly in 2018 and further by 2027. Management under Alternative E is the same as under Alternative B, except that it designates BLM-administered lands within greater sage-grouse Key Habitat Areas as an Area of Critical Environmental Concern (ACEC) (1,232,583 acres). The Greater Sage-Grouse Key Habitat Areas ACEC places limitations on resource development and other activities that cause emissions, and Alternative E, therefore, would result in the least amount of emissions of all the alternatives. Management under Alternative F is the same as management under Alternative D, except it designates greater sage-grouse PHMAs as an ACEC (1,116,698 acres). Similar to management of greater sage-grouse priority habitat under Alternative E, the designation of the Greater Sage-Grouse PHMAs ACEC under Alternative F would limit resource development and other activities that cause emissions, though to a lesser extent than under Alternative E or Alternative B (which includes restrictive management for greater sage-grouse priority habitat, though not as an ACEC designation).

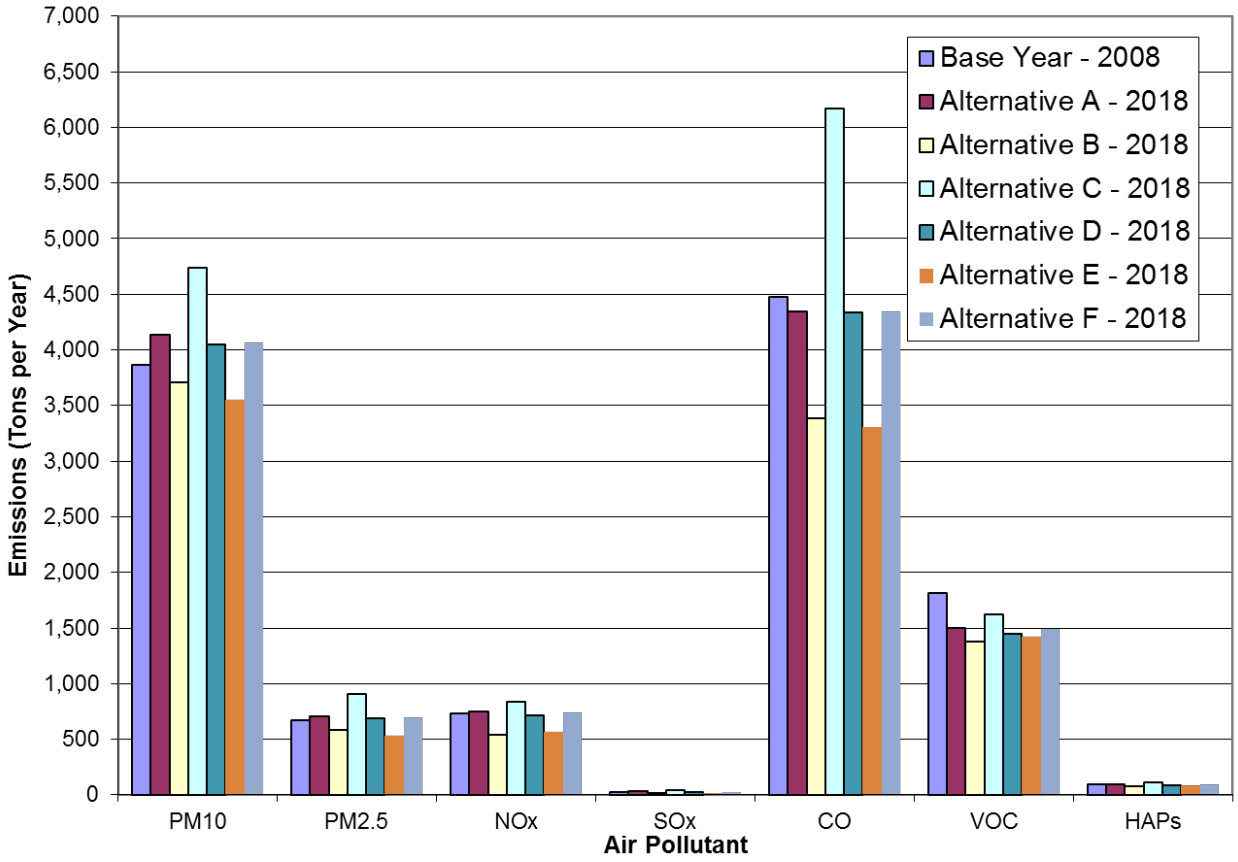
Table 4-2. Total Annual Emissions Summary for BLM Activities in the Bighorn Basin Planning Area

Scenario	Criteria Pollutants					Toxics & Organics	
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs
Base Year – 2008							
Base Year – Federal Only	3,779	659	562	26	4,419	1,623	74
Base Year – Cumulative	3,862	674	728	29	4,478	1,819	98
Forecast Year – 2018							
Alternative A – Federal Only	4,048	687	585	27	4,288	1,284	69
Alternative A – Cumulative	4,133	703	754	30	4,348	1,502	97
Alternative B – Federal Only	3,613	566	362	17	3,317	1,070	42
Alternative B – Cumulative	3,712	583	543	19	3,388	1,379	82
Alternative C – Federal Only	4,634	888	647	42	6,097	1,297	67
Alternative C – Cumulative	4,738	907	838	45	6,170	1,621	110
Alternative D – Federal Only	3,958	677	552	27	4,271	1,177	55
Alternative D – Cumulative	4,052	693	717	29	4,335	1,446	89
Alternative E – Federal Only	3,440	513	359	16	3,227	1,066	42
Alternative E – Cumulative	3,549	532	566	19	3,307	1,425	89
Alternative F – Federal Only	3,961	677	551	27	4,270	1,176	55
Alternative F – Cumulative	4,065	696	742	30	4,344	1,496	96
Forecast Year – 2027							
Alternative A – Federal Only	3,907	665	589	28	4,173	1,141	69
Alternative A – Cumulative	3,995	681	758	30	4,233	1,358	97
Alternative B – Federal Only	3,490	547	388	17	3,237	1,011	53
Alternative B – Cumulative	3,571	562	545	20	3,294	1,219	80
Alternative C – Federal Only	4,512	869	673	42	6,009	1,270	82
Alternative C – Cumulative	4,597	885	842	45	6,069	1,489	111
Alternative D – Federal Only	3,817	649	444	25	4,127	1,122	67
Alternative D – Cumulative	3,973	678	746	30	4,225	1,343	95
Alternative E – Federal Only	3,376	508	527	19	3,186	1,016	54
Alternative E – Cumulative	3,393	510	542	19	3,204	1,214	79
Alternative F – Federal Only	3,840	658	578	27	4,164	1,131	68
Alternative F – Cumulative	3,909	670	687	30	4,197	1,143	69

Source: Appendix U

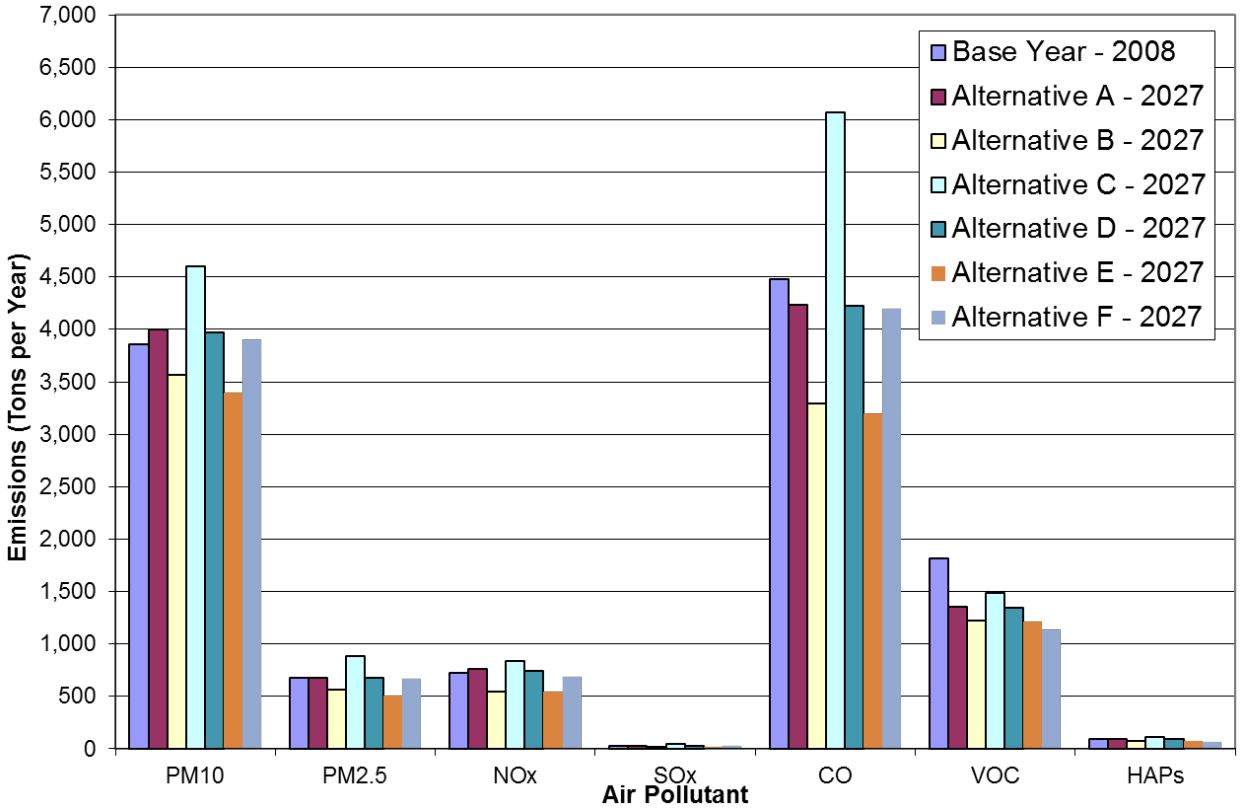
CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Figure 4-1. Emissions Estimates for 2018 from BLM Activities in the Bighorn Basin Planning Area



Source: Appendix U

Figure 4-2. Emissions Estimates for 2027 from BLM Activities in the Bighorn Basin Planning Area



Source: Appendix U

4.1.1.3 Detailed Analysis of Alternatives for Criteria Pollutants

Components of air quality that may be impacted include visibility, air pollutant concentrations, and atmospheric deposition. Air quality impacts would primarily result from minerals development and production, and oil and gas production as potential emissions associated with these actions would substantially outweigh those produced from any other proposed activity.

Mineral development and production would result in short-term air quality impacts from five sources: (1) combustive emissions (vehicle tailpipe and exhaust stack emissions) due to the operation of mobile and stationary source construction equipment; (2) fugitive dust emissions (PM_{10}) due to earthmoving activities and the operation of vehicles on unpaved surfaces; (3) NO_X and particulate emissions from blasting and oil and gas well construction activities and drilling rig equipment; (4) PM emissions from fire management; and (5) VOC and CO emissions associated with OHV use (all-terrain vehicles, off-road motorcycles [dirt bikes], and snowmobiles), vehicular traffic and oil and gas well construction and production equipment. The primary $PM_{2.5}$, NO_x, and SO_2 emissions may result in the formation of secondary $PM_{2.5}$ and would affect total measured $PM_{2.5}$ concentrations. Increases in $PM_{2.5}$ would also affect visibility in the region. The VOC, NO_x, and CO emissions may affect the formation of ground-level ozone, a criteria pollutant.

Ozone is a secondary pollutant not directly emitted, but rather formed in the lower atmosphere by a series of reactions involving ultra violet (UV) radiation and precursor emissions of NO_x, VOC, and CO. NO_x consists of nitric oxide (NO) and nitrogen dioxide (NO_2), which are primarily emitted from anthropogenic sources. VOCs consist of thousands of individual hydrocarbon and oxygenated hydrocarbons emitted from both man-made and biogenic sources (trees). Ozone formation in the troposphere is affected by local weather conditions (winds, temperature, solar radiation, and horizontal and vertical dispersion characteristics), which influence precursor concentrations, reaction rates, formation, transport, and deposition. Air quality data from the Basin monitor located near Worland for the years 2010-2012 showed a design value of 56 ppb, which is well below the 8-hour ozone standard of 75 ppb. The lack of additional ozone monitors in the Bighorn Basin makes it difficult to speculate about the potential impacts of emissions from the various alternatives to future ozone air quality in 2018 and 2027.

Minerals production would generate long-term combustive and fugitive dust emissions from two sources: (1) stationary sources, such as natural gas flaring, natural gas-fired compressors, and minerals storage and handling equipment; and (2) mobile sources that access and service oil and gas facilities and extract and handle subsurface minerals, such as hard minerals. Minerals reclamation activities also would produce combustive emissions and fugitive dust.

Management actions and resource uses under each of the alternatives may impact air quality related values (AQRVs) within the federal Class I areas of Yellowstone National Park, and the North Absaroka, Washakie, Bridger, and Fitzpatrick NWAs. Although minerals development and production and oil and gas production would be the primary sources of emissions, other resource management actions that would produce combustive and/or fugitive dust emissions include the following: forestry production, fire and fuels management, road maintenance, ROWs, and OHV use (especially for CO and VOC emissions). This analysis assumes that the expected activity and resulting emissions for these other resource management actions would be the same for all alternatives for 2018 and 2027.

Table 4-3 presents detailed criteria pollutant emission totals for 2008, and Tables 4-4 through 4-9 present similar information for 2018 by alternative for the various resource activities in the Planning Area. Information for 2027 is not presented in this section because the emission totals and distribution by pollutant and alternative are quite similar. Detailed emission totals for 2027 can be found in Appendix U.

Table 4-3. Estimated Annual Emissions (tons/year) for Activities in the Bighorn Basin Planning Area – Base Year 2008

Resource	Criteria Pollutants					Organics & Toxics	
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs
TOTAL – Federal Lands Only	**3,779**	**659**	**562**	**26**	**4,419**	**1,623**	**74**
TOTAL – Cumulative	**3,862**	**674**	**728**	**29**	**4,478**	**1,819**	**98**
Leasable Minerals – Natural Gas Development – Federal	36	8	119	1	54	427	59
Leasable Minerals – Coalbed Natural Gas Development – Federal	0	0	0	0	0	0	0
Leasable Minerals – Oil Development – Federal	146	26	253	5	74	19	2
Total Oil and Gas Minerals Development – Federal	**182**	**34**	**372**	**6**	**128**	**446**	**61**
Leasable Minerals – Natural Gas Development – All	53	12	178	1	80	614	82
Leasable Minerals – Coalbed Natural Gas Development – All	0	0	0	0	0	0	0
Leasable Minerals – Oil Development – All	212	38	360	7	107	27	3
Total Oil and Gas Minerals Development – All	**265**	**50**	**538**	**9**	**187**	**641**	**85**
Locatable Minerals – Bentonite and Gypsum Mining	2,124	308	88	2	21	7	1
Salable Minerals – Sand, Gravel, and Other Minerals	679	73	15	0	8	2	0
Total Non-Oil and Gas Minerals	**2,803**	**381**	**103**	**2**	**29**	**9**	**1**
Resource Road Maintenance	80	9	6	0	2	0	0
Land Resources – Rights-of-Way – Renewable Energy	27	3	4	0	8	3	0
Livestock Grazing	34	2	2	0	14	13	1
Fire Management Ecology	266	167	54	14	1,814	100	10
Forest Products	322	32	0	0	1	0	0
Invasive Species – Pest Management	34	3	1	0	1	0	0
OHV	31	28	21	3	2,423	1,051	---

Source: Appendix U

CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Table 4-4. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative A – 2018

Resource	Criteria Pollutants					Organics & Toxics	
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs
TOTAL – Federal Lands Only	**4,048**	**687**	**585**	**27**	**4,288**	**1,284**	**69**
TOTAL – Cumulative	**4,133**	**703**	**754**	**30**	**4,348**	**1,502**	**97**
Percent Change over Base Year – Federal Lands Only	**7%**	**4%**	**4%**	**5%**	**-3%**	**-21%**	**-6%**
Percent Change over Base Year – Cumulative	**7%**	**4%**	**3%**	**5%**	**-3%**	**-17%**	**0%**
Leasable Minerals – Natural Gas Development – Federal	36	8	121	1	54	409	54
Leasable Minerals – Coalbed Natural Gas Development – Federal	5	1	5	0	2	4	0
Leasable Minerals – Oil Development – Federal	148	27	252	5	75	19	2
Total Oil and Gas Minerals Development – Federal	**189**	**35**	**378**	**6**	**131**	**432**	**56**
Leasable Minerals – Natural Gas Development – All	54	12	180	1	81	617	82
Leasable Minerals – Coalbed Natural Gas Development – All	7	1	7	0	3	6	1
Leasable Minerals – Oil Development – All	214	38	360	7	107	27	3
Total Oil and Gas Minerals Development – All	**275**	**51**	**547**	**9**	**191**	**650**	**85**
Locatable Minerals – Bentonite and Gypsum Mining	2,192	322	88	2	21	7	1
Salable Minerals – Sand, Gravel, and Other Minerals	679	73	7	0	5	2	0
Total Non-Oil and Gas Minerals	**2,871**	**395**	**95**	**2**	**26**	**9**	**1**
Resource Road Maintenance	80	9	2	0	1	0	0
Land Resources – Rights-of-Way – Renewable Energy	230	24	11	0	10	4	0
Livestock Grazing	34	2	2	0	14	13	1
Fire Management Ecology	266	166	51	14	1,806	99	10
Forest Products	322	32	0	0	1	0	0
Invasive Species – Pest Management	34	3	1	0	1	0	0
OHV	23	21	45	5	2,298	727	---

Source: Appendix U

CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Table 4-5. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative B – 2018

Resource	Criteria Pollutants					Organics & Toxics	
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs
TOTAL – Federal Lands Only	**3,613**	**566**	**362**	**17**	**3,317**	**1,070**	**42**
TOTAL – Cumulative	**3,712**	**583**	**543**	**19**	**3,388**	**1,379**	**82**
Percent Change over Base Year – Federal Lands Only	**-4%**	**-14%**	**-36%**	**-35%**	**-25%**	**-4%**	**-43%**
Percent Change over Base Year – Cumulative	**-4%**	**-13%**	**-25%**	**-32%**	**-24%**	**-4%**	**-16%**
Leasable Minerals – Natural Gas Development – Federal	21	5	73	0	34	263	34
Leasable Minerals – Coalbed Natural Gas Development – Federal	1	0	2	0	1	1	0
Leasable Minerals – Oil Development – Federal	75	13	110	2	34	8	1
Total Oil and Gas Minerals Development – Federal	**97**	**18**	**186**	**3**	**69**	**272**	**35**
Leasable Minerals – Natural Gas Development – All	43	10	153	1	72	562	73
Leasable Minerals – Coalbed Natural Gas Development – All	3	1	4	0	2	3	0
Leasable Minerals – Oil Development – All	150	25	209	4	67	16	2
Total Oil and Gas Minerals Development – All	**196**	**35**	**366**	**5**	**140**	**581**	**75**
Locatable Minerals – Bentonite and Gypsum Mining	2192	322	88	2	21	7	1
Salable Minerals – Sand, Gravel, and Other Minerals	652	70	7	0	5	2	0
Total Non-Oil and Gas Minerals	**2,844**	**392**	**95**	**2**	**26**	**9**	**1**
Resource Road Maintenance	61	7	2	0	1	0	0
Land Resources – Rights-of-Way – Renewable Energy	186	19	8	0	8	3	0
Livestock Grazing	17	1	1	0	7	6	1
Fire Management Ecology	152	85	26	7	907	53	5
Forest Products	216	22	0	0	1	0	0
Invasive Species – Pest Management	17	2	0	0	0	0	0
OHV	23	21	45	5	2,298	727	---

Source: Appendix U

CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Table 4-6. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative C – 2018

Resource	Criteria Pollutants					Organics & Toxics	
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs
TOTAL – Federal Lands Only	**4,634**	**888**	**647**	**42**	**6,097**	**1,297**	**67**
TOTAL – Cumulative	**4,738**	**907**	**838**	**45**	**6,170**	**1,621**	**110**
Percent Change over Base Year – Federal Lands Only	**23%**	**35%**	**15%**	**61%**	**38%**	**-20%**	**-8%**
Percent Change over Base Year – Cumulative	**23%**	**34%**	**15%**	**56%**	**38%**	**-11%**	**13%**
Leasable Minerals – Natural Gas Development – Federal	32	7	103	1	44	315	42
Leasable Minerals – Coalbed Natural Gas Development – Federal	6	1	5	0	2	5	0
Leasable Minerals – Oil Development – Federal	146	27	276	6	79	21	2
Total Oil and Gas Minerals Development – Federal	**184**	**35**	**384**	**7**	**125**	**340**	**44**
Leasable Minerals – Natural Gas Development – All	55	12	185	1	83	628	83
Leasable Minerals – Coalbed Natural Gas Development – All	8	1	7	0	3	7	1
Leasable Minerals – Oil Development – All	224	40	383	8	113	29	3
Total Oil and Gas Minerals Development – All	**287**	**54**	**576**	**10**	**199**	**663**	**87**
Locatable Minerals – Bentonite and Gypsum Mining	2192	322	88	2	21	7	1
Salable Minerals – Sand, Gravel, and Other Minerals	813	87	8	0	5	2	0
Total Non-Oil and Gas Minerals	**3,005**	**410**	**96**	**2**	**26**	**9**	**1**
Resource Road Maintenance	126	14	3	0	1	1	0
Land Resources – Rights-of-Way – Renewable Energy	264	27	14	1	12	4	0
Livestock Grazing	41	3	2	0	26	25	3
Fire Management Ecology	493	328	101	28	3605	190	19
Forest Products	432	43	0	0	1	0	0
Invasive Species – Pest Management	67	7	1	0	1	0	0
OHV	23	21	45	5	2,298	727	---

Source: Appendix U

CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Table 4-7. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative D – 2018

Resource	Criteria Pollutants					Organics & Toxics	
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs
TOTAL – Federal Lands Only	**3,958**	**677**	**552**	**27**	**4,271**	**1,177**	**55**
TOTAL – Cumulative	**4,052**	**693**	**717**	**29**	**4,335**	**1,446**	**89**
Percent Change over Base Year – Federal Lands Only	**5%**	**3%**	**-2%**	**4%**	**-3%**	**-27%**	**-26%**
Percent Change over Base Year – Cumulative	**5%**	**3%**	**-2%**	**3%**	**-3%**	**-20%**	**-9%**
Leasable Minerals – Natural Gas Development – Federal	30	7	97	1	42	303	40
Leasable Minerals – Coalbed Natural Gas Development – Federal	5	1	4	0	2	4	0
Leasable Minerals – Oil Development – Federal	132	25	244	5	70	18	2
Total Oil and Gas Minerals Development – Federal	**167**	**32**	**345**	**6**	**114**	**325**	**42**
Leasable Minerals – Natural Gas Development – All	43	10	153	1	72	562	73
Leasable Minerals – Coalbed Natural Gas Development – All	7	1	6	0	3	6	1
Leasable Minerals – Oil Development – All	210	37	351	7	104	26	3
Total Oil and Gas Minerals Development – All	**260**	**48**	**511**	**8**	**179**	**594**	**76**
Locatable Minerals – Bentonite and Gypsum Mining	2192	322	88	2	21	7	1
Salable Minerals – Sand, Gravel, and Other Minerals	612	66	7	0	5	2	0
Total Non-Oil and Gas Minerals	**2,804**	**388**	**94**	**2**	**26**	**9**	**1**
Resource Road Maintenance	80	9	2	0	1	0	0
Land Resources – Rights-of-Way – Renewable Energy	230	24	11	0	10	4	0
Livestock Grazing	34	2	2	0	14	13	1
Fire Management Ecology	266	166	51	14	1,806	99	10
Forest Products	322	32	0	0	1	0	0
Invasive Species – Pest Management	34	3	1	0	1	0	0
OHV	23	21	45	5	2,298	727	---

Source: Appendix U

CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Table 4-8. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative E – 2018

Resource	Criteria Pollutants					Organics & Toxics	
	PM_{10}	*$PM_{2.5}$*	*NO_x*	*SO_2*	*CO*	*VOC*	*HAPs*
TOTAL – Federal Lands Only	**3,440**	**513**	**359**	**16**	**3,227**	**1,066**	**42**
TOTAL – Cumulative	**3,549**	**532**	**566**	**19**	**3,307**	**1,425**	**89**
Percent Change over Base Year – Federal Lands Only	**-9%**	**-22%**	**-36%**	**-38%**	**-27%**	**-34%**	**-43%**
Percent Change over Base Year – Cumulative	**-8%**	**-21%**	**-22%**	**-33%**	**-26%**	**-22%**	**-8%**
Leasable Minerals – Natural Gas Development – Federal	21	5	73	0	34	263	34
Leasable Minerals – Coalbed Natural Gas Development – Federal	1	0	2	0	1	1	0
Leasable Minerals – Oil Development – Federal	75	13	110	2	34	8	1
Total Oil and Gas Minerals Development – Federal	**97**	**17**	**185**	**3**	**69**	**272**	**35**
Leasable Minerals – Natural Gas Development – All	53	12	179	1	81	612	81
Leasable Minerals – Coalbed Natural Gas Development – All	3	1	3	0	2	3	0
Leasable Minerals – Oil Development – All	150	25	209	4	67	16	2
Total Oil and Gas Minerals Development – All	**206**	**37**	**391**	**6**	**149**	**631**	**83**
Locatable Minerals – Bentonite and Gypsum Mining	2022	277	88	2	21	7	1
Salable Minerals – Sand, Gravel, and Other Minerals	660	71	7	0	5	2	0
Total Non-Oil and Gas Minerals	**2,682**	**347**	**95**	**2**	**26**	**9**	**1**
Resource Road Maintenance	61	7	2	0	1	0	0
Land Resources – Rights-of-Way – Renewable Energy	186	19	8	0	8	3	0
Livestock Grazing	17	1	1	0	7	6	1
Fire Management Ecology	142	77	23	6	817	48	5
Forest Products	216	22	0	0	1	0	0
Invasive Species – Pest Management	17	2	0	0	0	0	0
OHV	23	21	45	5	2,298	727	---

Source: Appendix U

CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Table 4-9. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative F – 2018

Resource	Criteria Pollutants					Organics & Toxics	
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs
TOTAL – Federal Lands Only	**3,961**	**677**	**551**	**27**	**4,270**	**1,176**	**55**
TOTAL – Cumulative	**4,065**	**696**	**742**	**30**	**4,344**	**1,496**	**96**
Percent Change over Base Year – Federal Lands Only	**5%**	**3%**	**-2%**	**4%**	**-3%**	**-28%**	**-26%**
Percent Change over Base Year – Cumulative	**5%**	**3%**	**2%**	**4%**	**-3%**	**-18%**	**-1%**
Leasable Minerals – Natural Gas Development – Federal	30	7	97	1	42	303	40
Leasable Minerals – Coalbed Natural Gas Development – Federal	5	1	4	0	2	4	0
Leasable Minerals – Oil Development – Federal	132	25	243	5	70	18	2
Total Oil and Gas Minerals Development – Federal	**166**	**32**	**345**	**6**	**114**	**325**	**42**
Leasable Minerals – Natural Gas Development – All	53	12	179	1	81	612	81
Leasable Minerals – Coalbed Natural Gas Development – All	7	1	6	0	3	6	1
Leasable Minerals – Oil Development – All	210	37	351	7	104	26	3
Total Oil and Gas Minerals Development – All	**270**	**50**	**536**	**9**	**188**	**645**	**84**
Locatable Minerals – Bentonite and Gypsum Mining	2192	322	88	2	21	7	1
Salable Minerals – Sand, Gravel, and Other Minerals	674	72	7	0	5	2	0
Total Non-Oil and Gas Minerals	**2,866**	**395**	**95**	**2**	**26**	**9**	**1**
Resource Road Maintenance	80	9	2	0	1	0	0
Land Resources – Rights-of-Way – Renewable Energy	170	18	11	0	10	4	0
Livestock Grazing	33	2	2	0	13	12	1
Fire Management Ecology	266	166	51	14	1,806	99	10
Forest Products	322	32	0	0	1	0	0
Invasive Species – Pest Management	34	3	1	0	1	0	0
OHV	23	21	45	5	2,298	727	---

Source: Appendix U

CO	carbon monoxide
HAPs	hazardous air pollutants
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
SO_2	sulfur dioxide
VOC	volatile organic compound

Alternative A

For Alternative A (current management), Figure 4-1 indicates that emission estimates for 2018 are greater than those for 2008 for all pollutants, except for CO and VOCs. By 2027 (Figure 4-2), emissions for all pollutants (except CO, VOCs and HAPs) would be greater than in 2008, with the largest increase in PM_{10} emissions, which are expected to increase by 133 tons per year (3 percent).

The Planning Area is a large, irregularly shaped region with an east-west extent of approximately 100 miles, a north-south extent of 105 miles, and a northwest-southeast extent of 150 miles. Given the generally good air quality in the region currently and the expected separation of sources within the Planning Area, it is unlikely emissions from Alternative A would contribute to an exceedance of NAAQS or WAAQS. There may be localized air quality impacts (potentially on local ozone) depending on the locations and emission levels of proposed sources in the area, the surrounding topographical characteristics, and the site-specific meteorology.

The impacts of these estimated future air emissions at the nearby federal Class I areas under Alternative A are difficult to quantify with any level of confidence without information on the specific locations and characteristics of projected sources in the Planning Area. As noted in Appendix J, air quality modeling may be used on a case-by-case basis to estimate these impacts, and this would require detailed information regarding source location/characteristics, topography/land use, and local and regional meteorology to accurately quantify the potential spatial and temporal aspects of air quality impacts from the various emission sources/activities. In addition, the Wyoming DEQ air-permitting processes would require larger development projects to identify the locations for specific emission sources to demonstrate with air quality modeling analyses that proposed emissions would not adversely affect ambient air quality and AQRVs in federal Class I areas.

Alternative B

As shown in Figures 4-1 and 4-2, Alternative B would result in lower emissions than Alternative A for both 2018 and 2027. Compared to the base year 2008 estimates, Alternative B would result in lower emissions for all pollutants for both future years. VOC emissions would drop by 600 tons or 33 percent in 2027 due to development constraints in Alternative B. This would result in lower natural gas production—one of the principal sources of VOC emissions—than Alternative A and expected reductions in emissions from cleaner OHV engines, the other principal source of VOC emissions.

As a result, this alternative would likely result in similar or smaller impacts to AQRVs at the nearest federal Class I areas similar to base year conditions. In addition, given the generally good existing air quality in the region, the BLM would not expect emissions under Alternative B to contribute to an exceedance of NAAQS or WAAQS. Alternative B requires air quality modeling for all industrial activities expected to approach or exceed emissions standards whereas Alternative A only requires air quality modeling on a case-by-case basis. As a result, Alternative B would be most likely ensure a data-driven approach to determine potential effects and mitigation strategies.

Alternative C

Emission estimates for Alternative C, reflecting more resource use in the Planning Area, show slight to moderate increases in emissions (except for VOCs) by 2027 compared to the base year (2008). The largest increase is for PM_{10} emissions, with an expected increase of 735 tons (19 percent). The estimates for Alternative C are also consistently higher than those for Alternative A.

Because of the potential increases in emissions compared to Alternative A, it is possible that impacts under this alternative could contribute to exceedances of the NAAQS or WAAQS. Like Alternative A, Alternative C requires air quality modeling only a case-by-case basis to estimate impacts from industrial activities, which result in less effective emissions forecasting and mitigation strategies. Although the existing air quality in the region is considered good, limited measurements make it difficult to fully and comprehensively assess current conditions. Because of expected increases in emissions under this alternative, adverse impacts to AQRVs in the nearby Yellowstone National Park and other NWAs may occur. Implementing the mitigation measures common to all alternatives would reduce emissions and any air quality impacts associated with Alternative C.

Alternative D

As listed in Table 4-2 and depicted in Figures 4-1 and 4-2, the emission estimates for Alternative D are generally similar to or lower than Alternative A. Similar to the other alternatives, it is quite difficult to speculate whether emissions for this alternative would contribute to an exceedance of NAAQS or WAAQS or would adversely affect AQRVs in nearby Class I areas.

Under Alternative D, the BLM and interested stakeholders will characterize the condition of Class I areas within and adjacent to the Planning Area to measure progress toward meeting air quality goals and objectives (see Appendix J). Like Alternative A, Alternative D requires air quality modeling on a case-by-case basis to estimate impacts from industrial activities. However, the BLM may require additional air emission control measures and strategies within its regulatory authority and in consultation with stakeholders if proposed or committed measures are insufficient to achieve air quality goals and objectives. Compared to Alternative A, Alternative D may result in less adverse impacts to air quality by monitoring goals and objectives with respect to measurable indicators and requiring additional emission control measures if needed.

Alternative E

As shown in Table 4-2 and Figures 4-1 and 4-2, Alternative E would result in similar emissions to Alternative B, except to a slightly lesser extent due to additional restrictions within the Greater Sage-Grouse Key Habitat Areas ACEC. Under this alternative, the designation of greater sage-grouse Key Habitat Areas as an ACEC limits the development and impacts on physical, mineral, biological, and other resources in the Planning Area beyond the restrictions already placed under Alternative B, and to a much greater extent than under Alternative A. The expected effects on all BLM activities and resources in the Planning Area under this alternative were summarized in Chapter 2 and are detailed in the remainder of Chapter 4 below. In summary, this alternative reduces the number of acres available for mineral development, increases acreage available for withdrawal for mining, reduces acreage available for disposal of mineral materials, reduces slightly the number of acres open to renewable energy development, reduces acreage for renewable energy avoidance areas, increases the size of renewable energy exclusion areas, reduces acres limited to existing roads and trails for motorized vehicle use, increases acres limited to designated roads and trails for motorized vehicle use, reduces land available for standard disposal, reduces acreage for ROW avoidance areas, and increases the size of ROW exclusion areas. As a result, the emissions for sources involved in the development of leasable and locatable mineral resources and other activities under Alternative E, would be comparable to or less than those for Alternative B for all pollutants. Overall, Alternative E would result in the least emissions for future years when compared to the other alternatives.

Alternative F

The emissions estimates for 2018 and 2027 for Alternative F are generally the same as Alternative D (Table 4-2 and Figures 4-1 and 4-2). Under Alternative F, the management of physical, mineral, biological, and other resources in the Planning Area would be the same as under Alternative D, except for areas within the Greater Sage-Grouse PHMAs ACEC. Under this alternative, the designation of greater sage-grouse PHMAs as an ACEC limits the development and impacts beyond the restrictions already placed under alternatives A and D, but not as much as under Alternative B or E. In summary, this alternative increases the number of acres open to oil and gas leasing with major and moderate constraints, reduces slightly the number of acres open to oil and gas leasing subject to the standard lease form, reduces slightly the number of acres open to renewable energy development, increases slightly the acreage for renewable energy avoidance areas, reduces acres limited to existing roads and trails for motorized vehicle use, increases acres limited to designated roads and trails for motorized vehicle use, and reduces acreage for ROW avoidance areas. As a result of these limitations and restrictions, the emissions estimates for Alternative F would be comparable to those for Alternative D with the exceptions being for PM_{10} and NO_x emissions where slight decreases in emissions under this alternative are estimated. Overall, emissions under Alternative F are estimated to be less than Alternative A for all emissions and more than alternatives B and E for all emissions.

4.1.1.4 Summary of Impacts by Alternatives for Greenhouse Gases

Under all of the alternatives, a variety of activities in the Planning Area would generate greenhouse gas (GHG) emissions, including CO_2, CH_4, and nitrous oxide (N_2O). These activities include oil and gas and other minerals development, fire events, motorized vehicle use, livestock grazing, facilities development, and other surface-disturbing activities. Currently, the BLM does not have an established mechanism to accurately predict the effect of resource management-level decisions from this planning effort on global climate change. Since the Industrial Revolution, atmospheric concentrations of CO_2 have risen about 36 percent (IPCC 2007a), principally due to the combustion of fossil fuels. Fossil fuel combustion accounted for 94 percent of national CO_2 emissions in 2008 (EPA 2010).

Table 4-10 presents a summary of greenhouse gas emission estimates for CO_2, CH_4, and N_2O for the 2008 base year and the two future years (2018 and 2027) for each of the alternatives. The table also includes totals for CO_2 equivalent emissions. Tables 4-11 through 4-16 provide greenhouse gas emissions for 2018 for each of the alternatives, and for each of the activities contributing to these emissions. As was presented for criteria pollutant emissions, only 2018 estimates are provided in this section because of the similarities in emission totals to 2027. The totals for 2027 are included in Appendix U.

Table 4-10. Estimated Annual Greenhouse Gas Emissions (tons/year) Summary for Activities within the Bighorn Basin Planning Area

Greenhouse Gases					
Scenario	**CO_2**	**CH_4**	**N_2O**	**CO_2 Equivalents**	**CO_2 Equivalents (million metric tons)**
Base Year – 2008					
Base Year – Federal Only	83,344	8,794	14	272,492	0.25
Base Year – Cumulative	114,547	10,338	15	336,215	0.31
Forecast Year – 2018					
Alternative A – Federal Only	88,466	9,641	14	295,413	0.27
Alternative A – Cumulative	120,248	11,614	15	368,722	0.34
Alternative B – Federal Only	56,963	5,175	7	167,895	0.16
Alternative B – Cumulative	96,589	7,849	8	263,781	0.25
Alternative C – Federal Only	84,796	9,142	28	285,514	0.26
Alternative C – Cumulative	125,764	11,906	29	384,657	0.36
Alternative D – Federal Only	77,904	8,804	14	267,247	0.31
Alternative D – Cumulative	113,645	11,311	15	355,736	0.33
Alternative E – Federal Only	56,944	5,150	7	167,122	0.16
Alternative E – Cumulative	101,713	8,079	7	273,528	0.26
Alternative F – Federal Only	77,774	8,804	14	267,107	0.31
Alternative F – Cumulative	118,720	11,567	15	366,189	0.34
Forecast Year – 2027					
Alternative A – Federal Only	88,592	10,496	14	313,490	0.29
Alternative A – Cumulative	120,482	12,889	15	395,732	0.37
Alternative B – Federal Only	64,632	6,010	7	193,115	0.18
Alternative B – Cumulative	95,047	8,249	8	270,640	0.23
Alternative C – Federal Only	94,465	10,961	28	333,428	0.31
Alternative C – Cumulative	126,374	13,376	29	416,125	0.39
Alternative D – Federal Only	72,520	10,384	14	295,007	0.27
Alternative D – Cumulative	118,695	11,652	15	367,951	0.34
Alternative E – Federal Only	79,780	5,964	7	207,123	0.19
Alternative E – Cumulative	94,907	8,203	7	269,307	0.25
Alternative F – Federal Only	86,759	10,383	14	309,274	0.29
Alternative F – Cumulative	98,662	11,220	15	338,800	0.31

Source: Appendix U

CH_4 methane
CO_2 carbon dioxide
N_2O nitrous oxide

Table 4-11. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative A – 2018

Resource	Greenhouse Gases			
	CO_2	CH_4	N_2O	CO_2 Equivalents
TOTAL – Federal Lands Only	**88,466**	**9,641**	**14**	**295,413**
TOTAL – Cumulative	**120,248**	**11,614**	**15**	**368,722**
Leasable Minerals – Natural Gas Development – Federal	39,657	3,072	0	104,274
Leasable Minerals – Coalbed Natural Gas Development – Federal	1,559	766	0	17,643
Leasable Minerals – Oil Development – Federal	27,270	0	0	27,364
Total Oil and Gas Minerals Development – Federal	**68,486**	**3,838**	**1**	**149,281**
Leasable Minerals – Natural Gas Development – All	59,523	4,636	1	157,050
Leasable Minerals – Coalbed Natural Gas Development – All	1,866	1,174	0	26,528
Leasable Minerals – Oil Development – All	38,879	0	0	39,012
Total Oil and Gas Minerals Development – All	**100,269**	**5,811**	**1**	**222,590**
Locatable Minerals – Bentonite and Gypsum Mining	12,523	0	0	12,525
Salable Minerals – Sand, Gravel, and Other Minerals	2,165	0	---	2,166
Total Non-Oil and Gas Minerals	**14,688**	**0**	**0**	**14,691**
Resource Road Maintenance	617	0	---	617
Land Resources – Rights-of-Way – Renewable Energy	3,759	0	---	3,760
Livestock Grazing	488	5,708	---	120,356
Fire Management Ecology	286	95	14	6,565
Forest Products	36	0	---	36
Invasive Species – Pest Management	106	0	---	106
OHV	---	---	---	---

Source: Appendix U

CH_4 methane
CO_2 carbon dioxide
N_2O nitrous oxide
OHV Off-highway Vehicle

Table 4-12. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative B – 2018

Resource	Greenhouse Gases			
	CO_2	CH_4	N_2O	CO_2 Equivalents
TOTAL – Federal Lands Only	**56,963**	**5,175**	**7**	**167,895**
TOTAL – Cumulative	**96,589**	**7,849**	**8**	**263,781**
Leasable Minerals – Natural Gas Development – Federal	25,437	2,038	0	68,306
Leasable Minerals – Coalbed Natural Gas Development – Federal	1,148	214	0	5,653
Leasable Minerals – Oil Development – Federal	11,960	0	0	12,001
Total Oil and Gas Minerals Development – Federal	**38,545**	**2,253**	**0**	**85,960**
Leasable Minerals – Natural Gas Development – All	54,054	4,364	0	145,856
Leasable Minerals – Coalbed Natural Gas Development – All	1,408	562	0	13,204
Leasable Minerals – Oil Development – All	22,709	0	0	22,786
Total Oil and Gas Minerals Development – All	**78,171**	**4,926**	**1**	**181,846**
Locatable Minerals – Bentonite and Gypsum Mining	12,523	0	0	12,525
Salable Minerals – Sand, Gravel, and Other Minerals	2,108	0	---	2,109
Total Non-Oil and Gas Minerals	**14,631**	**0**	**0**	**14,634**
Resource Road Maintenance	469	0	---	469
Land Resources – Rights-of-Way – Renewable Energy	2,700	0	---	2,700
Livestock Grazing	243	2,875	---	60,616
Fire Management Ecology	286	48	7	3,426
Forest Products	36	0	---	36
Invasive Species – Pest Management	53	0	---	53
OHV	---	---	---	---

Source: Appendix U

CH_4 methane
CO_2 carbon dioxide
N_2O nitrous oxide
OHV Off-highway Vehicle

Table 4-13. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative C – 2018

Resource	Greenhouse Gases			
	CO_2	CH_4	N_2O	CO_2 Equivalents
TOTAL – Federal Lands Only	**84,796**	**9,142**	**28**	**285,514**
TOTAL – Cumulative	**125,764**	**11,906**	**29**	**384,657**
Leasable Minerals – Natural Gas Development – Federal	31,410	2,334	0	80,507
Leasable Minerals – Coalbed Natural Gas Development – Federal	1,668	909	0	20,755
Leasable Minerals – Oil Development – Federal	29,748	0	0	29,850
Total Oil and Gas Minerals Development – Federal	**62,826**	**3,243**	**1**	**131,112**
Leasable Minerals – Natural Gas Development – All	60,391	4,680	1	158,830
Leasable Minerals – Coalbed Natural Gas Development – All	1,976	1,327	0	29,855
Leasable Minerals – Oil Development – All	41,427	0	0	41,569
Total Oil and Gas Minerals Development – All	**103,794**	**6,007**	**1**	**230,254**
Locatable Minerals – Bentonite and Gypsum Mining	12,523	0	0	12,525
Salable Minerals – Sand, Gravel, and Other Minerals	2,450	0	---	2,451
Total Non-Oil and Gas Minerals	**14,973**	**0**	**0**	**14,976**
Resource Road Maintenance	975	0	---	975
Land Resources – Rights-of-Way – Renewable Energy	4,866	0	---	4,867
Livestock Grazing	623	5,708	---	120,494
Fire Management Ecology	286	191	28	12,843
Forest Products	36	0	---	36
Invasive Species – Pest Management	212	0	---	212
OHV	---	---	---	---

Source: Appendix U

CH_4 methane
CO_2 carbon dioxide
N_2O nitrous oxide
OHV Off-highway Vehicle

Table 4-14. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative D – 2018

Resource	Greenhouse Gases			
	CO_2	CH_4	N_2O	CO_2 Equivalents
TOTAL – Federal Lands Only	**77,904**	**8,804**	**14**	**267,247**
TOTAL – Cumulative	**113,645**	**11,311**	**15**	**355,736**
Leasable Minerals – Natural Gas Development – Federal	30,243	2,276	0	78,117
Leasable Minerals – Coalbed Natural Gas Development – Federal	1,531	725	0	16,758
Leasable Minerals – Oil Development – Federal	26,293	0	0	26,383
Total Oil and Gas Minerals Development – Federal	**58,067**	**3,001**	**1**	**121,259**
Leasable Minerals – Natural Gas Development – All	54,045	4,364	0	145,836
Leasable Minerals – Coalbed Natural Gas Development – All	1,839	1,144	0	25,858
Leasable Minerals – Oil Development – All	37,923	0	0	38,053
Total Oil and Gas Minerals Development – All	**93,808**	**5,508**	**1**	**209,748**
Locatable Minerals – Bentonite and Gypsum Mining	12,523	0	0	12,525
Salable Minerals – Sand, Gravel, and Other Minerals	2,022	0	---	2,023
Total Non-Oil and Gas Minerals	**14,545**	**0**	**0**	**14,549**
Resource Road Maintenance	617	0	---	617
Land Resources – Rights-of-Way – Renewable Energy	3,759	0	---	3,760
Livestock Grazing	488	5,708	---	120,356
Fire Management Ecology	286	95	14	6,565
Forest Products	36	0	---	36
Invasive Species – Pest Management	106	0	---	106
OHV	---	---	---	---

Source: Appendix U

CH_4 methane
CO_2 carbon dioxide
N_2O nitrous oxide
OHV Off-highway Vehicle

Table 4-15. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative E – 2018

Resource	Greenhouse Gases			
	CO_2	CH_4	N_2O	CO_2 Equivalents
TOTAL – Federal Lands Only	**56,944**	**5,150**	**7**	**167,122**
TOTAL – Cumulative	**101,713**	**8,079**	**7**	**273,528**
Leasable Minerals – Natural Gas Development – Federal	25,428	2,038	0	68,286
Leasable Minerals – Coalbed Natural Gas Development – Federal	1,134	194	0	5,211
Leasable Minerals – Oil Development – Federal	11,936	0	0	11,977
Total Oil and Gas Minerals Development – Federal	**38,498**	**2,232**	**0**	**85,473**
Leasable Minerals – Natural Gas Development – All	59,188	4,619	1	156,356
Leasable Minerals – Coalbed Natural Gas Development – All	1,394	541	0	12,761
Leasable Minerals – Oil Development – All	22,684	0	0	22,762
Total Oil and Gas Minerals Development – All	**83,267**	**5,161**	**1**	**191,879**
Locatable Minerals – Bentonite and Gypsum Mining	12,523	0	0	12,525
Salable Minerals – Sand, Gravel, and Other Minerals	2,136	0	---	2,137
Total Non-Oil and Gas Minerals	**14,659**	**0**	**0**	**14,662**
Resource Road Maintenance	469	0	---	469
Land Resources – Rights-of-Way – Renewable Energy	2,700	0	---	2,700
Livestock Grazing	243	2,875	---	60,616
Fire Management Ecology	286	43	6	3,112
Forest Products	36	0	---	36
Invasive Species – Pest Management	53	0	---	53
OHV	---	---	---	---

Source: Appendix U

CH_4 methane
CO_2 carbon dioxide
N_2O nitrous oxide
OHV Off-highway Vehicle

Table 4-16. Estimated Annual Emissions (tons/year) for Activities within the Bighorn Basin Planning Area – Alternative F – 2018

Resource	Greenhouse Gases			
	CO_2	CH_4	N_2O	CO_2 Equivalents
TOTAL – Federal Lands Only	**77,774**	**8,804**	**14**	**267,107**
TOTAL – Cumulative	**118,720**	**11,567**	**15**	**366,189**
Leasable Minerals – Natural Gas Development – Federal	30,230	2,275	0	78,094
Leasable Minerals – Coalbed Natural Gas Development – Federal	1,531	725	0	16,758
Leasable Minerals – Oil Development – Federal	26,244	0	0	26,334
Total Oil and Gas Minerals Development – Federal	**58,005**	**3,000**	**1**	**121,186**
Leasable Minerals – Natural Gas Development – All	59,188	4,619	1	156,356
Leasable Minerals – Coalbed Natural Gas Development – All	1,839	1,144	0	25,858
Leasable Minerals – Oil Development – All	37,923	0	0	38,053
Total Oil and Gas Minerals Development – All	**98,951**	**5,763**	**1**	**220,268**
Locatable Minerals – Bentonite and Gypsum Mining	12,523	0	0	12,525
Salable Minerals – Sand, Gravel, and Other Minerals	2,165	0	---	2,166
Total Non-Oil and Gas Minerals	**14,688**	**0**	**0**	**14,691**
Resource Road Maintenance	617	0	---	617
Land Resources – Rights-of-Way – Renewable Energy	3,555	0	---	3,556
Livestock Grazing	481	5,708	---	120,349
Fire Management Ecology	286	95	14	6,565
Forest Products	36	0	---	36
Invasive Species – Pest Management	106	0	---	106
OHV	---	---	---	---

Source: Appendix U

CH_4 methane
CO_2 carbon dioxide
N_2O nitrous oxide
OHV Off-highway Vehicle

Activities that require fossil fuel-powered machinery, such as minerals development and motorized vehicle use, comprise the majority of greenhouse gas emissions in the Planning Area under all of the alternatives. Wildland fires, including prescribed burns, would also result in CO_2 emissions. Alternative C is projected to result in the most new oil and gas wells and locatable mineral development (the activities anticipated to result in the greatest greenhouse gas contributions during the planning cycle), resulting in the most CO_2 emissions, followed by alternatives D, A, F, B, and E.

CH_4 is more than 20 times as effective as CO_2 at trapping heat in the atmosphere and accounted for 8.2 percent of GHG emissions in 2008 (based on CO_2 equivalents) (EPA 2010). CO_2 equivalent is a measurement that allows an aggregate comparison of multiple GHGs (e.g., CH_4 and N_2O), created by multiplying the actual or anticipated emissions of each gas by its relative global warming potential. Oil,

gas, and locatable mineral development and enteric fermentation from livestock (which accounted for 25 percent of total CH_4 emissions in 2008 [EPA 2010]) are the predominant source of CH_4 emissions in the Planning Area. As a result of higher levels of mineral development, CH_4 emissions are anticipated to be highest under Alternative C, followed by alternatives A, D, F, B, and E. Animal Unit Month (AUM) projections under alternatives A, C, D, and F are similar, and therefore would result in similar CH_4 emissions. Alternatives B and E would reduce AUMs by about 50 percent, resulting in a proportional reduction in CH_4 emissions from enteric fermentation.

N_2O emissions, which like CH_4 are also more effective heat trapping agents than CO_2, would result predominantly from fuel combustion in motor vehicles in the Planning Area. These emissions are likely to be greatest under Alternative C, followed by alternatives A, D, F, B, and E.

Under all alternatives, management actions would likely affect the level of carbon sequestration in the Planning Area. Management that conserves carbon sinks or provides for research and technology to store carbon that would otherwise be released into the atmosphere would reduce overall contributions of GHGs. Alternative E would result in the greatest preservation of biological carbon sinks including vegetation and soils, followed by alternatives B, F, D, A, and C. Forest management practices and silvicultural treatments that improve forest health and reduce the risk of catastrophic wildfire may increase or maintain carbon sequestration in forests and woodlands in the short term; however, altering the natural fire regime through forest management may lead to long-term impacts on forest health (e.g., infestation) that affect carbon sequestration in forests and woodlands. Alternative C includes the greatest number of silvicultural practices and other treatments to actively manage forests and woodlands, followed by alternatives D, A, F, B, and E. Allowing carbon sequestration research and projects under Alternative C and considering carbon sequestration research and projects under alternatives D and F would increase the potential for carbon sequestration projects and management that reduces atmospheric CO_2, compared to the other alternatives.

4.1.2 Geologic Resources

Management of geologic resources primarily addresses preserving unique geologic features such as paleontological resources, fragile easily eroded geological features, or scientifically important strata. Mineral development, as well as other surface-disturbing activities, can alter existing geologic features by disturbing, or excavating soil and rock. Sections 4.5 *Heritage and Visual Resources* and 4.7 *Special Designations and Other Management Areas* in this chapter discuss associated impacts to geologic resources. Section 4.2 *Mineral Resources* discusses impacts to mineral resources.

4.1.3 Soil

Soil resources provide the foundation for a variety of other resources and resource uses in the Planning Area. Adverse impacts to soils result from management actions that compact soil, increase erosion and runoff, disrupt soil stability, or reduce soil productivity. Surface-disturbing activities, such as mineral resources development, can result in removal of vegetative cover, soil compaction, reduced water infiltration, changes in physical and biological properties, and reduction in organic matter content. Beneficial impacts to soils result from management that minimizes soil compaction or erosion and runoff, stabilizes soil, and increases soil productivity. For example, management allowing post-disturbance reseeding would stabilize the soil and limit erosion.

Direct impacts to soils result from activities that disturb the existing soils horizon through earth-moving activities or remove the vegetative cover—loosening the surface soil, compacting soil layers, and

exposing soil particles to wind and water. Indirect impacts include management actions that increase the likelihood of soil erosion. Actions that create impervious surfaces (e.g., road construction) or new water sources (e.g., surface discharge of produced water) may increase runoff and erode soils.

Short-term impacts to soils are those that result from initial surface disturbance prior to completion of reclamation and revegetation activities. Long-term impacts are those that result from actions that leave bare ground and areas not reclaimed after 5 years. Long-term impacts to soil productivity would also result from disturbance that degrades the physical and biological properties of the soil.

4.1.3.1 Methods and Assumptions

The soils analysis uses the Water Erosion Prediction Project (WEPP) soil erosion model to analyze impacts to soil resources. WEPP simulates the conditions that affect erosion, such as the amount of vegetation canopy and soil water content, to estimate erosion rates. To facilitate this analysis, the Internet-based U.S. Forest Service (USFS) WEPP interfaces were used for erosion predictions using the "Disturbed WEPP" and "WEPP Road" modules.

Erosion rates are inherently difficult to predict. The rates of erosion predicted by WEPP are within +/-50 percent. Despite this lack of precision, these rates are appropriate for comparing and analyzing impacts of the alternatives on the soil resource. Erosion rates are calculated for different resource programs using surface-disturbance acreage figures as projected in the reasonable foreseeable action table in Appendix T.

WEPP model climate parameters were developed using Worland, Wyoming precipitation data at 5,000 feet above mean sea level to represent the entire Planning Area. Both the Disturbed WEPP and WEPP Road modules are limited to four soil textures (clay loam, silt loam, sandy loam, and loam). The WEPP analysis used a loam soil texture for all erosion predictions.

Disturbed WEPP has eight vegetative treatment options available: 20-year-old forest, 5-year-old forest, shrub-dominated rangeland, tall-grass prairie, short-grass prairie, low-severity fire, high-severity fire, and skid trail. By adjusting cover parameters, these vegetative treatment options can be applied to a wide variety of vegetative communities and land uses.

All WEPP erosion analyses used a 50-year simulation to represent the return interval.

The WEPP analysis used the following parameters:

- Slopes used in Disturbed WEPP – Upper slope 0 to 25 percent; lower slope 5 to 25 percent
- Slope lengths used in Disturbed WEPP – 300 feet (standard length used for environmental analysis in the Planning Area)
- Gradients used in WEPP Road – Road gradient 4 percent; fill gradient 30 percent; buffer gradient 15 percent
- Lengths used in WEPP Road – Road length 200 feet; fill length 15 feet; buffer length 130 feet
- Width used in WEPP Road – Road width 12 feet
- Rock cover used in Disturbed WEPP and WEPP Road – 5 percent

The WEPP model calculated an initial average erosion rate of 4.165 tons per acre per year for short-term disturbances and a rate of 1.602 tons per acre per year for post-reclamation disturbances in the long term, and estimated that areas impacted by short-term surface disturbance would experience 0.34 inches of runoff per year, and in the long term, average runoff would drop to 0.19 inches per year. The WEPP model estimated that there would be only trace amounts of annual runoff from undisturbed

areas. Appendix V provides a full list of the assumptions and parameters used in the WEPP analysis, and a table of erosion rates calculated by resource area.

Other assumptions used in this impact analysis include:

- There would be little or no runoff from undisturbed rangelands and forestlands (Laufen et al. 2000; Elliot et al. 2000).
- Bare soil (without vegetation or other surface cover) with a surface layer that has been altered from its natural condition is more susceptible to accelerated wind and water erosion than undisturbed soil.
- Implementing the *Wyoming Standards for Healthy Rangelands* (Appendix N) improves vegetation health, vigor, cover, and litter, as well as minimizes erosion rates in most areas.
- Wind erosion can affect soil productivity in a similar manner as water erosion. Because current soils data is not adequate to make a realistic determination of acres susceptible to wind erosion on rangelands, and there is no wind-erosion prediction technology available for use in a rangeland setting, this analysis will be limited to impacts resulting from water erosion.
- Most soils with a moderate water erosion potential within the Planning Area correlate with steep slopes (greater than 15 percent).
- The BLM will use BMPs to reduce runoff, soil erosion, and sediment yield, and to retain water on the landscape.
- To be effective on highly erodible soils, more extensive BMPs than those in common use are required to be utilized and aggressively maintained. The risk of BMP failure is greater on highly erodible soils.
- Although some forms of surface disturbance are restricted on slopes greater than 25 percent, it is assumed disturbance on highly erosive soils is distributed across the landscape in the same proportion these soils occur on the land, unless a proposed management action specifies additional protective measures. In other words, if 5 percent of the soils in the Planning Area are highly erosive, then it is assumed that 5 percent of the projected total disturbance would occur on highly erosive soils.
- Projected surface disturbance for each alternative potentially modifies soils by disrupting soil stability, changing vegetative cover that can reduce nutrient recycling, damaging biological crusts, decreasing productivity, and increasing compaction. When these modifications occur on highly erodible soils, the potential for accelerated erosion is greater than on less erodible soils. Site-specific erosion predictions and calculations require detailed soil mapping of areas to be disturbed. Soil mapping during site-specific analysis enables the BLM to minimize disturbance of highly erodible or otherwise sensitive soils.
- Sensitive soils incur greater adverse impacts from surface-disturbing activities than nonsensitive soils. Sensitive soils are fragile and especially susceptible to adverse impacts from surface disturbance because they are highly erodible and saline, sodic, or alkaline, or have a low reclamation potential. These fragile soils have limited reclamation potential either because of the vegetative community, physical or chemical limitations, susceptibility to erosion, or steep slopes.
- Installing and maintaining erosion controls and other mitigation measures, such as BMPs, result in a substantial reduction in soil erosion, depending on site conditions. However, these measures may not reduce adverse soil compaction and productivity impacts.

- Subject to applicable laws and regulations, surface-disturbing activities on fragile soils, soils with low reclamation potential, and soils with highly erosive characteristics will be authorized on a case-by-case basis.
- Fine-textured soils are more susceptible to water erosion and compaction when wet, whereas coarse-textured soils are more susceptible to wind erosion.
- Unless constrained by a management action or other data, surface disturbance will increase throughout the Planning Area during the planning cycle.

4.1.3.2 Summary of Impacts by Alternative

Impacts to soil resources may result from surface disturbance associated with a variety of resource programs that result in vegetation removal including mineral resources development, motorized vehicle use, road construction, and recreation. Concentrated or improperly managed livestock grazing can also result in adverse impacts to soil due to herbaceous vegetation removal. The greatest impacts to soil resources are anticipated under Alternative C, which would result in the greatest surface disturbance and erosion. The erosion rate due to surface-disturbing activities under Alternative C is estimated to be 66,459 tons per year in the long term, followed by Alternative D (29,326 tons per year), Alternative F (28,297 tons per year), Alternative A (25,065 tons per year), Alternative B (17,450 tons per year), and Alternative E (17,305 tons per year). Alternative E would result in the fewest potential adverse impacts to soil resources because it includes the most restrictions on surface-disturbing activities compared to the other alternatives. Alternative E also includes the most proactive management to minimize adverse impacts to soils in disturbed areas, followed by alternatives B, F, D, C, and A.

4.1.3.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Soils on BLM-administered surface lands and federal mineral estate could be disturbed under each alternative by activities proposed across a variety of resource programs. In disturbed areas, the WEPP model predicts an erosion rate of 4.165 tons per acre per year in the short term, which, after reclamation, would decrease to 1.602 tons per acre per year in the long term. This base erosion rate remains constant under each alternative. The intensity of impacts from erosion would vary under each alternative based on the area of projected surface disturbance. The intensity of impacts to soil resources from surface-disturbing activities under all alternatives is anticipated to be similar to the reasonable foreseeable actions identified in Appendix T.

Actions such as mineral resources development, motorized vehicle use, road construction, and recreation that disturb the soil surface can increase runoff and erosion, resulting in adverse impacts. The BLM utilizes various methods to minimize impacts to soil resources under all alternatives. BMPs, watershed enhancement projects, conservation practices, Storm Water Discharge Plans, and reclamation plans are designed to reduce impacts to soil, resulting in more successful reclamation, reduction in impacts during the time that soil is bare, as well as reduced runoff, soil erosion, and sediment yield. The BLM mitigates impacts from surface-disturbing and disruptive activities through the application of the *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix H).

Motorized vehicle use can compact the soil surface and remove vegetative cover that would protect soil from runoff events. Management that limits motorized vehicle use to existing roads and trails would

prevent route proliferation and vegetation removal that may increase erosion. In addition, management actions that restore plant communities would enhance soil resources by restoring infiltration, organic matter content, productivity, and reducing erosion.

Wild horses can adversely affect soils, especially in Herd Management Areas (HMAs) where concentrated year-round grazing can occur. Studies have shown that areas with wild horses experience increased compaction of the soil surface, especially in areas with finer-textured soils (Beever 2003; Beever and Herrick 2006). Horse-occupied sites also have been shown to have a lower abundance of grass and shrub cover on rangeland compared to sites where horses have been removed (Beever and Herrick 2006). Horses tend to use only a few trails to get water, which concentrates their movement and defecations and results in a greater impact to soil resources in these areas (Beever 2003). The impacts to soils from wild horses will likely be similar across all alternatives since the initial appropriate management levels for the HMAs do not vary.

Livestock, on the other hand, unless they are near a water source, tend to distribute themselves more uniformly across the landscape when grazing, thereby distributing the impacts. The BLM utilizes the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N) to protect and improve rangeland health, which is generally effective in managing the impacts to soils from livestock grazing.

Disposal of topsoil within the Planning Area is prohibited, which would result in beneficial impacts to soil resources, because this management would prevent the removal of soil at the startup of surface-disturbing activities or the loss of soil through disposals.

Actions that restrict surface disturbance in the Planning Area occur under all alternatives and generally are considered to have a beneficial impact on soil resources. For example, withdrawals that close areas to operation of the public land laws would reduce the potential for impacts to soil from surface-disturbing activities.

Alternative A

Surface Disturbance

Projected short-term disturbance from all BLM actions under Alternative A (current management) would affect 136,253 acres, resulting in erosion rates of 567,492 tons per year. After reclamation, long-term erosion rates would average 25,065 tons per year. Standard BMPs and mitigation guidelines combined with the restrictions on development on slopes greater than 25 percent are generally effective in mitigating impacts to soil and water resources under normal conditions.

Resource Uses

Surface-disturbing activities associated with mineral development expose soils to increased erosion potential in both the short term and long term. With projected initial disturbance of 25,552 acres for mineral resource development, short-term erosion rates would average 106,424 tons per year under Alternative A (Appendix T and Appendix V). Once these sites are stabilized and reclaimed, erosion rates would drop to 20,879 tons per year. Increases in surface disturbance related to mineral development may result in a proportional increase in impacts to soils.

Alternative A designates 115,905 acres of BLM-administered surface land available for disposal. Uncontrolled surface-disturbing activity would adversely affect land transferred out of federal control. Alternative A withdraws the second most acreage from operation of the public land laws in the Planning Area. Land withdrawn from operation under the public land laws would reduce the potential for

impacts to soil from surface-disturbing activities. The greatest long-term disturbance from ROW development would be from roads and other ROW facilities (typically associated with oil and gas facilities and mineral development). The projected initial erosion rate from disturbance associated with other ROW facilities would be 875 tons per year, which would decrease to 336 tons per year after reclamation. With the projection of 1,966 acres of disturbance associated with road construction (primarily related to oil and gas development and other local demand), short-term erosion would be 5,217 tons per year (Appendix T and Appendix V). Once new roads are stabilized, long-term erosion rates would average 2,608 tons per year.

Comprehensive travel and transportation management (CTTM) under Alternative A restricts motorized vehicle use in the majority of the Planning Area to existing roads and trails. The BLM anticipates an increase in motorized vehicle use in the Planning Area over the life of the plan. Increased motorized vehicle use on more user-created trails would accelerate degradation of the soil resource by removing vegetative cover and increasing erosion in more areas. Short-term disturbance associated with the creation of new roads and trails in areas open to cross-country motorized travel is predicted to disturb 1,233 acres, with erosion rates of 5,135 tons per year. Once these areas are stabilized, long-term erosion rates would average 1,338 tons per year (Appendix V).

Most of the Planning Area would remain open to livestock grazing under this alternative. Concentrated herbivory can result in adverse impacts when adequate vegetation does not remain to protect the soil resource. Excessive vegetation removal can cause soil compaction that reduces infiltration, increases runoff, and hampers reclamation. Livestock grazing management under Alternative A provides for protection or enhancement of other resource values, which would provide beneficial impacts to soils. Alternative A prohibits the placement of salt, mineral, or forage supplements within ¼ mile of water, wetlands, riparian areas, and reclaimed or reforested areas, which would reduce vegetation removal and soil compaction from concentrated livestock grazing. Rangeland improvement projects, including spring development, pipeline development, reservoir/pit development, fence development, well development, and reservoir maintenance development, are predicted to result in an initial disturbance of 370 acres and erosion rates averaging 1,541 tons per year (Appendix T and Appendix V). Revegetation would usually occur within several growing seasons and long-term erosion rates would average 34 tons per year.

Special Designations

Alternative A places constraints and restrictions on surface-disturbing and disruptive activities in certain special designation and other management areas where surface disturbance is minimized. Such areas, including Wilderness Study Areas (WSAs) (141,068 acres), Wild and Scenic River (WSR) eligible waterways (27,317 acres), and Areas of Critical Environmental Concern (ACECs) (71,646 acres), include restrictions that limit surface disturbance, resulting in beneficial impacts to soil resources within these areas. The Carter Mountain ACEC (10,867 acres) and Upper Owl Creek ACEC (13,758 acres), designated under Alternative A, include specific management prescriptions designed to protect fragile soils.

Resources

Fire and fuels management may have an adverse impact as well as a beneficial impact on soil resources. Fire in the Planning Area can affect soils in the short term by removing vegetation and exposing soils to water and wind erosion. Under certain conditions, intense fires can create hydrophic soil conditions (i.e., resistance to water infiltration), whereby runoff and erosion are increased. Wildfires in the Planning Area are estimated to result in 117,620 acres of surface disturbance, which is not anticipated to vary by alternative, and an average erosion rate of 489,887 tons per year. In the long term, however,

provided vegetative recovery is successful, fire can have a beneficial effect on soil resources by reducing long-term erosion and the risk of catastrophic fire.

Suppression and rehabilitation activities can also have the potential to affect the soil resource in both the short and long term. Activities such as firebreak construction, clearing vegetation, and use of heavy equipment would disturb the soil surface and increase erosion in the short term. For example, fire lines constructed during suppression efforts can channelize surface runoff, which can result in gully erosion. In the long term, however, successful stabilization efforts can increase cover with a subsequent reduction in the natural rate of erosion.

Alternative A utilizes wildland fire to restore fire-adapted ecosystems and to reduce hazardous fuels. The BLM anticipates that fire management would result in 40,000 acres of short-term disturbance from prescribed fire and 30,000 acres of short-term disturbance from mechanical fuels treatment on BLM-administered land in the Planning Area (Appendix T). This disturbance would result in an average erosion rate of 166,600 tons per year for prescribed fire and 124,950 tons per year for mechanical fuel treatments. The BLM does not anticipate long-term surface disturbance or associated erosion from prescribed fire or mechanical fuels treatments following reclamation.

Management actions under Alternative A designed to protect wildlife and special status species habitat from the impacts of surface-disturbing and disruptive activities also would protect soil resources from these activities. Management actions such as applying no surface occupancy (NSO) restrictions within big game crucial winter range and applying a controlled surface use (CSU) stipulation within ¼ mile of occupied greater sage-grouse leks would reduce the chance of erosion. Vegetation management in crucial wildlife habitat is an additional beneficial impact for soil resources.

Proactive Management

Existing management actions intended to protect soils include analyzing all surface-disturbing and disruptive activities for suitability and impact, seeding areas impacted by surface-disturbing activities, and reestablishing vegetative cover within 5 years of initial seeding. The use of native plant species under Alternative A would not have a substantial impact on runoff and erosion. Under Alternative A, the BLM considers topsoil salvage and the stabilization of heavily eroded or washed out roads on a case-by-case basis. The BLM also implements watershed improvement practices to reduce sediment loadings in streams. This includes seeding, riparian/stream restoration, travel management, head cut control and sediment capture and containment projects. This alternative requires stabilization of existing watershed improvement projects where they have failed to promote, enhance, or improve watershed stability. However, Alternative A does not require reclamation plans. Reclamation plans can improve the effectiveness of the reclamation process and reduce the risk of additional soil degradation. Due to the increase in off-road motorized vehicle use in the Planning Area, two-track trails and unimproved roads are a substantial source of runoff and sediment. The lack of mandatory action to stabilize heavily eroded or washed out roads increases the potential for degradation of watershed health.

Alternative B

Surface Disturbance

Alternative B includes less acreage subject to surface-disturbing activities through management actions for other resources than Alternative A; therefore, surface disturbance under this alternative would result in less impacts to soils than Alternative A. Under this alternative, projected short-term disturbance from all BLM actions would affect 73,940 acres. Erosion rates for short-term disturbance under Alternative B would be 307,960 tons per year. Following reclamation of disturbed sites, the

projected long-term erosion rates would average 17,450 tons per year; 7,615 tons per year less than Alternative A.

Alternative B includes greater restrictions on surface-disturbing activities than Alternative A for the protection of other resources such as special designations, crucial wildlife habitat, and recreation management areas.

Resource Uses

With the projected initial disturbance of 17,306 acres for mineral resource development, short-term erosion rates would average 72,079 tons per year under Alternative B (Appendix T and Appendix V). After these sites are stabilized and reclaimed, erosion rates would drop to 9,942 tons per year, 10,937 tons per year less than Alternative A.

Under Alternative B, the impacts of disposal and retention would be similar to those described under Alternative A. Under Alternative B, 24,042 acres are identified for disposal, which is less than under Alternative A. Disposing of potentially less land may decrease the potential for uncontrolled surface-disturbing activities and soil resource degradation. Withdrawals under Alternative B would close the most land to operation under the public land laws relative to the other alternatives. The projected initial erosion rate from disturbance associated with other ROW facilities (typically associated with oil and gas facilities and mineral development) would be 396 tons per year, which would decrease to 152 tons per year after reclamation, which is less than Alternative A. With the projection of 1,229 acres of disturbance associated with road construction (primarily related to oil and gas development and other local demand), short-term erosion would be 3,261 tons per year (Appendix T and Appendix V). Once the roads are stabilized, long-term erosion rates would be 1,632 tons per year, 976 tons per year less than Alternative A.

Alternative B designates the majority of the Planning Area as limited to designated road and trails for motorized vehicle use, reducing the potential for new route proliferation and providing more protection to soil resources than Alternative A. Compared to Alternative A, which designates the most acreage in the Planning Area as limited to existing roads and trails, and although inappropriate use of vehicles may still occur in areas limited to designated roads and trails, Alternative B would allow greater management control over motorized vehicle use and help limit the impacts to soils. Alternative B also designates a larger area as closed to motorized vehicle use compared to alternatives A, C, and D. Short-term disturbance associated with new road and trail creation in areas open to cross-country motorized travel under Alternative B is predicted to disturb 2,776 acres, with erosion rates of 11,562 tons per year (Appendix T and Appendix V). Once these areas are stabilized, long-term erosion rates would average 1,711 tons per year, which is higher than Alternative A.

Under this alternative, a large portion of the Planning Area is closed to livestock grazing (1,984,211 acres). A ½-mile buffer prohibiting the placement of salt, mineral, or forage supplements near water, wetlands, riparian areas, and reclaimed or reforested areas would provide greater protection of soil in these areas compared to Alternative A. Short-term erosion rates associated with rangeland improvement projects in the Planning Area would average 771 tons per year based on an initial disturbance of 185 acres. After reclamation, long-term erosion rates would average 17 tons per year.

Special Designations

Compared to Alternative A, Alternative B places more restrictions on surface-disturbing activity within special designations and other management areas where surface disturbance is minimized. Many of these areas designated and managed under Alternative B, including ACECs (302,490 acres), Special Recreation Management Areas (SRMAs) and Recreation Management Zones (RMZs) (933,831 acres),

WSAs (141,068 acres), WSR suitable waterways (27,317 acres), and lands with wilderness characteristics managed specifically to preserve their wilderness characteristics (476,349 acres), include restrictions such as NSO, mineral withdrawals, and prohibitions on surface-disturbing activities that would, subject to applicable laws and regulations, result in long-term beneficial impacts to soil resources within these areas. Similar to Alternative A, the Carter Mountain ACEC (16,574 acres) and Upper Owl Creek ACEC (32,733 acres) include specific management prescriptions designed to protect fragile soils. However, the beneficial impact would be greater under Alternative B because the two ACECs include a combined additional 24,681 acres more than the same two ACECs under Alternative A.

Resources

Fire and fuels management under Alternative B utilizes wildland fire and other vegetative treatments to restore fire-adapted ecosystems for natural resource systems and to reduce hazardous fuels. The BLM anticipates that management will result in 20,000 acres of short-term disturbance from prescribed fire and 5,000 acres of short-term disturbance from mechanical fuels treatment on BLM-administered land in the Planning Area (Appendix T). This would result in an average erosion rate of 83,300 tons per year for prescribed fire and 20,825 tons per year for mechanical fuel treatments, 83,300 tons per year and 104,125 tons per year less than Alternative A, respectively.

Alternative B applies greater restrictions on surface-disturbing activities designed to protect wildlife and special status species habitat than Alternative A and therefore has a greater beneficial impact on soil resources. Vegetation management in crucial wildlife habitat is an added beneficial impact for soil resources.

Proactive Management

The management prescriptions on lands administered by the BLM under Alternative B are more protective of soil resources than Alternative A. Proactive management actions under this alternative include taking inventory of erosion rates and analyzing impacts from surface-disturbing activities by mapping soils, collecting samples, and evaluating current conditions. Site-specific data would result in better project design, BMP implementation, and better reclamation.

Proactive management also includes reestablishing native plant communities in disturbed areas, requiring topsoil salvage for all surface-disturbing activities, and requiring photo point monitoring of all channel crossings and all surface disturbance greater than ½ acre. The BLM would improve watershed health through the development of watershed improvement practices including seeding, riparian/stream restoration, travel management, head cut control and sediment capture and containment projects in cooperation with local governments and by stabilizing watershed projects if they are no longer meeting source objectives to prevent the release of stored sediment. Protecting watershed health will help to reduce the incidence of runoff and erosion.

Successful reclamation efforts following surface disturbance reduce the chance of long-term impacts to soil. Under Alternative B, higher reclamation standards and greater proactive management would improve reclamation success compared to Alternative A. Requiring reclamation plans before any authorized surface-disturbing activity leads to more successful reclamation efforts, which would benefit soils. A temporary protective surface treatment (such as mulch, netting, or tackifiers) used for the reclamation of all mechanically disturbed areas would, on average, reduce erosion rates in the short term by 2.97 tons per acre per year in these areas. Alternative B requires a more stringent reclamation standard than Alternative A by requiring 50 percent pre-disturbance of desired vegetative cover within three growing seasons and 80 percent pre-disturbance vegetative cover within 5 years of initial seeding.

While providing a beneficial impact to soils by reestablishing vegetative cover, the use of native plant species in disturbed areas would not have a substantial impact on runoff and erosion.

Alternative B mitigates the impacts to soil from the increase in off-road motorized vehicle use in the Planning Area by closing and reclaiming eroded roads and trails if alternative roads and trails are available and stabilizing or relocating these roads and trails if alternative routes are not available. Applying proactive management actions under this alternative would provide the most beneficial impacts to soils of any alternative.

Alternative C

Surface Disturbance

Alternative C places the fewest restrictions on resource uses with the result that more acreage is subject to surface-disturbing activities than the other alternatives. Under this alternative, projected short-term disturbance from all BLM actions would affect 245,642 acres, the most of any alternative. Erosion rates for short-term disturbance under Alternative C would be 1,023,099 tons per year. Following reclamation of disturbed sites, the projected long-term erosion rates would average 66,459 tons per year, over twice as high as under Alternative A.

As with the other alternatives, restrictions on surface-disturbing activities for the protection of other resources (e.g., water, biological resources, and special designations) may provide additional protection for soil resources.

Resource Uses

With the projected initial disturbance of 25,912 acres for mineral resource development, short-term erosion rates would be 107,923 tons per year under Alternative C. Once these sites are stabilized and reclaimed, erosion rates would decrease to 21,114 tons per year, slightly more than under Alternative A.

Alternative C identifies the most acreage of all alternatives for disposal of BLM-administered surface lands (117,845 acres), resulting in greater uncertainty of future land uses and impacts to soil. Alternative C designates the fewest acres for withdrawal from the operation of the public land laws than the other alternatives, which increases the potential for adverse impacts to soil. The projected erosion rates from surface disturbance associated with other ROW facilities (typically associated with oil and gas facilities) are the highest of any alternative, averaging 970 tons per year in the short term and 373 tons per year in the long term. With the projection of 4,638 acres of surface disturbance associated with road construction (primarily related to oil and gas development and other local demand), short-term erosion rates would be 12,307 tons per year (Appendix T and Appendix V). Once the roads are stabilized, long-term erosion rates would average 6,154 tons per year, the highest of all alternatives.

Alternative C limits motorized vehicle use to existing roads and trails in the majority of the Planning Area, resulting in similar impacts as those described under Alternative A. Alternative C closes the fewest number of acres to motorized vehicle use and opens more acreage to cross-country motorized travel than any other alternative, resulting in the least protection of soil resources in sensitive areas. The areas open to cross-country motorized travel, such as Basin Gardens Play Area SRMA and Lovell Lakes "Motocross" area, would have a higher probability of erosion and long-term soil degradation than areas that close or limit motorized vehicle use. Partly because more acreage is open to cross-country motorized travel, short-term disturbance associated with the creation of new roads and trails for recreational purposes (12,907 acres) is projected to be higher under Alternative C than under the other alternatives. The creation of these roads and trails would result in erosion rates of 53,758 tons per year

in the short term, the highest of all alternatives (Appendix V). Once these areas stabilize, long-term erosion rates would average 20,401 tons per year.

Under Alternative C, the majority of the Planning Area is available for livestock grazing. The BLM manages livestock grazing to optimize commodity production while meeting rangeland health standards but not specifically to enhance other resource values. Management under Alternative C also does not prohibit the placement of salt, mineral, or forage supplements, and increases the potential for adverse impacts to soil near water, wetlands, riparian areas, and reclaimed or reforested areas. This alternative focuses on rangeland improvement projects to mitigate impacts to resources. Short-term erosion rates associated with rangeland improvement projects in the Planning Area would be 3,082 tons per year based on an initial disturbance of 740 acres. After reclamation, long-term erosion rates would decrease to 74 tons per year, higher than the other alternatives.

Special Designations

Compared to other alternatives, Alternative C prescribes fewer restrictions on surface-disturbing and disruptive activities for a smaller number of special designations and other management areas where surface disturbance is minimized. Alternative C designates two ACECs (11,799 acres) which provide protection for the soil resource by limiting surface-disturbing and disruptive activities. Alternative C also manages the 10 WSAs (141,068 acres) in accordance with BLM Manual 6330, *Management of Wilderness Study Areas* to maintain the non-impairment standard, and therefore provides protections for soils within these areas. Alternative C, in contrast to Alternative B, does not include special management prescriptions for WSR eligible waterways or lands with wilderness characteristics that would provide additional protection for soils.

Resources

Fire and fuels management under Alternative C utilizes wildland fire and other vegetative treatments to restore fire-adapted ecosystems, to enhance forage for commodity production, and to reduce hazardous fuels. The BLM anticipates that management would result in 80,000 acres of short-term disturbance from prescribed fire and 60,000 acres of short-term disturbance from mechanical fuels treatment on BLM-administered land in the Planning Area (Appendix T). This would result in an average erosion rate of 333,200 tons per year for prescribed fire and 249,900 tons per year for mechanical fuel treatments, which are the highest erosion rates of all alternatives. In comparison, wildland fires in the Planning Area are estimated to result in 117,620 acres of disturbance, which is not anticipated to vary based on alternative, and an average erosion rate of 489,887 tons per year.

In contrast to the other alternatives, Alternative C applies fewer management restrictions on surface-disturbing and disruptive activity designed to protect wildlife and special status species. The absence or reduction of these restrictions results in greater potential for adverse impacts to soil resources.

Proactive Management

Proactive management under Alternative C is similar to Alternative A. However, unlike Alternative A, Alternative C reestablishes plant communities in disturbed areas to increase commodity production and requires reclamation plans on a case-by-case basis. The use of reclamation plans can increase the use of BMPs to better protect the soil resource and improve overall reclamation success. Alternative C sets a lower vegetation restoration standard than alternatives B and D. Alternative C requires 30 percent desired vegetative cover within three growing seasons compared to Alternative A, which does not specify the degree of cover to be restored. Low vegetative cover increases the chance of erosion and nutrient loss, which increases the difficulty of achieving successful final reclamation. On a case-by-case basis, watershed projects are stabilized if they are no longer meeting resource objectives, resulting in a

beneficial impact to soil and watershed health by preventing the release of stored sediment. Other management actions beneficial to soil resources under Alternative C include stabilizing heavily eroded or washed out roads and collecting site-specific data through mapping, collecting, and evaluating current erosion conditions on a case-by-case basis. Site-specific data would result in better project design, BMP implementation, and better reclamation.

Alternative D

Surface Disturbance

Impacts to soil from surface disturbance under Alternative D are projected to be greater than under alternatives A and B but less than under Alternative C. Projected short-term disturbance from all BLM actions would affect 140,175 acres (Table 4-1), resulting in an erosion rate of 583,827 tons per year. After reclamation, the long-term erosion rate would average 29,326 tons per year, which is slightly greater than Alternative A.

Resource Uses

Under Alternative D, the projected amount of surface disturbed by activities associated with minerals development (25,229 acres) is greater than under Alternative B but less than under alternatives A and C. The predicted average erosion from surface disturbance would be 105,079 tons per year in the short term, reducing to 20,398 tons per year after reclamation and stabilization. Proper reclamation in accordance with an approved reclamation plan, stipulations, or measures, which are required under Alternative D, would help improve reclamation success and reduce long-term impacts to soil.

Alternative D identifies 66,363 acres for disposal of BLM-administered surface lands, more acres than under Alternative B but fewer than under alternatives A and C. Impacts to soil resources in areas disposed from federal ownership would be similar to those described for Alternative A. The erosion rate predicted from disturbance associated with other ROW facilities and road construction would be the same as under Alternative A.

CTTM under Alternative D would protect soil from motorized vehicle use on more acreage than alternatives A and C through closures and limiting motorized vehicle use to designated roads and trails, but would also designate the second most acreage as open to cross-country motorized travel (5,885 acres). Partly because more acreage is open to cross-country motorized travel and partly due to a higher projected rate of yearly new road and trail creation under this alternative, disturbance associated with the creation of new roads and trails (5,820 acres) is projected to be higher under Alternative D than under alternatives A and B but less than under Alternative C. Creating these roads and trails would result in erosion rates of 24,240 tons per year in the short term and 6,313 tons per year in the long term (Appendix T and Appendix V).

Livestock grazing management is conducted in a similar fashion as Alternative A, resulting in similar impacts to soils. Alternative D is projected to disturb the same acreage from rangeland improvement projects as Alternative A and result in the same amount of erosion.

Special Designations

Alternative D designates several special designations and other management areas that would minimize surface disturbance and provide a beneficial impact to soil in these areas. Management prescriptions for ACECs (105,498 acres) and WSAs (141,068 acres) can provide additional protection for soils from surface-disturbing activities. Alternative D protects a greater area in these special designations from surface-disturbing activities than alternatives A and C, but less than Alternative B. Management of

certain SRMAs would only allow surface-disturbing activities if the impacts could be avoided, minimized or mitigated, thereby reducing the impacts to soil in the long term. Similar to Alternative C, Alternative D does not include special management prescriptions for WSR eligible waterways that would provide additional protection for soils. Similar to Alternative A, the Carter Mountain ACEC (10,867 acres) and Upper Owl Creek ACEC (13,758 acres) include specific management prescriptions designed to protect fragile soils.

Resources

Fire and fuels management under Alternative D would utilize wildland fires and other vegetation treatments to restore fire-adapted ecosystems, reduce hazardous fuels, and accomplish resource management objectives. Under Alternative D, prescribed fire and mechanical fuels treatments are projected to disturb the same acreage as under Alternative A and would result in the same erosion rate and similar impacts to soils.

Management designed to protect fish and wildlife, special status species, and other biological resources would provide benefits to soil by limiting surface-disturbing activities and other actions that could degrade soil health. The beneficial impacts would be similar to those described under Alternative A except that several areas would require avoidance of surface-disturbing activities. In these areas, surface-disturbing activities would be prohibited unless the impacts could be mitigated, thereby limiting long-term adverse impacts.

Proactive Management

Overall, proactive management actions under Alternative D would provide soil resources with greater protection and improve reclamation efforts more than alternatives A and C but less than Alternative B. Stabilization of existing watershed improvement projects would prevent the release of stored sediment and the degradation of watershed health. In disturbed areas, the reestablishment of healthy native or desired plant communities (DPCs) would benefit soils by increasing vegetative cover and reducing runoff. Soil would also benefit from the reclamation standards under Alternative D, which considers final reclamation to be achieved if conditions are equal to or better than pre-disturbance site conditions. When appropriate for the site and situation, Alternative D would require temporary protective surface treatments such as weed-free mulch, matting, netting, or tackifiers to facilitate the reclamation of disturbed areas, which would result in beneficial impacts similar to those described for Alternative B.

Applying a Master Leasing Plan (MLP) to the Fifteenmile MLP Analysis Area (230,699) under Alternative D would reduce the potential for adverse impacts from oil and gas-related surface disturbance to Limited Reclamation Potential (LRP) soils. The MLP requirements include CSU restrictions, a minimum lease size of 640 acres, and allowing only one oil and gas-related facility, not exceeding 32 acres of surface disturbance at any given time, per lease. Although certain exceptions would apply, Alternative D also limits OHV use for notice of staking level casual use actions to areas within 300-feet of established roads with limited travel designations. The reduction in adverse effects from these restrictions would be limited by the generally low potential for oil and gas development within the Fifteenmile area. However, should oil and gas development occur, Alternative D management would provide less protection for LRP soils than Alternative B, which applies a NSO restriction and prohibits OHV use for notice of staking level casual use actions in the Fifteenmile MLP Analysis Area, but more protection than under alternatives A and C, which only apply case-by-case basis restrictions on surface-disturbing activities.

Alternative E

Surface Disturbance

Alternative E includes the greatest restrictions on surface-disturbing activities, compared to the other alternatives, for the protection of other resources such as special designations, crucial wildlife habitat, and recreation management areas, and would result in the fewest impacts on soils. Under Alternative E, projected short-term disturbance from all BLM actions would affect 71,829 acres (Table 4-1), resulting in a short-term erosion rate of 299,169 tons per year. Following reclamation of disturbed sites, projected long-term erosion rates would average 17,305 tons per year, which is the least among the alternatives. Management practices relating to surface disturbance would be the same as Alternative B, except for areas within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). In this ACEC, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) so they do not exceed one disturbance per 640 acres and cover less than 3 percent of the total sage-grouse habitat, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. This restrictive management over the large area of the ACEC would generally benefit soil resources by limiting the size and extent of disturbances.

Resource Uses

Under Alternative E, initial disturbance of 17,297 acres for mineral resource development is projected, and short-term erosion rates would average 72,042 tons per year under Alternative E (see Appendix T and Appendix V). Following stabilization and reclamation of disturbed areas, erosion rates are projected to drop to 9,936 tons per year, which is the same as Alternative B, and less than the other alternatives.

Alternative E identifies 24,042 acres for disposal (including disposal for specific uses), which is the same as Alternative B, decreasing the potential for surface-disturbing activities and soil resource degradation in areas removed from federal ownership. The initial erosion rate from disturbance associated with other ROW facilities would be 396 tons per year, decreasing to 152 tons per year after reclamation, which is the same as Alternative B, and less than the other alternatives (Appendix V).

Alternatives B and E include the most limitations on and closures to motorized vehicle use for resource protection. Therefore, these alternatives would minimize new route proliferation and provide more protection to soil resources than the other alternatives. Similarly, alternatives B and E close the largest area to motorized vehicle use compared to the other alternatives and include the greatest areas of seasonal closures. Under Alternative E, new road and trail creation in areas open to cross-country motorized travel would result in generally the same acreage of short- and long-term disturbance as Alternative B and erosion rates following stabilization would be the same as listed under Alternative B (Appendix T and Appendix V). Total disturbances associated with road construction under Alternative E are projected to be the same as Alternative B, resulting in less short- and long-term erosion when compared to alternatives A, C, D, and F (Appendix T and Appendix V).

Livestock grazing management under Alternative E would be the same as Alternative B, and impacts to soil would be the same as described under that alternative.

Special Designations

Special designations under Alternative E would be the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land within greater sage-grouse Key Habitat Areas that would be designated as an ACEC. The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative E would result in additional protection for soils in comparison to the other alternatives. Specifically, requirements include a full

reclamation bond to insure restoration of disturbed areas to their original condition and other habitat restoration and vegetation management requirements associated with the Greater Sage-Grouse Key Habitat Areas ACEC would reduce adverse impacts from surface-disturbing activities in greater sage-grouse Key Habitat Areas.

Resources

Fire and fuels management under Alternative E would result in the least amount of disturbance from fuels treatment and prescribed fire of any alternative, and the fewest short-term adverse impacts to soils from fire management activities. Approximately 18,000 acres of short-term disturbance from prescribed fire is projected under Alternative E (Appendix T). An average erosion rate of 74,970 tons per year for prescribed fire and 20,825 tons per year for mechanical fuel treatments is projected for Alternative E, which is the least for all alternatives (Appendix V). Post-fire reclamation requirements within the Greater Sage-Grouse Key Habitat Areas ACEC would result in additional beneficial impacts on soil retention through management practices that ensure long-term persistence of seeded and pre-treatment native plants.

Proactive Management

Soil resources management under Alternative E would generally be the same as Alternative B, and beneficial impacts to soils would be the same as Alternative B. However, areas in the Greater Sage-Grouse Key Habitat Areas ACEC would be subject to additional protective management under Alternative E; these additional protections would result in the greatest overall beneficial impacts to soil resources of any alternative.

Alternative F

Surface Disturbance

Impacts to soil resources from surface disturbance under Alternative F are projected to be greater than under alternatives A, B, and E, but less than under alternatives C and D. Short-term disturbance from all BLM actions would affect 137,065 acres (see Table 4-1 and Appendix T) under Alternative F, resulting in an erosion rate of 570,877 tons per year. Following reclamation, the long-term erosion rate would be 28,297 tons per year, which is greater than alternatives A, B, and E (Appendix V). Management practices restricting surface disturbances for the protection of other resources (such as soil, water, biological resources, and special designations) would be the same as Alternative D, except within areas of the proposed Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). In this ACEC, the BLM manages the density of disturbance to not exceed an average of one disruptive activity location per 640 acres and cover less than 3 percent of the total greater sage-grouse PHMAs, compared to a larger allowable disturbance of 5 percent under Alternative D. This restrictive management over the large area of the ACEC would generally benefit soil resources by limiting the size and extent of disturbances.

Resource Uses

The projected surface disturbance from minerals development would be 25,223 acres under Alternative F and would be greater than alternatives B and E, less than alternatives A and C, and generally the same as Alternative D (Appendix T). A predicted average erosion rate of 105,054 tons per year would result from these surface disturbances under Alternative F in the short term (Appendix V). Following reclamation and stabilization, the erosion rate is expected to decrease to 20,395 tons per year. Resource exploration, development, and extraction management under Alternative F would be the same as Alternative D, and impacts to soils would generally be the same as Alternative D. However,

in greater sage-grouse PHMAs, additional restrictions on leasable minerals under Alternative F would decrease surface disturbance impacts compared to Alternative D.

The management of lands and realty and ROWs under Alternative F would generally be the same as Alternative D, and impacts to soils would be the same as Alternative D.

Impacts from CTTM and recreation management under Alternative F would provide greater protections for soil resources than under alternatives A, C, and D, but fewer protections than under alternatives B and E. CTTM management practices for Alternative F would be the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC where motorized vehicle use would be limited to designated roads. Under Alternative F, disturbances associated with the creation of new roads and trails is projected to involve 1,343 acres and would be less than alternatives A, C, and D, but higher than under alternatives B and E (Appendix T). New road and trail construction under Alternative F would result in erosion rates of 3,564 tons per year in the short term and 1,783 tons per year in the long term (Appendix V).

Livestock grazing management under Alternative F would generally be the same as Alternative D, and impacts to soils would be the same as Alternative D. However, for areas within the Greater Sage-Grouse PHMAs ACEC, livestock grazing restrictions and vegetation management requirements under Alternative F would result in additional beneficial impacts to soil resources through increased vegetation cover and infiltration compared to Alternative D.

Special Designations

The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative F would result in greater protections for soil resources in comparison to alternatives A, C, and D, but fewer than under alternatives B and E. Special designations under Alternative F would be the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land within the Greater Sage-Grouse PHMAs ACEC. When compared to alternatives A and D, Alternative F would add additional management actions within the Greater Sage-Grouse PHMAs ACEC that would provide benefits to soil by limiting surface-disturbing activities and other actions that could degrade soil health. The beneficial impacts would be similar to Alternative A, except that more acreage would be managed to avoid and minimize surface-disturbing activities, thereby limiting short- and long-term adverse impacts.

Resources

Under Alternative F, prescribed fire and mechanical fuels treatments are projected to disturb less acreage than Alternative A and would subsequently result in decreased erosion rates. Approximately 40,000 acres of short-term disturbance from prescribed fire is projected under Alternative F (Appendix T). An average erosion rate of 166,600 tons per year for prescribed fire and 124,950 tons per year for mechanical fuel treatments is projected for Alternative F, the same as alternatives A and D, and greater than alternatives B and E (Appendix V). Disturbance from fuels treatments and prescribed fire under Alternative F would be the same as Alternative D, with the exception of additional fire management restrictions within the Greater Sage-Grouse PHMAs ACEC that would be designed to maintain or improve sagebrush habitat. The additional ACEC restrictions would decrease the potential adverse impacts to soil resources from fire management activities compared to alternatives A and D.

Proactive Management

Soil resources management that would benefit soil resources under Alternative F are the same as Alternative D for areas outside of the Greater Sage-Grouse PHMAs ACEC; management of areas inside

that ACEC would provide greater protection and improve reclamation efforts more than alternatives A, C, and D, but less than alternatives B and E.

4.1.4 Water

This section summarizes beneficial and adverse impacts to surface water quality and quantity, and groundwater quality and quantity. In addition, the section describes the differences between direct and indirect impacts and short- and long-term impacts.

Surface Water Quality

Adverse impacts to water quality are those that result in a violation of state water quality standards or degrade a designated use. Management actions that permit surface-disturbing activities that contribute to offsite erosion and sediment delivery are considered adverse impacts. Beneficial impacts to surface water quality result from management actions that improve water quality or minimize, reduce, or prevent offsite erosion or the discharge of supplemental water that is of lower quality than the ambient water quality of the receiving water. For example, management actions that stabilize watershed projects no longer meeting resource objectives or that seed degraded portions of watersheds would result in beneficial impacts to surface water quality.

Direct impacts to surface water quality are those that degrade the ambient water quality of surface waters in the Planning Area. For example, management actions that modify drainages, such as altering the number of linear water crossings or the distribution and condition of wetlands and riparian areas, would result in direct impacts to surface water quality. Indirect impacts are those that disturb soil in a watershed, especially highly erodible soil, as this leads to increased sedimentation.

Long-term impacts to surface water quality are those that result from bare soil or established point discharges that increase sediment loads or degrade water quality. Short-term impacts include exceedances of state water-quality standards mitigated within required timeframes, or surface disturbances temporarily affecting water quality that are reclaimed immediately after a temporary use.

Surface Water Quantity

Impacts to surface water quantity result from management actions that reduce or supplement streamflows and may be either beneficial or adverse, depending on the quantity and the location of the withdrawal(s) and/or discharge(s).

Direct impacts to surface water quantity result from management actions (e.g., vegetative and physical treatments, impoundments, retention and detention structures, etc.) that increase or decrease runoff, as well as from changes in the quantity of produced water discharged into the system. Direct impacts also result from adding or modifying diversions from the drainage system.

Indirect impacts to surface water quantity result from management that modifies the capacity of stream channels or result in changes to the amount of water reaching the stream system. For example, changes in the locations of roads that direct surface water runoff into drainages may increase or decrease the timing and amount of surface water flowing in the stream system. The distribution and condition of wetlands and riparian areas would indirectly result in changes to surface water quantity because they increase infiltration and delay peak flows.

Long-term impacts to surface water quantity are those that alter the amount of impervious surface in a drainage or change established discharges that alter supplemental streamflows (more than 5 years).

Short-term impacts include uses that may temporarily affect water quantity, such as temporary impoundments or detention structures.

Groundwater Quality and Quantity

Change in the number of wells drilled in a given area, including domestic or municipal water supply wells, and water disposal or injection wells, result in direct impacts to groundwater quality and quantity. Other factors include the number and location of springs developed, whether there are water conservation efforts in an area, and the amount of water infiltration and recharge. Oil- or gas-well stimulation methods also can directly affect groundwater, although proper construction, completion, and plugging/abandonment of oil, gas, water, and monitor wells would assist in protection of ground water resources.

Indirect impacts to groundwater quality and quantity result from activities that modify recharge areas related to a groundwater system or systems. For example, activities that decrease vegetative cover, or increase runoff, can reduce infiltration of precipitation, thereby reducing recharge to groundwater aquifers.

Short-term impacts to groundwater are those resulting from any temporary or short-term use of groundwater—for example, temporary use of a well to supply water for drilling an exploratory gas well or for supplementing the water supply in a grazing allotment. Long-term impacts to groundwater quality and quantity can result from permanent oil and gas fields and production facilities constructed in recharge areas, or from landscape alterations that modify groundwater recharge. Such impacts can include wells that deplete an aquifer through extraction of water, paved surfaces and compacted soils that decrease water infiltration, or wells used to inject water of similar quality (disposal wells) into the aquifer.

4.1.4.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Surface disturbance can affect surface water quality by increasing sediment transport, which can ultimately be transported to streams or other surface waters and by reducing infiltration, which affects surface water and groundwater quality, quantity, and timing.
- Surface disturbance can affect surface water quality by concentrating flow and increasing flow energy resulting in increased erosion. Most activities that result in 1 or more acres of surface disturbance require coverage under a Wyoming Pollutant Discharge Elimination System (WYPDES) storm water permit, and require a storm water pollution prevention plan that identifies specific BMPS to prevent or reduce erosion and pollution, periodic inspection and monitoring, and cannot result in a violation of water quality standards in the receiving stream.
- Actions that provide protection for the soil and vegetation resources will generally mitigate impacts on the water resource as well.
- Soils that are the most susceptible to erosion are the most likely to adversely affect surface water quality if disturbed. The amount of sedimentation is determined by many factors, including the amount of disturbed surface, the type of soil, the amount and timing of water sufficient to create overland flow, the proximity to established channels, the density and vigor of the vegetative community, the buffering capacity of land over which the water would flow, and the effectiveness of erosion-control measures, such as BMPs.

- The extent of two-tracks and unsurfaced roads (i.e., those without gravel or any other added surface material) is an indicator of the quantity of erosion and sediment delivery that may impact surface water quality within each watershed (Furniss et al. 2000).
- Produced water generated from oil and gas development adds to surface water flows and can supplement streamflows. It is assumed legal water rights are established according to the requirements of the state engineer if livestock producers or other land users choose to utilize this water.
- The impacts of produced water from coalbed natural gas (CBNG) wells have not been studied to the same extent as those of produced waters from conventional oil and gas wells, and may vary considerably based on the specific characteristics of the produced water and its receiving environment (Veil et al. 2004). For the purposes of this analysis, water produced from future CBNG wells in the Planning Area is assumed to be of essentially the same quality and quantity as produced water from conventional or deep oil and gas wells. Specific impacts from the disposal and treatment of produced water are regulated through the Wyoming DEQ WYPDES permitting program.
- Produced water discharged from oil and gas operations generally has a higher temperature than the naturally occurring surface water. However, most produced water discharges first enter a naturally ephemeral drainage that would otherwise not contain surface water. By the time the produced water does reach a perennial water, the temperature has cooled dramatically and there is little if any impact on the temperature of perennial water. Wyoming DEQ oversees the water from the point of discharge to assure that Wyoming rules and regulations are implemented so as to not change the ambient water temperature to levels that result in harmful acute or chronic effects to aquatic life, or that would not fully support existing and designated uses (Wyoming DEQ 2013d).
- Surface-disturbance associated with mineral development is one of many human activities that in addition to natural events have the potential to impact shallow groundwater quality and quantity. Locations in the Planning Area with depths to groundwater of less than 100 feet are considered the most likely to be impacted by mineral development or natural events. The shallower the depth to water, the more sensitive an aquifer is to contamination (Wyoming Geographic Information Science Center 1998).
- The state of Wyoming has primacy regarding water. This includes water quality standards and water rights. The BLM may use water as an indicator or management tool, but it does not directly manage water.
- The principal sources of surface disturbance from mineral development are roads and well pads for oil and gas and the disturbance created by solid mineral mining.
- Livestock usually affect soil less than other developments, but the tendency for livestock to concentrate in riparian areas and in the proximity of open water while simultaneously affecting riparian vegetation may increase loading of fecal bacteria and nitrate (NO_3) to surface waters, and may increase erosion and sedimentation. In cooperation, consultation, and coordination with permittees/lessees, cooperators, and other stakeholders, the BLM would develop and implement appropriate livestock grazing management actions to enhance rangeland health, improve forage for livestock, and meet other multiple use objectives by using the *Wyoming Guidelines for Livestock Grazing Management*, other appropriate BMPs, and development of appropriate range improvements.
- Herbivory use is typically disproportionately higher in riparian/wetland communities than in upland communities. Improper or unmanaged herbivory can adversely impact these areas

throughout the year, but surface impacts (due to hoof action) are generally greater in the spring and early summer, when soils are wet and, therefore, more vulnerable to compaction and stream banks are more vulnerable to sloughing. Because herbivores tend to congregate in these communities during the hot season (mid to late summer), the utilization levels in riparian/wetland areas can be high.

- Substantial disturbance to soil, including compaction of soil or changes in vegetative cover, would increase water runoff and downstream sediment loads and would lower soil productivity, thereby degrading water quality, channel structure, and overall watershed health. Several factors influence the degree of impacts attributed to any one disturbance or series of disturbances, including location within the watershed, time and degree of disturbance, existing vegetation, and precipitation.
- Changes in channel geomorphology due to activities may be detrimental to current designated uses. Sediment in channels is necessary for maintaining channel geomorphology and building riparian systems. Most channel systems achieve a channel form in equilibrium to the water and sediment being naturally supplied to it and generally respond to changes in sediment loads or streamflows by changing the channel form.
- Changes in flow frequency, volume, duration and/or energy, sediment loading, and bank degradation may degrade aquatic habitat and may affect other designated uses (e.g., stock-watering, irrigation, and drinking water supplies). Changes in water quality for surface waters, such as increases in pollutants, may also degrade aquatic habitat or affect other designated uses.
- The BLM policy prohibiting the mixing of chemicals within 500 feet of open water (BLM Handbook H-9011) would reduce the likelihood of chemical spills from federal actions contaminating surface waters.
- Because the state of Wyoming must comply with federal laws, compliance with state laws includes compliance with federal rules and regulations, including the Clean Water Act, Safe Drinking Water Act, and others. Therefore, it is assumed that any discharged water would meet water quality limits at the point of discharge.
- As populations expand in the area, disturbances that affect water in the Planning Area will most likely continue to expand.
- This analysis uses the WEPP model to calculate the runoff amounts and erosion rates used throughout this section. WEPP simulates the conditions that affect runoff and erosion, such as the amount of vegetation canopy and soil water content, to estimate runoff averages and erosion rates. For a more detailed description of the WEPP model and a list of the assumptions and parameters used in the analysis, see Section 4.1.3 *Soil* and Appendix V. All erosion rates and runoff amounts calculated using the WEPP model for this section were calculated using the same assumptions and input parameters that were used for Section 4.1.3 *Soil* and as described in Appendix V.

4.1.4.2 Summary of Impacts by Alternative

Adverse impacts to surface and groundwater quality and quantity include increased erosion and sediment loading in streams and may result from a variety of resource programs including soils management, minerals development, management of fish and wildlife, motorized vehicle use, and improper livestock grazing management. Reclamation and other management activities that increase vegetative cover result in beneficial impacts to water resources. Alternatives that result in more long-

term surface disturbances and stipulate fewer restrictions on resource uses that might affect water resources are anticipated to result in the greatest overall impact to water resources. Alternative C would result in the greatest adverse impacts to water resources due to the greatest projected surface disturbance and the fewest resource use restrictions. Although it would allow more long-term disturbance than Alternative A, Alternative D may result in fewer long-term adverse impacts to water resources due to increased reclamation standards and requirements for mitigation under this alternative. Alternative E would result in the fewest adverse impacts to water resources due to the comparatively smaller amount of projected surface disturbance and greater number of resource use restrictions under this alternative. Impacts to groundwater quality may result from produced water discharge where oil and gas wells are in areas with shallow groundwater. Alternative C is projected to result in the greatest number of new federal oil and gas wells, followed by alternatives A, D, F, B, and E (Appendix T).

4.1.4.3 Detailed Analysis of Alternatives

The following analysis focuses on potential short-term and long-term impacts to surface water and groundwater quality and quantity as a result of allowable uses and management actions proposed under each alternative. The proposed management of the following resource programs has the highest potential to beneficially or adversely affect water resources: locatable minerals, oil and gas (including, but not limited to the handling of produced water), soils (including restoration of healthy plant communities), fish and wildlife, CTTM, livestock grazing, and ACECs and other special designations. Other resource programs that have the potential to affect water resources include recreation (particularly the recreational use of OHVs), ROW improvements, watershed enhancement, invasive species, and forests, woodlands, and forest products (though these activities are usually small scale and do not totally denude the surface or alter root masses). Emphasis on the *Wyoming Standards for Healthy Rangelands* (Appendix N) would moderate impacts to water resources.

The principal factors used to differentiate between alternatives are the acres of projected surface disturbance for each alternative and the limitations of allowable uses and management actions. Alternatives with higher projected disturbance areas may lead to greater potential impacts to surface and groundwater (as described below under *Impacts Common to All Alternatives*). Similarly, greater or fewer allowable uses under an alternative would lead to a similar change in the potential for impacts to surface and groundwater. Due to the programmatic nature of the RMP alternatives, the timing and specific location of project actions that may affect resources are not defined. Alternative A is the primary point of comparison for all other alternatives.

Impacts Common to All Alternatives

Surface Water Quality Impacts

Actions that remove vegetation and loosen surface soil may cause surface runoff, resulting in soil erosion and sedimentation in the surface water system. Activities that compact soils can result in even greater runoff and erosion. Eroded soil that reaches surface water channels is a principal source of impaired surface water quality. The amount of sediment delivered to a stream depends on many factors (e.g., slope length and gradient, vegetative cover and type, and density of the drainage network), all of which may result in deposition of the sediment before it reaches a drainage (also called buffering). For example, large runoff events can lead to gully erosion, which can deliver large amounts of sediment in a small period.

Analysts used the WEPP analysis model, described in Section 4.1.3 *Soil* of this chapter, to estimate average runoff as a result of surface disturbances in the Planning Area. Analysts used the same assumptions they used to estimate soil erosion (see Section 4.1.3 *Soil* and Appendix V) to calculate the mean annual average runoff. The WEPP model estimates that areas affected by short-term surface disturbance would experience 0.34 inches of runoff per year. Once these areas are stabilized and reclaimed, the average runoff would drop to 0.19 inches per year in the long term. In comparison, the WEPP model estimates that with no disturbance there would be only trace amounts of annual runoff. The scale of impacts from runoff is anticipated to vary by alternative based on the amount of surface disturbance anticipated under each alternative. Therefore, if there is more acreage of surface disturbance, there is more impact to water resources in the Planning Area.

The highest potential for long-term surface disturbance under all alternatives would result from the development of minerals, fire and fuels management, forest management, ROW development (roads, pipelines, and powerlines), motorized vehicle use, and recreational site development. Soil disturbance may also result from invasive species and pest management, motorized vehicle use, livestock and wildlife grazing, and the reclamation of disturbed areas. Alternatives with greater projected surface disturbance would result in increased sedimentation. Livestock and wildlife also may introduce fecal coliform, NO_3, and sediment to surface waters, which would contribute to water quality impairment.

Roads intercept surface water runoff on the landscape and often direct flows to drainages through ditches and culverts. If roads are unsurfaced, runoff flowing down a road often picks up sediment that is then deposited in the surface water system at stream crossings or at culverts and water bars. Alternatives that increase the density of roads in a watershed, especially unsurfaced roads, may increase sedimentation. Roads may also act as conduits for directing contaminants from vehicles and resource management activities (e.g., pesticide applications) into the surface water system (Furniss et al. 2000). The aerial application of fire suppressant chemicals within 300 feet of perennial waters is avoided under all alternatives, which would reduce the potential for chemical contamination of surface waters.

Short-term and long-term surface disturbance (e.g., from oil and gas and other minerals development, or travel and transportation management) and herbivory within the Planning Area also may affect surface water quality. Those watersheds with the greatest proportion of highly erodible soils have the most potential for contributing sediment to the surface water system with the presence of surface-disturbing activities. Under all alternatives, implementation, inspection, and maintenance of BMPs and the development and implementation of Stormwater Pollution Prevention Plans, as required under the WYPDES Stormwater Program would minimize sedimentation within watersheds. Water management plans for surface discharges of produced water would include reclamation strategies, mitigation, and monitoring to track changes in receiving channels and to minimize adverse impacts to watershed health. The BLM monitors rangeland health to determine livestock grazing management actions necessary to control erosion and other water-quality issues, such as contamination by fecal coliform bacteria that affect surface waters. Proper management of livestock grazing can mitigate sediment delivery from erosion. WYPDES permits required by the state of Wyoming would regulate water quality changes associated with point source discharges (Wyoming DEQ 2004). In the case of WYPDES permits on public land, the BLM consults with Wyoming DEQ-Water Quality Division (WQD) during the permitting process and follows-up if issues associated with permitted discharges are discovered.

Management that reduces the production of sediment (e.g., through the enhancement of vegetative ground cover, proper livestock grazing management, or watershed improvement projects that reduce sediment transport into waterways) would have a beneficial impact on efforts to reduce sedimentation of Bighorn Lake. A 2009 study by the Bureau of Reclamation (BOR) and U.S. Army Corps of Engineers states that implementing BMPs in the Bighorn Basin could reduce the total sediment load entering this

reservoir. The study notes, however, that such an approach might not be a practical way to achieve substantial sediment reductions given conditions in the area, noting that it would require considerable time to achieve results noticeable in the northern portion of Bighorn Lake that are important for recreational access (USACE and BOR 2009).

The Wyoming DEQ WQD permits surface discharges of produced water from oil and gas wells through a WYPDES permit that requires compliance with specific water-quality standards. The quality of produced water discharged on the surface must be suitable for designated uses, such as agriculture and livestock, and cannot result in a violation of water-quality standards in the receiving stream. Due to prolonged contact with the formations that contain oil and gas and contamination from chemical additives used in well drilling and production, this water may be more saline and contain higher concentrations of organic compounds (e.g., oil and other hydrocarbons) and various inorganic compounds than the receiving surface waters (Veil et al. 2004). Adverse impacts on surface water quality from the introduction of these components of produced water would be minimized, but not eliminated, under all alternatives by following standard practices, BMPs, and guidelines for surface-disturbing activities. The properties of produced water can vary depending on the location of the producing well and the oil and gas formation, which will influence the application of BMPs and other measures intended to safeguard water quality.

Surface Water Quantity Impacts

When watersheds lack vegetation, surface infiltration into the soil decreases, causing more runoff to reach stream systems. As surface disturbance increases, so does the amount of bare soil, compacted soils, and possibly less-pervious areas in a watershed. As a result, more surface water runoff reaches streams in a shorter period of time, which increases the potential for sedimentation and the frequency of flooding or erosive velocities from high flows in channels. Conversely, activities such as reclamation would improve vegetative cover and would have a beneficial impact. Healthy vegetative cover increases infiltration of surface water flows, filters out sediment before it reaches drainages, reduces runoff, and lowers peak flows in the surface water system. Prescribed fire would reduce vegetation cover and increase sedimentation in the short term, but restoring fire-adapted ecosystems would increase vegetation cover and decrease the potential for large catastrophic fires in the long term. Concentrated grazing by livestock, wild horses in HMAs, and wildlife may contribute to soil compaction and damage to the vegetative cover and soil crust, thus increasing surface water runoff, erosion, and sedimentation.

Produced water from oil and gas wells sometimes is discharged to surface waters, thereby contributing to surface water flows. Beneficial impacts from produced water discharges include increased availability of surface water. Under conditions where produced water discharges enable the establishment of riparian vegetation, channel erosion and resulting impacts on water quality could decrease. Potential adverse impacts from produced water discharges include erosion, changes in stream morphology and increased loading of sediment, chlorine, selenium, and arsenic. This would be the case under all alternatives, including Alternative B, under which the BLM would prohibit new surface discharge of produced water on public lands. Surface discharges previously authorized by the state of Wyoming would be allowed to continue.

Groundwater Quality and Quantity Impacts

Potential sources of groundwater contamination may come from point sources, such as chemical spills, chemical storage tanks (aboveground and underground), industrial sites, landfills, household septic tanks, oil and gas well sites, oil and gas detention and retention ponds, well stimulation and hydraulic fracturing, and mining activities. Other possible sources of groundwater contamination may come from nonpoint sources, such as roadways and agricultural activities. Groundwater quality is most susceptible to pollution where the aquifer is shallow (within 100 feet of the surface), very permeable, or connected

directly to a surface water system, such as river gravels. Shallow aquifers are more vulnerable to contamination from activities that disturb the surface or subsurface in a given area. Produced water from oil and gas wells and, potentially, CBNG would have the greatest potential to affect groundwater quality and quantity where the wells or produced water discharge points are in areas with shallow depth to groundwater.

Potential impacts on groundwater resources from fluid mineral extraction activities could include the five following scenarios:

- Contamination of aquifers through the introduction of drilling fluids during drilling.
- Extended fracture growth allowing hydraulic fracturing fluid migration into source water zones or drinking water supplies.
- Cross-contamination of aquifers from the introduction of drilling fluids into one aquifer that travels upward into shallower units due to improperly sealed well casings.
- Localized depletion of unconfined groundwater availability.
- Progressive contamination of deep confined, shallow confined, and unconfined aquifers if the deep confined aquifers are not completely cased off from deeper units.

The BLM considers the application of BMPs as Required Design Features during site-specific permitting and compliance with federal rules and regulations to be adequate, to a reasonable level of certainty, in preventing groundwater contamination from fluid mineral extraction activities. In addition, proper construction, completion, and plugging/abandonment of oil, gas, water, and monitor wells, as well as the implementation of a groundwater monitoring program for oil and gas wells, in accordance with the rules of the Wyoming Oil and Gas Conservation Commission would assist in protection of ground water resources.

Proactive Management Actions

Management actions that would protect or enhance water resources, regardless of the alternative, include, but are not limited to: applying BMPs for oil and gas and water well drilling operations, mining, and other activities that could affect groundwater resources; using watershed improvement and conservation practices, and Stormwater Discharge Plans to reduce impacts; restoring healthy plant communities and vegetative cover after surface disturbance in a timely fashion; meeting Wyoming DEQ water quality standards; and participating in the development and implementation of local watershed management plans and/or total maximum daily loads (TMDLs) with interested stakeholders and the Wyoming DEQ WQD. The BLM designates the Spanish Point Karst ACEC under all alternatives, which would protect important groundwater recharge areas from surface-disturbing activities and other resource uses that may affect water quality.

Alternative A

Surface Disturbance

The BLM projects approximately 15,646 acres of long-term surface disturbance from BLM-authorized actions and approximately 136,253 acres of short-term surface disturbance (Table 4-1). Surface-disturbing activities would result in adverse impacts to water quality due to erosion, runoff, sedimentation, and potential changes in the chemical characteristics of water resources. Erosion rates, calculated using the WEPP model (Appendix V), are estimated to be 567,492 tons per year in the short term. After reclamation, long-term erosion rates would average 25,065 tons per year. The BLM analyzes all surface-disturbing activities for suitability and potential impact, which may reduce adverse

impacts from surface disturbances by allowing the BLM to impose additional mitigation to reduce erosion on some projects.

Resource Uses

Resource uses such as locatable minerals operations, oil and gas operations, travel and transportation management, and livestock grazing may result in both direct and indirect adverse impacts to water resources. Direct adverse impacts resulting from such activities include accidental chemical releases. Under Alternative A, the BLM allows the aerial application of pesticides near water on a case-by-case basis subject to label requirements, which would result in potential but limited direct adverse impacts to water quality. Indirect adverse impacts may result from surface disturbance, soil erosion, and resultant sedimentation. Alternative A would result in new roads from ROW development and user pioneered roads in areas open to cross-country motorized travel (Appendix T). The amount of new roads would result in proportional adverse impacts to soils, described under *Impacts Common to All Alternatives*. The BLM conducts the least extensive monitoring of grazing allotments under this alternative, which may result in less documentation of impacts to water quality, compared to the other alternatives. Alternative A prohibits the placement of salt, mineral, or forage supplements within ¼ mile of water, which would reduce the potential for soil compaction and vegetation removal adjacent to waterways from concentrated livestock grazing.

Under Alternative A, the BLM authorizes new activities resulting in the surface discharge of produced water if it meets State of Wyoming water quality standards. Such discharges could increase in-stream flow, thereby benefitting surface water quantity.

Special Designations

Special designations, such as ACECs, would restrict surface-disturbing activities and resource uses that may adversely impact water quality and quantity, which generally would result in beneficial impacts to water resources. Under Alternative A, ACECs and WSAs would encompass 44 and 19 miles of streams, respectively. Due to their size and management, special designations under Alternative A would result in the third-greatest beneficial impact to water resources, compared to the other alternatives.

Resources

Reclamation requirements to manage soil resources would result in beneficial impacts to water quality in the short term by reducing erosion and associated sedimentation, and water quality and quantity in the long term by reestablishing vegetation to reduce runoff. Under Alternative A, the BLM routinely seeds, or requires permittees and operators to seed, disturbed areas with native plant species or approved seed mixtures and reestablishes vegetative cover over disturbed areas within 5 years of initial seeding, but does not require temporary protective surface treatments for mechanically disturbed areas. The BLM considers stabilization of heavily eroded or washed-out roads as well as trail stabilization on a case-by-case basis. These management actions would result in beneficial impacts to soils and ultimately water quality under Alternative A.

Alternative A would result in disturbance from fuels treatments and prescribed fire that would result in adverse impacts to surface water quality and quantity, but the small area of these treatments and the use of BMPs would minimize these impacts. Alternative A would also result in long-term beneficial impacts from restoring fire-adapted ecosystems by reducing the potential for catastrophic fires that may cause greater adverse impacts to water resources.

Forests, woodlands, and forest products may result in adverse impacts to water quantity and quality under Alternative A. The BLM allows clear cuts of up to 300 yards in any direction under this alternative.

Clear cuts would increase sedimentation from increased erosion and runoff in clear-cut areas and result in adverse impacts to water resources. Spur roads generally are closed after completion of timber management, allowing vegetation to return, which would minimize long-term impacts to water resources from erosion in these areas.

To protect fish habitat, the BLM applies an NSO restriction and prohibits unnecessary and unmitigated surface-disturbing activities within 500 feet of surface water and riparian areas. This management would reduce adverse impacts to water quality from oil and gas development and other surface-disturbing activities.

Proactive Management

Proactive management actions under Alternative A that would result in beneficial impacts to surface water quality and quantity include implementing watershed improvement practices in Wyoming's Bighorn Basin water quality plans, encouraging the maintenance of natural flow regimes in streams supporting fisheries, and fencing streams and reservoirs as necessary. This alternative also benefits surface water quality and quantity by stabilizing existing failed watershed improvement projects to benefit watershed stability and by assessing erosion and soil stability during rangeland health evaluations.

Alternative B

Surface Disturbance

Over the long term, it is projected that BLM actions under Alternative B would disturb approximately 10,893 acres, 4,839 fewer acres than Alternative A, and would result in 17,450 tons per year of soil erosion. Projected short-term surface disturbance would affect approximately 73,940 acres (Table 4-1), resulting in an average of 307,960 tons of erosion per year. Alternative B requires additional analysis of soils for erosion potential, and therefore more information to prevent erosion than Alternative A, by requiring mapping of the soils in areas to be disturbed and elsewhere on BLM-administered lands to a series level, collecting soil samples, and evaluating current erosion conditions. Unlike Alternative A, Alternative B requires reclamation plans prior to surface-disturbing activities, increasing the chances for successful reclamation and reducing the chances for watershed decline. Surface-disturbing activities under Alternative B would also reduce the potential for erosion and sedimentation in surface waterbodies compared to Alternative A, resulting in less impervious surface to diminish groundwater recharge.

Resource Uses

Conservation measures under this alternative would improve water quality and quantity compared to Alternative A by reducing erosion and sedimentation, and increasing infiltration. Under Alternative B, the BLM prohibits the aerial application of pesticides within ½ mile of aquatic habitats, which would result in less potential for adverse water quality impacts compared to Alternative A. Alternative B would also result in fewer acres of new roads from ROW development and user pioneered roads in areas open to cross-country motorized travel (Appendix T), with proportional adverse impacts to water quality described under *Impacts Common to All Alternatives*.

The BLM conducts extensive monitoring of grazing allotments under Alternative B that do not meet the *Wyoming Standards for Healthy Rangelands* (Appendix N), which would result in more beneficial impacts to water quality than Alternative A by monitoring erosion. Alternative B prohibits the placement of salt, mineral, or forage supplements within ½ mile of water. The additional grazing

constraints under Alternative B may reduce the potential for fecal coliform and NO3 reaching surface waters when compared to Alternative A. In addition, reduced grazing in riparian areas under Alternative B would reduce erosion and sedimentation in surface waters, and reduced well development would reduce groundwater withdrawals when compared to Alternative A.

Alternative B places more restrictions on motorized vehicle use in the Planning Area than Alternative A, which would result in less potential for vegetation removal and soil compaction, and fewer water crossings and associated adverse impacts to water resources.

Additionally, new surface discharge of produced water on public lands is prohibited, which would result in less potential adverse impacts to surface water quality and groundwater quality and quantity, and less beneficial impacts to surface water quantity than Alternative A.

Special Designations

Alternative B designates an additional eight ACECs, the Absaroka Front Management Area and manages all lands with wilderness characteristics specifically to preserve their wilderness characteristics. Under this alternative, ACECs, WSAs, the Absaroka Front Management Area, and lands with wilderness characteristics would encompass 78, 19, 15, and 90 miles of streams, respectively. The relative size and additional restrictions on surface-disturbing activities and resource uses in these areas would result in additional protection for surface and groundwater compared to Alternative A.

Resources

Alternative B would result in less adverse impacts to water resources from short-term surface disturbance than Alternative A because it applies the most stringent requirements to minimize erosion. The BLM reestablishes native plant communities in disturbed areas; requires temporary protective surface treatments of disturbed areas, such as mulch, matting, netting, or tackifiers; requires interim and final reclamation of disturbed areas at the earliest feasible time; and closes or relocates heavily eroded or washed out roads and trails. Specifically, Alternative B requires the reestablishment of 50 percent of pre-disturbance levels of desired vegetative cover within three growing seasons following surface disturbance and 80 percent within 5 years of initial seeding to prevent erosion.

Alternative B would create less disturbance from fuels treatments and prescribed fire than Alternative A, which would therefore result in less short-term adverse impacts to surface water quality and quantity, but also less long-term beneficial impacts from restoring fire-adapted ecosystems to reduce the potential for catastrophic fires.

Forests, woodlands, and forest products management practices under Alternative B would result in less adverse impact to water resources than Alternative A. The BLM prohibits clear cuts and closes timber access and haul roads not required for existing uses, which would result in less potential for erosion and sedimentation than Alternative A.

To protect fisheries and riparian/wetland areas, the BLM applies an NSO restriction on wetland areas greater than 40 acres and prohibits surface-disturbing activities within ¼ mile of riparian/wetland areas, any Wyoming Game and Fish Department (WGFD)-Blue and Red Ribbon rated waters, and many major rivers in the Planning Area. The BLM allows sediment reduction structures on a case-by-case basis. These management practices under Alternative B would reduce adverse impacts to water quality from oil and gas development more than Alternative A.

Proactive Management

Under Alternative B, the BLM manages water resources with an emphasis on conservation. Proactive management actions under Alternative B that would result in beneficial impacts to surface water quality

and quantity include completing a greater number of watershed enhancement projects; maintaining natural flow regimes in priority streams; cooperating with adjacent landowners and managers to address impaired waterbodies on the state of Wyoming 303d list; and prohibiting activities that could affect water resources within a ¼ mile area around public water supply wells, rivers, streams, and other water bodies within 10 miles upstream of public water supply intakes. Watershed improvement projects are stabilized to prevent release of stored sediment if the project no longer meets resource objectives. Proactive management actions under Alternative B would result in the more beneficial impacts to water resources than Alternative A.

Alternative C

Surface Disturbance

Long-term (41,485 acres) and short-term (245,642 acres) surface disturbance under Alternative C constitute more acreage than under the other alternatives (Table 4-1). Similarly, erosion rates under Alternative C are the highest among the alternatives. Erosion rates would average 1,023,099 tons per year in the short term and 66,459 tons per year in the long term, over twice as high as the long-term erosion rate under Alternative A. Additional analysis of soils for erosion potential, which is required under Alternative B, is performed only on a case-by-case basis under Alternative C, reducing the relative potential benefits to soils. The BLM requires reclamation plans only on a case-by-case basis, which may reduce the beneficial impacts of this action compared to Alternative B. Overall, Alternative C would have the greatest potential for erosion and sedimentation in surface waterbodies and result in the most impervious surface to diminish groundwater recharge.

Resource Uses

Alternative C would have the most acreage available for surface disturbance when compared to the other alternatives, and, therefore, the greatest potential for adverse impacts to water resources among the alternatives. Alternative C prohibits the aerial application of pesticides within 100 feet of aquatic habitats, which would result in less potential water quality impact from the associated chemicals than alternatives A and D, but more than Alternative B. Alternative C would result in the most acreage of new roads from ROW development and user pioneered roads in areas open to cross-country motorized travel (Appendix T) with proportional adverse impacts to water quality described under *Impacts Common to All Alternatives*.

Potential impacts from grazing allotment monitoring would be similar to those under Alternative A. Alternative C allows the placement of salt, mineral, or forage supplements to maximize livestock use. This management action would result in the greatest potential impact to surface water from soil compaction and vegetation removal in riparian/wetland areas and from potential fecal coliform and NO_3 introduction, compared to all other alternatives.

Alternative C would allow the most motorized vehicle use in the Planning Area, including the most acreage open to cross-country motorized travel, which would result in the greatest potential vegetation removal, soil compaction, and water crossings and the associate impacts to water resources.

Alternative C would result in the same types of adverse and beneficial impacts from produced water disposals as described under *Impacts Common to All Alternatives* and Alternative A. However, expanded oil- and gas-well development projected under this alternative would result in the greatest intensity of these impacts, because groundwater withdrawals would increase compared to the other alternatives.

Special Designations

Except for travel restrictions, Alternative C proposes no specific management for the Absaroka Front Management Area, and also designates fewer ACECs than alternatives A, B or D, manages all WSR eligible waterway segments as unsuitable for inclusion in the National Wild and Scenic Rivers System (NWSRS), and does not manage any lands with wilderness characteristics to protect their wilderness characteristics. Under Alternative C, ACECs and WSAs encompass 9 and 19 miles of streams, respectively. Generally, Alternative C would protect fewer areas from surface-disturbing activities than the other alternatives and therefore would be the least beneficial to surface and groundwater.

Resources

To prevent erosion, Alternative C requires 30 percent of pre-disturbance vegetation cover within three growing seasons of initial seeding. However, unlike Alternative B, Alternative C does not institute long-term vegetation cover requirements. Alternative C would result in the greatest adverse impact to water resources from short-term surface disturbance due to the greater acreage disturbed under this alternative and because it applies the second-least stringent requirements to minimize erosion. Alternative C does require reclamation plans on a case-by-case basis and stabilizes heavily eroded or washed out trails, which are a major source of runoff and sediment.

Alternative C would result in the greatest disturbance from fuels treatments and prescribed fire. This disturbance would result in the greatest short-term adverse impacts to surface water quality and quantity, but would have the greatest long-term beneficial impact of restoring fire-adapted ecosystems to reduce the potential for catastrophic fires.

Forests, woodlands, and forest products management practices under Alternative C would result in similar impacts to water resources as under Alternative A. The BLM allows clear cuts of up to 100 acres (more area than under Alternative A) and permits timber access and haul roads to remain open to meet other resource goals and objectives, maintaining impervious surfaces in these areas.

Alternative C applies similar NSO restrictions as Alternative A, but allows surface-disturbing activities in flood plains or riparian/wetland areas on a case-by-case basis. These management practices under Alternative C would result in the greatest potential adverse impacts to water quality from oil and gas development, compared to the other alternatives.

Proactive Management

Under Alternative C, the BLM manages resources with an emphasis on resource uses. This alternative manages for the stabilization of watersheds through maintenance of existing watershed improvement projects. Under Alternative C, the BLM does not implement or develop new watershed improvement practices and only fences springs and their associated wetlands. Overall, proactive management actions under Alternative C would result in the fewest beneficial impacts to water resources, compared to the other alternatives.

Alternative D

Surface Disturbance

Under Alternative D, short- and long-term surface disturbance from BLM-authorized actions would disturb more acreage than alternatives A and B but less than Alternative C. Short-term surface disturbance of approximately 140,175 acres (Table 4-1) would result in an erosion rate of 583,827 tons per year. After reclamation, long-term surface disturbance (18,306 acres) would result in an erosion

rate of 29,326 tons per year. Impacts from surface disturbance and erosion would be similar to those described under Alternative A although to a slightly higher degree due to more acreage of surface disturbance and greater erosion potential. However, more stringent reclamation standards and a requirement for reclamation plans, stipulations, or measures would provide a greater beneficial impact to surface water than both alternatives A and C by increasing the potential for successful reclamation and reducing the potential for long-term erosion. Soil and erosion evaluations are conducted in a similar manner as under Alternative A, although a slightly greater benefit may occur by conducting soil surveys as funds become available.

Resource Uses

Alternative D allows more resource use that would result in greater surface disturbance than alternatives A and B, creating a greater potential for watershed health degradation than those two alternatives. However, for certain resource programs, such as minerals development, Alternative D is projected to result in less disturbance than alternatives A and C. The BLM allows the aerial application of pesticides near water on a case-by-case basis, which would result in the same impacts as Alternative A. Alternative D is estimated to result in more new roads from ROW development and user-pioneered roads than alternatives A and B, resulting in proportional impacts.

Potential impacts from grazing allotment monitoring would be similar to Alternative A. Alternative D prohibits the placement of salt, mineral, or forage supplements within ¼ mile of water, reducing the potential for adverse impacts from concentrated livestock grazing similarly to Alternative A.

Alternative D opens more area to cross-country motorized travel than alternatives A and B, creating mores areas that could be adversely affected by concentrated motorized vehicle use through increased runoff and erosion.

The surface discharge of produced water under Alternative D would be authorized for new activities where compatible with other resource objectives and in consultation with stakeholders. The impacts, both adverse and beneficial, from produced water disposals would be similar to those described under *Impacts Common to All Alternatives* and Alternative A. However, because the number of new federal wells projected under Alternative D would be less than under alternatives A and C, adverse impacts to water may be reduced overall. In addition, Alternative D would require water-monitoring plans for new activities resulting in surface discharges of water to track changes in receiving channels and to minimize adverse impacts to watershed health. If adverse impacts to receiving channels or watershed health occur, the development and implementation of water management plans, which include reclamation strategies and mitigation to address impacts, would be required.

Special Designations

Alternative D designates more acreage as ACECs than alternatives A and C and designates the Absaroka Front Management Area, which would limit surface disturbance and adverse impacts to water in these areas. However, like Alternative C, Alternative D manages all WSR eligible waterway segments as unsuitable for inclusion in the NWSRS. Under this alternative, ACECs, WSAs, and the Absaroka Front Management Area would encompass 48, 19, and 43 miles of streams, respectively, which would provide greater beneficial impacts to water resources than alternatives A and C but less than Alternative B.

Resources

Alternative D would help to reduce erosion and subsequent sediment loading in streams by reestablishing native or desired plant communities in disturbed areas; requiring temporary protective surface treatments of disturbed areas when appropriate; requiring interim and final reclamation of

disturbed areas at the earliest feasible time; and closing and reclaiming heavily eroded roads and trails if other stable roads and trails are available. While Alternative D does not specify timing requirements for achieving vegetative cover after surface disturbance, a potential adverse impact, it also does not consider successful final reclamation of vegetative cover to be achieved until conditions are equal to or better than pre-disturbance site conditions, a potential beneficial impact. Overall, measures to prevent erosion under Alternative D would result in a greater beneficial impact to surface water than under alternatives A and C, but less than under Alternative B.

Disturbance from fuels treatments and prescribed fire is projected to be the same as Alternative A with similar impacts.

In general, impacts from forests, woodlands, and forest products management would be similar to Alternative A. Spur roads would be assessed for closure on a case-by-case basis while clear cuts would be limited to 100 yards, potentially resulting in greater adverse impacts to surface water than under Alternative A by increasing runoff and erosion.

To protect riparian/wetland areas, the BLM applies a NSO restriction on wetland areas greater than 20 acres and on designated 100-year flood plains. Alternative D also prohibits surface disturbing activities within 500 feet and avoids surface-disturbing activities within ¼ mile of perennial surface water and riparian/wetland areas and WGFD rated Blue or Red Ribbon fisheries, which would provide a similar beneficial impact to water as Alternative A, but with additional protections outside of the 500-foot buffer.

Proactive Management

Proactive management actions that would benefit surface water quality and quantity include developing watershed improvement practices; applying BMPs to reduce sediment loading; avoiding activities that could affect water resources within a ¼ mile area around public water supply wells, rivers, streams, and other water bodies within 10 miles upstream of public water supply intakes; and fencing streams, wetlands, reservoirs, and riparian areas as necessary. The BLM conducts the same amount of watershed enhancement projects as under Alternative A while also stabilizing existing watershed improvement projects to prevent the release of stored sediment and protect watershed health. Similar to Alternative A, Alternative D would encourage the maintenance of natural flow regimes in priority streams supporting fisheries.

Alternative D would avoid, minimize and/or compensate BLM-authorized activities and infrastructure, such as unlined impoundment ponds/pits, reserve pits, and evaporation ponds, that could result in the contamination of sensitive water resources, including Source Water Protection Areas and “High” and “Moderately High” sensitivity aquifer systems on a case-by-case basis. This management would reduce the potential for adverse impacts to water resources.

Alternative E

Surface Disturbance

Alternative E would result in 10,676 acres of long-term and 71,829 acres of short-term surface disturbance (see Table 4-1 and Appendix T), the smallest acreage of disturbance of any alternative. Projected short-term surface disturbance would result in an initial 299,169 tons of soil erosion, followed by an estimated rate of 17,305 tons per year for the long term (Appendix V). Management practices relating to surface disturbance would be the same as Alternative B, except for areas within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). In this ACEC, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) so that they do not exceed one disturbance

per 640 acres and cover less than 3 percent of the total sage-grouse habitat, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. When compared to the other alternatives, the potential for erosion and sedimentation in surface waterbodies would be the least for the surface-disturbing activities of Alternative E, resulting in less impervious surfaces to diminish groundwater recharge. Surface-disturbing activities under Alternative E would provide the best chances for successful reclamation while also reducing the chances for watershed deterioration.

Resource Uses

Compared to the other alternatives, the restrictions on surface disturbance and conservation measures of Alternative E would provide the most improvement to water quality and quantity by increasing infiltration rates and reducing existing and future erosion and sedimentation sources. Management for resource uses would be the same as Alternative B, except for areas within the Greater Sage-Grouse Key Habitat Areas ACEC. Livestock grazing management under Alternative E would be the same as Alternative B, and impacts to water would be the same as Alternative B.

Alternative E would result in a similar number of new roads from ROW authorizations and new roads in locales open to cross-country motorized travel or from BLM road and trail creation as anticipated under Alternative B (Appendix T). Also similar to Alternative B, travel during the wettest months of the year would be restricted under Alternative E through a seasonal closure of routes within greater sage-grouse Key Habitat Areas from March 15 through June 30. However, unlike Alternative B, Alternative E includes additional restrictions on new road and trail development in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). Management in this ACEC limits the allowable surface disturbance, prohibits construction within 4 miles of leks, and restricts the types of routes that can be constructed. These restrictions would result in the least potential vegetation removal, soil compaction, and fewest water crossings and associated adverse impacts to water resources. Outside of the Greater Sage-Grouse Key Habitat Areas ACEC, management of ROWs and CTTM under Alternative E would be the same as Alternative B.

Management of new surface discharges of produced water under Alternative E would be the same as Alternative B, but would also restrict the development of infrastructure, such as reserve pits and evaporation ponds and other uses that could result in the contamination of sensitive water resources. As a result, Alternative E would limit the potential for adverse impacts from produced water discharges and other activities generally associated with oil and gas development to a greater extent than Alternative B.

Special Designations

Special designations under Alternative E would be the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land in the Greater Sage-Grouse Key Habitat Areas ACEC. Under this alternative, ACECs, WSAs, the Absaroka Front Management Area, and lands with wilderness characteristics would encompass 193, 19, 15, and 90 miles of streams, respectively.

The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative E would result in additional protection for surface and groundwater in comparison to the other alternatives. Specifically, requirements to include a full reclamation bond to insure restoration of disturbed areas to their original condition and other habitat restoration and vegetation management requirements associated with the Greater Sage-Grouse Key Habitat Areas ACEC would reduce adverse impacts from surface-disturbing activities in greater sage-grouse Key Habitat Areas.

Resources

The erosion control requirements and habitat restoration and vegetation management under Alternative E would result in the fewest adverse impacts to water resources through restricting surface disturbances. Management and impacts under Alternative E would be the same as Alternative B except in the Greater Sage-Grouse Key Habitat Areas ACEC, with additional management regarding re-establishment of sagebrush cover and understory vegetation.

Fire and fuels management under Alternative E would be the same as Alternative B, except in the Greater Sage-Grouse Key Habitat Areas ACEC, which includes additional restrictions on the use of prescribed fire and post-fire reclamation requirements compared to Alternative B. Alternative E would result in the fewest short-term adverse impacts to surface water quality and quantity from soil erosion related to fuels treatments and prescribed fire. However, fuels management under Alternative E could result in the largest adverse impacts to water quality from catastrophic fires.

Forests, woodlands, and forest products management practices under Alternative E would be the same as Alternative B, and impacts to water would be the same as Alternative B.

Proactive Management

Proactive management to protect and enhance water resources under Alternative E would be the same as Alternative B; however, Alternative E would restrict or prohibit BLM-authorized activities and infrastructure (such as unlined impoundment ponds/pits, reserve pits, and evaporation ponds) to protect sensitive water resources (Surface and Groundwater Zones 1-3 and sensitive aquifer systems), resulting in greater beneficial impacts to water resources than alternatives A or B and similar, but more beneficial impacts than Alternative D due to the more prohibitive nature of the restrictions under Alternative E.

Alternative F

Surface Disturbance

Alternative F would result in 137,064 acres of short-term and 17,663 acres of long-term surface disturbance (see Table 4-1 and Appendix T); this projected disturbance is more acreage than alternatives A, B and E, but less than alternatives C and D. Short-term surface disturbance under Alternative F would result in an initial 570,877 tons of soil erosion, followed by an estimated rate of 28,297 tons per year for the long term (Appendix V). Management practices restricting surface disturbances for the protection of other resources (such as soil, water, biological resources, and special designations) would be the same as Alternative D, except within areas of the proposed Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). In this ACEC, the BLM manages the density of disturbance to not exceed an average of one disruptive activity location per 640 acres and cover less than 3 percent of the total greater sage-grouse PHMAs, compared to a larger allowable disturbance of 5 percent in greater sage-grouse Key Habitat Areas (1,232,583 acres) under Alternative D.

Resource Uses

Alternative F would allow fewer surface-disturbing resource uses and subsequent adverse impacts to water resources than alternatives A, C, and D, but more than alternatives B and E. As a result of additional restrictions in the Greater Sage-Grouse PHMAs ACEC, the number of new roads from ROW development and user-pioneered roads would be greater under Alternative F than alternatives A, B, and E, but less than alternatives C and D. In the Greater Sage-Grouse PHMAs ACEC, Alternative F would result in fewer mineral development-related surface disturbances than alternatives A, C, and D. In areas

outside the Greater Sage-Grouse PHMAs ACEC, management for mineral resources, CTTM, and ROWs would be similar to Alternative D, and impacts to water resources would generally be the same as described for that alternative.

Livestock grazing management under Alternative F is similar to management under Alternative D, and impacts to water would be similar to Alternative D. However, management for the Greater Sage-Grouse PHMAs ACEC includes additional livestock grazing management restrictions to promote vegetative cover compared to management under Alternative D, which could reduce adverse impacts to water quality and quantity from surface runoff compared to alternatives A, C, and D.

The areas open to cross-country motorized travel under Alternative F would be the same as Alternative D, and impacts from runoff and erosion would be the same as described under Alternative D; however, Alternative F also limits travel in the Greater Sage-Grouse PHMAs ACEC to designated roads and trails, resulting in greater beneficial impacts than alternatives A, C, and D, but fewer than alternatives B and E.

Management of new surface discharges of produced water under Alternative F would be the same as Alternative D, and impacts to surface water quality and groundwater quality and quantity would be the same as Alternative D. However, by comparison, the number of new federal wells projected under Alternative F would be less than under alternatives A, C, and D, resulting in an overall reduction of adverse impacts to water resources.

Special Designations

Special designations under Alternative F would be the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. Under this alternative, ACECs, WSAs, and the Absaroka Front Management Area would encompass 188, 19, and 43 miles of streams, respectively, which would provide greater beneficial impacts to water resources than alternatives A, C, and D, but less than alternatives B and E.

The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative F would result in greater protection for surface and groundwater than alternatives A, C, and D, but fewer than under alternatives B and E. Specifically, requirements to include a full reclamation bond to insure restoration of disturbed areas to their original condition and other habitat restoration and vegetation management requirements associated with the Greater Sage-Grouse PHMAs ACEC would reduce adverse impacts from surface-disturbing activities in greater sage-grouse PHMAs.

Resources

Measures to prevent erosion under Alternative F would result in a greater beneficial impact to surface water than under alternatives, A, C, and D, but less than under alternatives B and E. Erosion and subsequent sediment loading in streams under Alternative F would be the same as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC, which includes additional management to enhance healthy native vegetation and to manage disturbed areas to predisturbance or better conditions.

Fire and fuels management under Alternative F would be the same as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC, which includes additional restrictions on the use of prescribed fire and post-fire reclamation requirements compared to Alternative D. Alternative F would result in fewer adverse impacts to surface water quality and quantity from fuels treatments and prescribed fire than under alternatives A and D. However, similar to Alternative E, Alternative F would increase adverse impacts to water quality from potential catastrophic fires, though to a lesser extent than under Alternative E.

Forests, woodlands, and forest products management practices under Alternative F would be the same as Alternative D, and impacts to water would be the same as Alternative D.

Proactive Management

Proactive management to protect and enhance water resources under Alternative F would be the same as Alternative D, and beneficial impacts to water from these actions would be the same as Alternative D.

4.1.5 Cave and Karst Resources

This section describes impacts to cave and karst resources resulting from implementation of the alternatives. Adverse impacts to cave and karst systems result from management actions that alter, degrade, or destroy cave or karst systems and their features. Conversely, actions that result in data collection and preservation or establishment of cave and karst resources and their associated geological, biological, cultural, paleontological, hydrological, and/or educational values are considered beneficial impacts. Beneficial impacts from the designations of the Spanish Point Karst, Sheep Mountain Anticline, and Little Mountain ACECs are addressed in the Special Designations section of this chapter.

Direct impacts to cave and karst resources result from management actions that physically alter, damage, or destroy cave and karst systems, including their associated geologic features (speleothems) and biologic communities. In general, recreational uses of caves have the greatest potential to directly impact cave and karst resources.

Indirect impacts to cave and karst systems can result from actions that increase the accessibility of cave and karst areas, and therefore the probability of adverse impacts due to incompatible or excessive recreational use. Indirect impacts can also result from activities that can alter water quality (e.g., agriculture, pesticide application, pollution) when degraded water infiltrates into groundwater, thereby possibly altering the chemical and biological environment of cave and karst systems.

4.1.5.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Cave and karst resources are abundant within the Bighorn Basin. Thirty-two caves are known to exist within the Planning Area, 19 of which are considered significant for their biological, cultural, geological/mineralogical/paleontological, hydrological, recreational, and/or educational or scientific values according to the Federal Cave Resources Protection Act (FCRPA).
- The cave and karst system along the west slope of the Big Horn Mountains, including the Medicine Lodge, Spanish Point, and Little Mountain areas, is important due to fragile mineral deposits or specimens (speleothems), the potential for diverse cave and karst aquatic organisms and biological communities, cultural resources, recreational opportunities, and its link to regional groundwater aquifers.
- Sediments, and mineral deposits, including speleothems, in caves are a source of paleoclimate and other scientific information, providing important opportunities for education and scientific research. Due to their sensitive and nonrenewable nature, excessive recreational use, or recreational use not consistent with cave and karst resource values, can potentially, irreparably impact these systems. Adverse impacts to cave and karst resources also would impact the biological communities that depend on them.
- The potentially hazardous, often unfamiliar nature of caves can put inexperienced recreationists at risk.

- Recreational use of caves would be managed under a cave management plan to promote the importance of cave resources, to protect and maintain cave resources and the habitat in and around them, and to enhance user experiences by managing use compatibly with resource protection.

4.1.5.2 Summary of Impacts by Alternative

Adverse impacts to cave and karst areas would result from management that increases incompatible or excessive recreational use. The principle beneficial impacts to cave and karst resources, regardless of the alternative, result from managing the recreational use of caves to protect and maintain cave resources, while enhancing user experiences through ensuring compatible use levels and promoting the importance and research of cave resources. Under Alternative A, management of cave and karst resources as the Worland Cave SRMA would preserve the recreational setting in caves and provide protection of these resources by promoting appropriate recreational uses. Alternatives B and E manage cave and karst resources as a separate Caves and Karst Extensive Recreation Management Area (ERMA), which would result in similar impacts to those under Alternative A, but to a lesser degree. Managing cave and karst resources consistent with resources objectives under alternatives C, D, and F, rather than under a specific cave and karst ERMA, would result in the fewest beneficial impacts. Protection for these areas through the designation of ACECs would be greatest under alternatives B and E, followed by alternatives A, F, D, and C, respectively. Alternatives B and E would be the most beneficial for scientific research and data collection in cave and karst areas.

4.1.5.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Numerous beneficial direct impacts to cave and karst resources may result from proactive management actions under all alternatives. Implementing BMPs to protect water quality within cave and karst areas exhibiting unique underground drainage characteristics would preserve the hydrological and biological characteristics in these areas.

Managing cave and karst resources as ROW avoidance areas and limiting motorized vehicle use to designated roads and trails in areas over important caves or cave passages would result in beneficial impacts by reducing potential destruction and minimizing surface disturbance and the potential for excessive or incompatible recreational uses in these areas. Managing the recreational use of caves under a specific management plan would result in beneficial impacts by promoting the significance and importance of cave resources through education; protecting and maintaining cave resources, including wildlife and habitat in and around caves; and enhancing user experiences by managing use levels to be compatible with resource carrying capacity and protection.

Designating the Spanish Point Karst ACEC under all of the alternatives would restrict resource uses and activities that may adversely affect cave and karst resources in this area.

Indirect beneficial impacts would result from management actions under all alternatives that maintain or improve the hydrological, biological, and chemical characteristics of water in cave and karst resources. Under all alternatives, these management actions include controlling water runoff from disturbed or developed sites; implementing local watershed management plans and/or TMDLs with interested stakeholders and the Wyoming DEQ WQD; cooperating with stakeholders to plug unneeded abandoned water wells to prevent groundwater contamination; and cooperating with the EPA, the state

of Wyoming, and local governments to develop source water wellhead protection plans (groundwater aquifers can be linked to cave and karst systems, as in the Medicine Lodge area).

Accomplishing cave resource protection and providing for user safety with controls such as timing of use to avoid crowding and closing caves to use during periods of high water runoff would result in beneficial impacts to caves. These actions would provide for the protection of- or reduce the potential degradation of cave resources.

Alternative A

Allowing commercial recreational use of Spirit Mountain cave on a case-by-case basis may result in short-term adverse impacts to this cave resource by increasing human activity and the potential for degradation of geologic or biological features in the cave.

Allowing scientific research of cave and karst areas on a case-by-case basis may result in beneficial impacts by increasing the understanding of cave and karst areas and their associated geological, biological, cultural, paleontological, hydrological, and educational values. An increased understanding of cave and karst characteristics and values may lead to improved management or may lead to the identification of specific values that require additional management to protect the resource.

Managing cave and karst resources as the Worland Cave SRMA, with goals of providing protection for cave resources and informing the public on proper recreational uses, would result in beneficial impacts to recreational opportunities and settings in this area. However, recreational use may result in adverse impacts to cave and karst resources by increasing the potential for damage and degradation.

Designating the Sheep Mountain Anticline and Little Mountain ACECs under Alternative A would result in beneficial impacts to cave and karst resources by placing additional restrictions on activities and resource uses (e.g., minerals development and motorized vehicle use) that may degrade these resources.

Alternative B

Allowing commercial recreational use of Spirit Mountain cave on a case-by-case basis would result in the same impacts as those described under Alternative A.

Scientific research of cave and karst areas would result in similar impacts as those described under Alternative A, though to a greater degree due to management to actively pursue research opportunities. Beneficial impacts to cave and karst resources from scientific research under Alternative B would be greater than Alternative A.

Managing cave and karst resources under a specific ERMA would result in long-term impacts to these resources. Management as an ERMA would provide custodial oversight of recreational activities in these areas to provide for resource protection and to resolve use and user conflicts, which would result in beneficial impacts to cave and karst resources.

Designating the Sheep Mountain Anticline and Little Mountain ACECs under Alternative B, would result in similar beneficial impacts to cave and karst resources in these ACECs as described under Alternative A, though to a greater degree with more restrictions placed on resource uses and activities that may adversely affect cave and karst resources. The Little Mountain ACEC expansion area may also include more known and yet-to-be discovered cave and karst resources in the ACEC area.

Alternative C

Management of Spirit Mountain Cave would result in similar impacts as those described under Alternative A, but to a greater degree. Encouraging commercial caving tours may increase the number of visitors and the potential degradation of geologic and biological features in caves resulting in greater adverse impacts to this area compared to alternatives A, B, and D.

Allowing scientific research in caves would result in the same beneficial impacts as those described under Alternative A.

Managing cave and karst resources consistent with resource objectives would not provide for the beneficial impacts that would result from designation of cave and karst areas as a separate recreation management area.

The BLM does not designate the Sheep Mountain Anticline and Little Mountain ACECs under Alternative C; therefore, no beneficial impacts would result in these areas by restricting activities and resource uses that may degrade cave and karst resources.

Alternative D

Alternative D allows commercial caving tours of Spirit Mountain Cave, which may increase recreational use of the cave and the potential for adverse impacts more than alternatives A and B. However, impacts would be less than under Alternative C, as Alternative D would allow, but not encourage, commercial caving tours.

Allowing scientific research in caves would result in the same beneficial impacts as those described under Alternative A. Alternative D would protect caves from White Nose Syndrome by requiring decontamination protocol under BLM IM 2010-181 or the National White Nose Syndrome protocol.

As under Alternative C, management of cave and karst resources consistent with resource objectives would provide less of a beneficial impact to cave and karst resources than alternatives A and B, which manage cave and karst resources as a separate recreation management area.

Alternative D places additional restrictions on activities and resource uses that could degrade cave and karst resource within the Sheep Mountain Anticline and Little Mountain ACECs, resulting in similar beneficial impacts as Alternative A.

Alternative E

Impacts to cave and karst resources under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis for cave and karst resources under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Impacts to cave and karst resources under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for cave and karst resources under Alternative D is representative of the impacts anticipated under Alternative F.

4.2 Mineral Resources

4.2.1 Locatable Minerals

This section describes potential impacts to exploration for and development of locatable minerals as a result of implementation of each of the alternatives. Implementation of specific management actions within a given alternative could result in some public lands being opened, segregated, or withdrawn from locatable mineral entry under the Mining Law of 1872, as amended (herein, the mining laws). Such actions could affect the ability of potential mining claimants and/or exploration and mining companies to explore and develop locatable minerals on some public lands in the Planning Area. Management actions that restrict access include short-term actions, such as 2-year land segregations, or long-term actions, such as seeking and obtaining 20-year withdrawals from the operation of the mining laws, subject to valid existing rights. In these instances, only valid, existing mining claims may be developed. Subject to such valid existing rights, exploration, staking of new mining claims, development, or mining on segregated or withdrawn federal mineral estate is prohibited. The BLM may apply Conditions of Approval (COA) in conformance with Section 6 of the Standard Oil and Gas Lease terms and conditions while recognizing valid existing rights. On withdrawn lands, mining claimants or operators must submit a plan of operations if they propose operations that would exceed casual use, regardless of the acreage proposed for surface disturbance. The BLM must first determine the validity of preexisting mining claims in withdrawals before approving these plans of operation.

Mining claimants or operators also must file a plan of operations before beginning operations that exceed casual use in areas in the NWSRS and areas designated for potential addition to the system; designated ACECs; designated wilderness areas; areas closed to motorized vehicle use; any lands or waters known to contain federally proposed or listed threatened or endangered species or their proposed or designated important habitat, unless the BLM allows for other action under a land use plan or threatened or endangered species recovery plan; and BLM-administered National Monuments and National Conservation Areas. Based on this regulatory framework, management actions that result in lands being placed or removed from any of these land-status categories either will restrict or will remove limitations on access in cases where proposed exploration for locatable minerals would otherwise be performed under a notice, without the need for prior approval from the BLM (43 CFR 3809.11 and 43 CFR 3809.21).

Adverse impacts to locatable minerals exploration or development include management actions that segregate, withdraw, or limit the development of these minerals. Beneficial impacts to locatable minerals development result from management actions that open access to federal locatable minerals, including allowing existing withdrawals or segregations to expire without seeking new withdrawals. Direct impacts to locatable mineral operations result from management actions or statutory or regulatory limitations that open or restrict the exploration for or development of these minerals. Examples of direct impacts include segregations or withdrawals from locatable mineral entry, or compliance with the Endangered Species Act (ESA) to prevent adverse impacts to threatened or endangered species or their habitat as well as compliance with the mining laws for the proper recording of mining claims and sites, recording of title transfers to mining claims and sites, payment of annual fees and filings of annual assessment work documents, and deferments of assessment work. No indirect impacts to locatable minerals are identified.

4.2.1.1 Methods and Assumptions

This analysis is based on known areas of locatable mineral development in the Planning Area, and on mineral occurrence potential (referred to as "potential" in this analysis) as identified in the *Solid Mineral Occurrence and Development Potential Report, Bighorn Basin Resource Management Plan Revision Project* (BLM 2009d). "Potential" refers to the potential for or the presence (occurrence) of a concentration of one or more locatable mineral resources. It does not refer to or imply potential for development and/or extraction of the mineral resource(s), nor does it imply that the potential concentration is or may be economic (i.e., could be extracted profitably). The BLM has identified areas where specific locatable mineral types are known to exist ("known" mineral occurrence), and areas with moderate to high potential for the presence of a specific locatable mineral type ("potential" mineral occurrence). See the *Solid Mineral Occurrence and Development Potential Report, Bighorn Basin Resource Management Plan Revision Project* (BLM 2009d) for more information regarding mineral occurrence potential.

Methods and assumptions used in this impact analysis include the following:

- Restrictions on resource uses apply throughout the life of the RMP, but can be changed by amending the RMP.
- The surface management regulations at 43 CFR 3809 (outside WSAs) and 3802 (within WSAs) apply to all surface-disturbing activities for locatable minerals.
- Lands not formally withdrawn or segregated from mineral entry will be available for locatable mineral entry, exploration, and development as per the regulations at 43 CFR 3800 and 3810.
- The BLM must approve a plan of operations that meets all applicable statutory and regulatory requirements and will not cause unnecessary or undue degradation as per 43 CFR 3809 and 3802. Unnecessary or undue degradation is defined by 43 CFR 3809.5.
- Regardless of the level of operations to be conducted (casual use, notice level, or operations under a plan of operations), a locatable mineral operator must prevent adverse impacts to threatened or endangered species and their habitat that may be affected by operations.
- Locatable mineral operators may not knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains or any historical or archeological site, structure, building, or object on federal lands.
- Restrictions applicable to locatable minerals are generally limited to the prevention of unnecessary or undue degradation, as defined in 43 CFR 3809.5; additional requirements beyond the unnecessary or undue degradation standard may not apply to locatable minerals, and may be voluntary and achieved by negotiation with the claim holder.
- Notice level operations do not require approval from the BLM (i.e., there is no "federal action") but are bound by statutory requirements, including the ESA, the National Historic Preservation Act (NHPA), and the requirement under the Federal Land Policy and Management Act (FLPMA) to prevent unnecessary or undue degradation of public lands.
- The potential for mineral resources is a prediction of the likelihood of the occurrence of these resources. The occurrence of a mineral resource does not necessarily imply that the mineral can be economically exploited or is likely to be developed; mineral occurrence potential includes both exploitable and potentially exploitable occurrences. The potential for the occurrence of a mineral resource also does not imply that the quality and quantity of the resource are known.
- On lands which are open to operations under the mining law, as amended, operators may conduct casual use operations, explore, locate new mining claims, submit notices under 43 CFR

3809, or seek approval of plans of operations under 43 CFR 3802 or 43 CFR 3809. This is the case even in areas which are currently believed to have low or no potential for the occurrence or development of locatable minerals.

- About 346,206 acres of federal mineral estate have known occurrence of bentonite (BLM 2009d). Known bentonite-bearing strata within the Planning Area (Map 4) are primarily located in the eastern half of the Planning Area, but are also found in the southern and western portions of the Planning Area near Thermopolis and Cody. Refer to the *Solid Mineral Occurrence* and *Development Potential Report,* (BLM 2009d) for detailed maps of other known or potential locatable mineral occurrence within the Planning Area.
- The potential for continued bentonite development activity, particularly in the eastern half and southern portions of the Planning Area, is high (BLM 2009d). Bentonite will continue to be mined using surface mining methods.
- About 114,095 acres of federal mineral estate have known or potential gypsum occurrence (BLM 2009d). Gypsum-bearing strata within the Planning Area (Map 5) occur generally in the eastern portion of the Planning Area. The potential for continued gypsum mining activity, particularly in several locations in the CYFO, is high. Gypsum will continue to be mined using open pit/surface mining methods.
- About 18,286 acres of federal mineral estate have a known occurrence and 129,926 have potential occurrence of uranium (BLM 2009d). Most known uranium-bearing strata within the Planning Area are located in the extreme northeast part of the Planning Area (Little Mountain Uranium District). Interest in uranium exploration could increase during the planning period with a rise in uranium prices. No active mining of uranium is taking place anywhere in the Planning Area.
- There are about 1,535 acres of federal minerals with a known occurrence and 211,953 acres with potential occurrence of thorium (BLM 2009d). Potential thorium-bearing strata within the Planning Area are located in small deposits in various locations throughout the Planning Area. Potential for the occurrence of thorium mineralization coincident with titaniferous black sandstone deposits in the Planning Area is generally high. Currently, there is no active exploration for or mining of thorium taking place in the Planning Area. This is not expected to change over the life of the plan.
- About 51,291 acres of federal mineral estate have a known occurrence of placer gold (BLM 2009d). The southwest-central and northwest portions of the Planning Area contain very limited quantities of placer gold. The potential for placer gold development activity is low for the planning period.
- About 1,535 acres of federal mineral estate have a known occurrence and 211,953 have potential occurrence of titaniferous black sands (BLM 2009d). Titaniferous black sandstone paleoplacer deposits occur in specific locations in the southern, eastern, and northern portions of the Bighorn Basin, but are not currently being developed in the Planning Area. Known titaniferous black sandstone deposits are likely to contain titanium and zirconium. The potential for the development of titaniferous black sands over the planning cycle is estimated to be low, although some small-scale mining of black sand is possible.
- The potential for the occurrence of all metallic minerals other than placer gold and titanium-bearing black sands in the Planning Area is low. The proper geologic conditions, namely, igneous plutons and/or metamorphosed ore bodies, do not exist in the Planning Area. Therefore, the potential for the development of these metallic minerals is considered low during

the planning period. No active mining of placer gold is taking place anywhere in the Planning Area.

- Although discoveries of other valuable deposits of locatable minerals may occur during the planning period, bentonite and gypsum will remain the dominant locatable minerals being mined in the Planning Area. See the *Solid Mineral Occurrence and Development Potential Report* (BLM 2009d) for more information on the occurrence and development potential for locatable minerals within the Planning Area.

4.2.1.2 Summary of Impacts by Alternative

Alternative E, primarily due to mineral withdrawals for ACECs and Wild and Scenic Rivers (WSR) suitable waterway segments, would result in the largest amount of acreage with restrictions to locatable mineral development (1,759,312 acres), followed by Alternative B (314,223 acres), Alternative A (72,861 acres), alternatives D and F (83,321 acres), and Alternative C (48,095 acres). Alternative E includes the largest acreage proposed for mineral withdrawal in areas of known or moderate locatable mineral potential, followed by alternatives B, A, D, F and C.

4.2.1.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Subject to valid existing rights, restrictions on exploration and development of locatable minerals would result in adverse impacts when areas are withdrawn, segregated, or classified from locatable mineral entry, or with the application of other resource restrictions that limit or prohibit mineral activity. The intensity of impacts varies by alternative and whether there are existing locatable minerals activities in an area proposed for withdrawal or segregation. The more acreage withdrawn, segregated, or classified, the more adverse impacts to exploration and development of locatable mineral resources occur. Withdrawals would result in more impacts where withdrawals apply to locatable mineral areas with known or moderate potential. Discussions of individual alternatives describe adverse impacts to exploration and development of locatable minerals from these actions. See Table 3-44 in Chapter 3, Existing and Proposed Withdrawals, Classifications, and Other Segregations in the Planning Area, for additional information about existing withdrawals and segregations and the associated resources that those actions are intended to protect. Under all alternatives, the BLM anticipates that mining for locatable minerals would likely occur using surface mining methods.

Management actions in the lands and realty program that revoke or require the review of existing withdrawals that segregate areas from locatable mineral entry would result in beneficial impacts to locatable mineral exploration and development by opening new areas to operation under the mining laws. These revocations and reviews include opening restored BOR lands, revoking 3,287 acres of Classification and Multiple Use (C&MU) lands, and reviewing 14,341 acres of power withdrawals/classifications and 14,381 acres of other agencies' withdrawals. Continuing existing classifications and segregations would withdraw these areas from operation under the mining laws, which would result in adverse impacts.

For all alternatives, the BLM would respect all valid existing rights within those areas subject to review, including unpatented mining claims within sage grouse Key Habitat Areas or PHMAs. All mining claims located within an area that are subsequently withdrawn are subject to validity examinations prior to the approval of any operations. Mining claims which have not demonstrated discovery of a valuable mineral

deposit or use and occupancy as defined in the mining laws prior to the withdrawal date, have no valid and existing rights and could be contesting by the BLM, whether or not they are located in greater sage-grouse Key Habitat Areas or PHMAs.

Pursuing newly proposed BLM protective withdrawals and other agency withdrawal requests on a case-by-case basis would result in adverse impacts to locatable mineral exploration and development if areas are withdrawn from mineral entry.

It is important to note that because of overlapping management restrictions, withdrawals associated with resource and resource uses described in this section are not additive. A list of all withdrawals from locatable mineral entry and associated acreages by alternative are supplied in Table 4-27 in Section 4.6.1 *Lands and Realty*.

Alternative A

Under Alternative A, the BLM maintains withdrawals for locatable minerals on 72,861 acres, or approximately 2 percent, of the federal mineral estate in the Planning Area (Map 9).

Under Alternative A, the following locatable minerals and associated acreages (and percent of total known and/or potential occurrence on federal mineral estate in the Planning Area) are known to occur or have moderate to high potential for occurrence (not actual commercial development) in areas pursued for withdrawal from operation of the mining laws, as amended:

- Bentonite – 2,858 acres of known occurrence (3 percent of total occurrence)
- Gypsum – 5,958 acres of known and potential occurrence (5 percent of total occurrence)
- Uranium – 6,041 acres of known and potential occurrence (4 percent of total occurrence)
- Thorium – 290 acres of potential occurrence (less than 1 percent of total occurrence)
- Titaniferous black sands – 81 acres of potential occurrence (less than 1 percent of total occurrence)

The remainder of the discussion for this alternative identifies the major withdrawals that result from other resources and uses, regardless of known mineral occurrence or mineral potential.

Resource Uses

Specific lands and realty actions, establishing some recreation sites, and management of special designations, may result in adverse impacts to exploration for or development of locatable mineral resources. Adverse impacts may result when management actions related to these uses and designations result in either a withdrawal or a segregation of the federal mineral estate from locatable mineral entry, which closes the lands to entry under the mining laws, as amended. Conversely, lifting withdrawals, segregations, or some existing mineral classifications could open the lands to locatable mineral entry.

Under Alternative A, termination of all existing coal and phosphate withdrawals or classifications would open lands previously withdrawn from locatable mineral entry, which would result in beneficial impacts to new locatable mineral activities. Lands and realty actions under Alternative A include approximately 644 acres of land classifications under the Recreation and Public Purposes (R&PP) Act, which have the effect of segregating the classified lands from locatable mineral entry (location of new mining claims) under the mining laws, as amended.

In addition, C&MU classifications (Little Mountain Area) and Desert Land Entries (DLEs) segregate an additional 4,696 acres from locatable mineral entry. Other segregations under Alternative A include

public water reserves (2,763 acres) and power-site reservations (3,468 acres). Withdrawals from locatable mineral entry for other federal agencies, including the Federal Energy Regulatory Commission (FERC), the U.S. Department of Defense, the National Park Service, the BOR, and the USFS, total approximately 121,052 acres. See Section 4.6.1 *Lands and Realty* for more detailed discussion of classifications, segregations, and withdrawals.

Under Alternative A, the Beck Lake Scenic Area (708 acres) and the Castle Gardens Recreation Site (110 acres) are withdrawn from appropriation under the mining laws for the protection of recreation resources in these areas.

Special Designations

Under Alternative A, the BLM withdraws several WSR eligible waterway segments and ACECs from locatable mineral entry, including the Big Cedar Ridge, Red Gulch Dinosaur, Sheep Mountain Anticline, Spanish Point Karst, Five Springs Falls, and Upper Owl Creek ACECs. In addition, all designated ACECs (71,646 acres, including the withdrawn ACECs) and all areas closed to motorized vehicle use (68,115 acres) require a plan of operation before mining can begin for all activity exceeding casual use; such a requirement may either restrict or remove limitations on access to these areas for exploration for locatable minerals and may result in adverse impacts in the form of delay for claimants, who would otherwise be able to undertake these activities without prior approval from the BLM. Under all alternatives, the Heart Mountain Relocation Center National Historic Landmark (72 acres) would be withdrawn from appropriation under the mining laws.

Resources

Under Alternative A, cave and karst areas continue to be withdrawn from locatable mineral entry to prevent degradation of these resources. The BLM also continues to withdraw certain areas in the Big Cedar Ridge and Red Gulch Dinosaur Tracksite ACECs (2,062 acres) to protect paleontological resources. The BLM continues to withdraw important cultural sites from appropriation under the mining laws on a case-by-case basis. Refer to Appendix T for detailed information and acreages associated with mineral entry, mining, and withdrawals.

Alternative B

Alternative B would pursue withdrawal from appropriation under the mining laws for locatable minerals on 314,223 acres, or 8 percent, of the federal mineral estate in the Planning Area (Map 10). These withdrawals encompass more acres than under Alternative A.

Under Alternative B, the following locatable minerals and associated acreages (and percent of total known and/or potential occurrence on federal mineral estate in the Planning Area) are known to occur or have moderate to high potential for occurrence (not actual commercial development) in areas pursued for withdrawal from operation of the mining laws, as amended:

- Bentonite – 9,289 acres of known and potential occurrence (3 percent of total occurrence)
- Gypsum – 10,891 acres of known and potential occurrence (10 percent of total occurrence)
- Uranium – 26,160 acres of known and potential occurrence (18 percent of total occurrence)
- Thorium – 378 acres of potential occurrence (less than 1 percent of total occurrence)
- Titaniferous black sands – 81 acres of potential occurrence (less than 1 percent of total occurrence)

The remainder of the discussion for this alternative identifies the major withdrawals that would result from other resources and uses, regardless of known mineral occurrence or mineral potential.

Resource Uses

Under Alternative B, all existing coal and phosphate withdrawals and classifications would continue. These withdrawals and classifications would not result in adverse impacts to exploration and development of locatable minerals, because there is generally no known interest in exploration for or development of locatable minerals in the areas where there are coal or phosphate classifications.

Lands and realty management actions under this alternative are expected to result in similar impacts to locatable minerals access as under Alternative A, but to a slightly greater extent. Lands and realty actions under Alternative B include a withdrawal for a 208-acre industrial park in Cody, Wyoming. Other segregations and withdrawals under Alternative B would result in impacts similar to those actions described for Alternative A, except for a decrease in other federal agency withdrawals. A complete list of the withdrawals, classifications, and other segregations in the Planning Area by alternative is provided in Table 4-27 in Section 4.6.1 *Lands and Realty*.

Management actions that withdraw recreational areas under Alternative B are expected to result in impacts to locatable minerals access similar to those actions under Alternative A.

Special Designations

Special designations under Alternative B that would result in withdrawal of some lands from locatable mineral entry include all WSR suitable waterway segments and all ACECs except the Little Mountain and Upper Owl Creek/Absaroka Front proposed expansion areas; the total acreage of these withdrawals due to special designations would be greater than Alternative A.

In addition, Alternative B designates more areas as ACECs (302,490 acres, including the withdrawn ACECs) and closes more areas to motorized vehicle use (170,253 acres) than Alternative A. Therefore, this alternative would result in more adverse impacts to claimants from requirements for plans of operation.

Resources

Withdrawals from locatable mineral entry for resource protection under Alternative B are anticipated to be similar to Alternative A, except that Alternative B withdraws more area for the protection of paleontological resources in ACECs. Other management actions under Alternative B to protect resources are expected to be similar to those under Alternative A.

Alternative C

Under Alternative C, withdrawals would be pursued on 48,095 acres, or 1 percent, of the federal mineral estate in the Planning Area (Map 11), a smaller amount than the other alternatives.

Under Alternative C, the following locatable minerals and associated acreages (and percent of total known and/or potential occurrence on federal mineral estate in the Planning Area) are known to occur or have moderate to high potential for occurrence (not actual commercial development) in areas pursued for withdrawal from operation of the mining laws, as amended:

- Bentonite – 2,880 acres of known and potential occurrence (1 percent of total occurrence)
- Gypsum – 3,016 acres of known and potential occurrence (3 percent)

- Uranium – 5,915 acres of known and potential occurrence (less than 4 percent of total occurrence)
- Thorium – 290 acres of potential occurrence (less than 1 percent of total occurrence)
- Titaniferous black sands – 81 acres of potential occurrence (less than 1 percent of total occurrence)

The remainder of the discussion for this alternative identifies the major withdrawals that would result from other resources and uses, regardless of known mineral occurrence or mineral potential.

Resource Uses

Under Alternative C, the BLM would terminate all coal and phosphate withdrawals and classifications, resulting in the same impacts to locatable mineral entry as under Alternative A. Other segregations and withdrawals under Alternative D would results in impacts similar to those actions under Alternative A, except there would be less area withdrawn for other agencies and public water reserves, which would benefit locatable mineral development. A complete list of the withdrawals, classifications, and other segregations in the Planning Area by alternative is provided in Table 4-27 in Section 4.6.1 *Lands and Realty*.

Under Alternative C, the Castle Gardens Recreation Site (110 acres) is withdrawn for protection of recreational use, but in contrast to the other alternatives, does not withdraw the Beck Lake Scenic Area from locatable mineral entry.

Special Designations

Under Alternative C, federal mineral estate under the Spanish Point Karst ACEC is the only special designation with a withdrawal from locatable mineral entry, resulting in the smallest adverse impact to locatable mineral entry.

Alternative C includes the smallest area designated as ACECs (11,799 acres) and closed to motorized vehicle use (9,274 acres), and would therefore result in the fewest adverse impacts to claimants from requirements for plans of operation.

Resources

The BLM expects withdrawals from locatable mineral entry for resource protection under Alternative C to be similar to Alternative A, except that the BLM would not withdraw any areas for the protection of paleontological resources.

Alternative D

Under Alternative D, withdrawals would be pursued on 83,321 acres, or 2 percent, of the federal mineral estate in the Planning Area (Map 12), a larger area than under Alternative C, but smaller than under alternatives A and B.

Under Alternative D, the following locatable minerals and associated acreages (and percent of total known and/or potential occurrence on federal mineral estate in the Planning Area) are known to occur or have moderate to high potential for occurrence (not actual commercial development) in areas pursued for withdrawal from operation of the mining laws, as amended:

- Bentonite – 3,892 acres of known and potential occurrence (less than 1 percent of total occurrence)
- Gypsum – 7,134 acres of known and potential occurrence (6 percent of total occurrence)

- Uranium – 10,764 acres of known and potential occurrence (7 percent of total occurrence)
- Thorium – 290 acres of potential occurrence (less than 1 percent of total occurrence)
- Titaniferous black sands – 0 acres of potential occurrence

The remainder of the discussion under this alternative identifies the major withdrawals that result from other resources and uses, regardless of known mineral occurrence or mineral potential.

Resource Uses

Under Alternative D, all existing coal and phosphate withdrawals and classifications would continue unless they are no longer needed. Similar to Alternative B, this would not result in adverse impacts to exploration and development of locatable minerals, because there is generally no known interest in exploration for or development of locatable minerals in the areas where coal or phosphate classifications exist.

Similar to Alternative B, lands and realty actions under Alternative D do not open a 209-acre industrial park in Cody, Wyoming, to locatable mineral entry. Other segregations and withdrawals under Alternative D would result in impacts similar to those actions under Alternative A, except for a small decrease in land withdrawn for power-site reservations and a larger decrease in other federal agency withdrawals. A complete list of the withdrawals, classifications, and other segregations in the Planning Area by alternative is provided in Table 4-27 in Section 4.6.1 *Lands and Realty*.

Management actions that withdraw certain areas for the protection of recreational resources under Alternative D are expected to result in impacts to locatable minerals access similar to those actions under Alternative A.

Special Designations

Under Alternative D, withdrawals are pursued on the fewer acres of ACECs than Alternative B, but on more acres than alternatives A and C. In contrast to alternatives A and B, Alternative D does not include special management that would withdraw WSR eligible waterway segments. However, Alternative D would withdraw a portion of the Chapman Bench Management Area (3,425 acres) for resource protection. Alternative D designates 105,498 acres as ACECs (including the withdrawn ACECs). Alternative D closes 61,010 acres to motorized vehicle use, which would result in adverse impacts to claimants from requirements for plans of operation.

Resources

Under Alternative D, withdrawals from locatable mineral entry for resource protection of cave and karst and paleontological resources would be similar to those under Alternative B, except that the BLM would withdraw less area for the protection of paleontological resources.

Alternative E

Alternative E would pursue withdrawal from appropriation under the mining laws for locatable minerals on 1,759,312 acres, or 42 percent, of the federal mineral estate in the Planning Area (Map 13). The area of withdrawal from mineral entry under Alternative E would be substantially larger than under any other alternative due to the withdrawal of the proposed Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). This alternative would withdraw 1,686,451 more acres from mineral entry than Alternative A. As per 43 Code of Federal Regulations (CFR) 3809.100, when surface management operations are proposed on claims that pre-date a withdrawal, operations would not proceed until the

BLM has prepared a mineral examination report to determine whether or not the claim was valid before the withdrawal and if it continues to be valid.

Under Alternative E, the following locatable minerals and associated acreages (and percent of total known and/or potential occurrence on federal mineral estate in the Planning Area) are known to occur or have moderate to high potential for occurrence (not actual commercial development) in areas pursued for withdrawal from operation of the mining laws, as amended:

- Bentonite – 141,537 acres of known and potential occurrence (41 percent of total occurrence)
- Gypsum – 35,856 acres of known and potential occurrence (31 percent of total occurrence)
- Uranium – 57,983 acres of known and potential occurrence (39 percent of total occurrence)
- Thorium – 92,369 acres of potential occurrence (43 percent of total occurrence)
- Titaniferous black sands – 19,518 acres of potential occurrence (9 percent of total occurrence)

The remainder of the discussion for this alternative identifies the major withdrawals that would result from other resources and uses, regardless of known mineral occurrence or mineral potential.

Resource Uses

Impacts to locatable mineral development from resources uses would be greater under Alternative E than under any other alternative. Management within the proposed Greater Sage-Grouse Key Habitat Areas ACEC, including restrictions on ROW development, withdrawals, limitations and closures on motorized vehicle use, and land tenure adjustments would adversely impact locatable mineral development. However, authorized or permitted uses that specify allowable access would not be affected by travel management designations. Impacts to lands outside the ACEC would be the same as those identified under Alternative B.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), would be the same as Alternative B, and impacts would be similar to Alternative B. Withdrawal of the Greater Sage-Grouse Key Habitat Areas ACEC from mineral entry under Alternative E would result in more acres withdrawn due to special designations than any other alternative. Alternative E includes the largest area of designated ACECs (1,535,851 acres). In addition, surface disturbances would be limited to one disturbance per 640 acres and less than 3 percent of greater sage-grouse Key Habitat Areas, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. As per 43 CFR 3809.11, a Plan of Operations must be submitted for any operation greater than casual use within an ACEC.

Resources

Adverse impacts to locatable mineral development would be substantially greater under Alternative E than under any other alternative due to the withdrawal of the proposed Greater Sage-Grouse Key Habitat Areas ACEC for the protection of greater sage-grouse (1,232,583 acres). Management actions to protect resources outside of this ACEC would be the same as Alternative B, and impacts would be the same as described under Alternative B.

Alternative F

Withdrawals from locatable mineral entry under Alternative F would be the same as under Alternative D (Map 12), and the impacts to locatable minerals would be the same as described under Alternative D.

Resource Uses

Lands and realty actions that withdraw, classify, or segregate lands from mineral entry under Alternative F would be the same as under Alternative D, and the impacts to locatable minerals would be the same as Alternative D. A complete list of the withdrawals, classifications, and other segregations in the Planning Area by alternative is provided in Table 4-27 in Section 4.6.1 *Lands and Realty*.

Withdrawals pursued for the protection of recreational resources are the same as Alternative D, and impacts to locatable minerals would be the same as that alternative.

Special Designations

Withdrawals pursued in ACECs under Alternative F are the same as those pursued under Alternative D, and the impacts from those withdrawals are the same as described under Alternative D. However, Alternative F implements additional restrictions in the Greater Sage-Grouse PHMAs ACEC that would result in adverse impacts to claimants from requirements for plans of operation by limiting surface-disturbing activities and motorized vehicle use, as well as considering seasonal restrictions on locatable mineral development if deemed necessary to protect greater sage-grouse PHMAs. However, ACEC designation under Alternative F would also necessitate a Plan of Operation for exploration activities in PHMAs where a notice would have otherwise sufficed.

Resources

Impacts from resource protective management would be greater under Alternative F than under alternatives A and D due to restrictions on surface disturbance and motorized vehicle use, and potential seasonal restrictions within the proposed Greater Sage-Grouse PHMAs ACEC. However, authorized or permitted uses that specify allowable access would not be affected by travel management designations.

4.2.2 Leasable Minerals – Coal

The BLM does not anticipate reasonable foreseeable coal exploration, leasing, or development during the planning cycle. If the BLM receives an application for a federal coal lease, an appropriate land use and environmental analysis, including the coal screening process, would be necessary to determine whether the area(s) proposed for leasing are acceptable for coal development and leasing (in accordance with 43 CFR 3425). If the BLM determined that public lands were acceptable for further consideration for coal leasing, the land use plan would need to be amended, as necessary. The BLM would accept federal coal lease applications only for federal coal lands with development potential (Map 6) identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. For example, an application for a federal coal lease in greater sage-grouse PHMAs would be considered unsuitable.

4.2.2.1 Analysis of Alternatives

If interest arises, the BLM may allow coal exploration subject to the regulations at 43 CFR 3410 and subject to Appendix H guidance to mitigate surface-disturbing activities. Closing large areas to mineral leasing or applying NSO restrictions on large areas may adversely affect potential coal leasing in the

Planning Area if demand were to arise. Major and moderate constraints on mineral leasing, geophysical exploration, and minerals development also would adversely impact potential future coal leasing.

4.2.3 Leasable Minerals – Oil Shale

The BLM anticipates the potential for oil shale exploration and development activity would be low for the next planning cycle because of the relative thinness of oil shale beds, thickness of overburden, and poor quality of oil shale in the Planning Area. In 2008, the BLM released a *Programmatic Environmental Impact Statement (EIS) for Oil Shale and Tar Sands* (BLM 2009c) that amended existing RMPs in Wyoming and other states. The only areas of Wyoming addressed in this Programmatic EIS were the Washakie and Green River Basins in the southwestern part of the state. The Programmatic EIS did not include the Bighorn Basin because oil shale resources in the Bighorn Basin are not considered economically feasible to produce. Oil shale exploration, development, and leasing in the Planning Area would require additional evaluation and an RMP amendment.

4.2.3.1 Analysis of Alternatives

The BLM did not consider oil shale leasing and development under any alternative due to the absence of known, commercially exploitable resources and lack of anticipated leasing and development. The BLM does not anticipate impacts to oil shale leasing and development. However, closing large areas to mineral leasing or applying NSO restrictions on large areas may adversely affect potential oil shale leasing in the Planning Area if demand were to arise. Major and moderate constraints on mineral leasing, geophysical exploration, and minerals development also may adversely impact potential oil shale leasing.

4.2.4 Leasable Minerals – Geothermal

Lands in the Planning Area have been classified as having low to negligible potential for geothermal development, with the exception of lands surrounding the known hydrothermal spring areas near Thermopolis and Cody (BLM 2009h). Due to current policy direction guiding the development of renewable energy resources on public lands, there could be increased interest in geothermal exploration and development in the Planning Area over the next 10 to 20 years. The *Reasonable Foreseeable Development Scenario for Geothermal, Bighorn Basin Planning Area* (BLM 2009h) provides more information and related studies on geothermal resources and development potential in the Planning Area.

The definition of direct/indirect, beneficial/adverse, and short-term/long-term impacts described in Section 4.2.5 *Leasable Minerals – Oil and Gas* would be the same for geothermal exploration and development. In addition, adverse impacts to geothermal resources result from management that may limit or prohibit public use of geothermal resources (hot springs). Beneficial impacts would result from management that maintains or increases public use and access to geothermal resources.

Managing geothermal leasing on split-estate lands (federal mineral ownership and private surface ownership) would not limit or prohibit the use of warm water or normal-temperature geothermal systems for nonutility-grade home heating or other applications.

4.2.4.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Except as noted for alternatives B and D, where differences occur in leasing availability, BLM-administered land in the Planning Area that is open to oil and gas leasing will be open to geothermal leasing, subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix H.
- Unless otherwise noted, those lands identified as closed to oil and gas leasing will be closed to geothermal leasing.
- There will be low to moderate potential interest in development of geothermal resources during the planning period.
- Any potential geothermal development on federal mineral estate in the Planning Area would be carefully assessed to avoid adverse impacts to geothermal resources developed near Thermopolis and Cody, Wyoming.

4.2.4.2 Summary of Impacts by Alternative

The principal source of adverse impacts to geothermal exploration and development results from applying restrictions (i.e., managing these areas as closed or applying NSO or CSU stipulations) on areas with development potential; managing these areas as open to geothermal leasing with standard restrictions would generally result in beneficial impacts. Geothermal resources in the Planning Area are classified as moderately low to negligible and, since none of these resources are capable of generating electricity, restrictions on geothermal exploration and development are anticipated to result in minimal impacts under all alternatives. Alternatives B and E would result in the greatest potential for adverse impacts to geothermal exploration and development as they contain the largest areas closed to geothermal leasing (2,453,193 acres each), followed by alternatives D and F (361,777 acres), Alternative A (151,931 acres) and Alternative C (145,836 acres). Alternatives B, D, E, and F place additional restrictions on the geothermal development around Hot Springs State Park in Thermopolis, the only area of moderate geothermal resources potential in the Planning Area; though these restrictions would prevent commercial development, these alternatives would provide the greatest protection to the current public uses of these thermal springs.

4.2.4.3 Detailed Analysis of Alternatives

Management and restrictions for geothermal resources are the same as those for oil and gas resources. Except as noted for alternatives B and D, where there are differences in leasing availability, areas open to oil and gas leasing are open to geothermal leasing and areas closed to oil and gas leasing are closed to geothermal leasing. In addition, exploration and development of geothermal resources are subject to the same restrictions on surface-disturbing activities applied to oil and gas exploration and development. As a result, impacts to geothermal exploration and development by alternative would be the same as those described in Section 4.2.5 *Leasable Minerals – Oil and Gas*. Because commercial geothermal development requires drilling and facilities comparable to those associated with oil and gas development, management that affects oil and gas is expected to similarly affect geothermal development.

Because of the lower level of anticipated geothermal development compared to oil and gas development, impacts to geothermal resources from management actions may be less than those

associated with oil and gas development. However, the extent of impacts between alternatives, based on management actions in the alternatives, would be the same.

This section identifies areas that have specific management actions for geothermal resources separate from oil and gas management in the area. Except as noted for alternatives B and D, see Section 4.2.5 *Leasable Minerals – Oil and Gas* for a discussion of the acreages open, open with constraints, and closed, and the associated impacts comparison between alternatives.

Impacts Common to All Alternatives

Impacts to geothermal resources common to all alternatives would be similar to impacts described in Section 4.2.5 *Leasable Minerals – Oil and Gas*.

Under all alternatives, any potential geothermal development on federal mineral estate in the Planning Area would be carefully assessed to avoid adverse impacts to geothermal resources near Cody and Thermopolis, Wyoming.

Alternative A

Areas open subject to standard lease stipulations, open with constraints, and closed to geothermal exploration and development (Map 14), and resulting impacts, are the same as those described in Section 4.2.5 *Leasable Minerals – Oil and Gas* for Alternative A. Approximately 151,931 acres are closed to geothermal leasing under Alternative A, resulting in direct adverse impacts to potential development of geothermal resources on these lands. Compared to the other alternatives, Alternative A designates the least amount of land as closed to geothermal leasing.

Lands within 15 miles of the Hot Springs State Park at Thermopolis are open to geothermal leasing under Alternative A. There has been no recent expressed interest in such leasing for commercial purposes on the federal mineral estate. Development of geothermal resources in the area of Hot Springs State Park is not within BLM jurisdiction because the state of Wyoming owns and controls the park and all surface water and groundwater resources.

Alternative B

Under Alternative B, 2,453,193 acres are closed to geothermal leasing (Map 15), which would result in impacts similar to those described in Section 4.2.5 *Leasable Minerals – Oil and Gas* for Alternative B. However, under Alternative B, more acreage is closed to geothermal leasing than oil and gas leasing because federal mineral estate is closed to geothermal leasing within 15 miles of Hot Springs State Park.

Managing federal mineral estate within 15 miles of Hot Springs State Park as closed to geothermal leasing would not result in long-term adverse impacts to leasing, because the BLM does not anticipate interest in commercial geothermal leasing in this area over the next planning cycle. However, if interest in geothermal grows, there would be long-term adverse impacts to leasing.

Prohibiting geothermal development on federal mineral estate within 15 miles of Hot Springs State Park would ensure development would not alter pressures and volumes within the hydrothermal system. This would be a beneficial impact.

Alternative C

Under Alternative C, lands open to leasing subject to standard lease stipulations, open with constraints, and closed to geothermal exploration and development (Map 16), and the resulting impacts, would be roughly the same as those described for Alternative A, and described in Section 4.2.5 *Leasable Minerals – Oil and Gas* for Alternative C. Compared to the other alternatives, Alternative C designates the least amount of land as closed to geothermal leasing (145,836 acres).

Managing lands within 15 miles of the Hot Springs State Park as open to geothermal leasing would result in the same impacts as those described for Alternative A.

Alternative D

Under Alternative D, 361,777 acres are closed to geothermal leasing, which would result in impacts similar to those described in Section 4.2.5 *Leasable Minerals – Oil and Gas* for Alternative D (Map 17). However, more acreage is closed to geothermal leasing than oil and gas leasing under Alternative D because of the closure of federal mineral estate to geothermal leasing within 5 miles of Hot Springs State Park.

Managing lands within 5 miles of Hot Springs State Park as closed to geothermal leasing would result in impacts similar to those described for Alternative B, though to a lesser extent because less area would be affected if interest in geothermal development grows. Alternative D would also provide a beneficial impact by requiring geothermal resource monitoring and protection within 5 miles of Hot Springs State Park and within the Thermopolis Anticline.

Alternative E

Under Alternative E, lands open to leasing subject to standard lease stipulations, open with constraints, and closed to geothermal exploration and development are the same as Alternative B (Map 15), and impacts to geothermal resources would be the same as Alternative B.

Alternative F

Under Alternative F, lands open to leasing subject to standard lease stipulations, open with constraints, and closed to geothermal exploration and development are the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC (Map 17). In this ACEC, the BLM applies an NSO stipulation within 0.6 mile of greater sage-grouse leks, which would result in more adverse impacts to geothermal exploration and development than alternatives A, C, and D, but fewer than alternatives B and E.

4.2.5 Leasable Minerals – Oil and Gas

The potential for oil and gas occurrence in the Planning Area ranges from high to low, depending on location, as documented in the RFD. Based on oil and gas occurrence and other considerations, such as the characteristics of mineral-bearing formations and historic drilling activity, the RFD also analyzed the potential for anticipated drilling activity over the next 20 years (i.e., mineral development potential). Lands in the Planning Area are classified as having moderate to no potential for development of oil and gas resources, depending on location and based on projected drilling densities (BLM 2009a). Drilling in existing fields accounts for a large proportion of the growth, with a lesser share attributed to additional new discoveries in both conventional and unconventional reservoirs.

Unconventional oil reservoirs, specifically fractured shale oil reservoirs formed in fine-grained shale rock with low permeability, could be present in the Mowry Shale. Exploration and development of unconventional oil and gas from the Mowry Shale is discussed in the RFD. The RFD indicates that the Mowry Shale has the lowest potential for development during the planning period while also having the lowest undiscovered resource quantity. Development of the Mowry Shale would likely require horizontal drilling technology, though the BLM notes that the Mowry Shale is considered difficult to drill horizontally due to numerous interbeds of commercial bentonite and swelling shale.

The RFD considers the potential for development of CBNG in the Planning Area, depending on location, to be low, very low, or nonexistent.

There could be adverse impacts to oil and gas exploration and development activities from management actions that restrict or constrain the potential for oil and gas leasing, development, and exploration. Constraints to oil and gas development include NSO, CSU restrictions, timing limitations (TLS), or the allocation of public land for management of other resource objectives that limit or prohibit oil and gas exploration and development (e.g., visual resource management [VRM] allocations). These restrictions could include provisions imposed prior to leasing under a MLP. The MLP concept, criteria for MLP nomination, and potential resources of concern in MLP analysis areas considered in this RMP are discussed in Chapter 3, Section 3.2.5 *Leasable Minerals – Oil and Gas*.

Additional adverse impacts to exploration and development of oil and gas resources can result from specific management actions that require mitigation, certain BMPs, or other lease stipulations to protect resources that may increase project costs and timeframes. Beneficial impacts related to oil and gas exploration and development can result from management actions that ease restrictions or open areas for oil and gas exploration and development, thereby increasing the potential for leasing, exploration, and development.

Management actions to protect other resource values may directly and indirectly impact new oil and gas leases, exploration, and development. A direct impact is one that either specifically prohibits or permits oil and gas leasing, exploration, or development. Direct impacts include managing areas as closed to new oil and gas leasing. Indirect impacts result from management actions that may place or remove surface use restrictions or additional requirements on oil and gas exploration and development (e.g., BMPs or mitigation). These actions do not explicitly permit or prohibit oil and gas exploration and development activity, but may influence an operator's decision about whether to proceed. An example of an indirect impact would be a seasonal restriction on entering a greater sage-grouse Key Habitat Area for part of the year.

4.2.5.1 Methods and Assumptions

The unconstrained baseline RFD for oil and gas in the Planning Area is based on a set of reasonable geologic, engineering, and economic assumptions about resource occurrence only, and past and present activity, without management constraints on future activities. An unconstrained RFD provides a basis for comparing alternatives. Constrained oil and gas projections typically are lower than those in the unconstrained baseline RFD because of management constraints on oil and gas activities in the alternatives.

It is important to note that the RFD is not a decision, and it neither establishes nor implies a "cap" on development. Surface disturbance associated with well counts likely will be reduced in the future as the result of improvements in drilling- and well-completion technologies and techniques. Thus, the BLM uses any discussion of well counts in the RFD only to form the basis for an analysis of levels of impact. In addition, because the RFD is a snapshot in time, it cannot capture how future advances in technology

may make it possible to exploit certain oil and gas plays in the future that are currently not economical or commercially exploit.

Chapter 3 includes a summary of unconstrained baseline projections for oil and gas drilling activity in the Planning Area. Appendix T includes detailed projections of well counts by alternative, which vary by the degree of management constraints. See the RFD for oil and gas for more specific information on baseline oil and gas development and drilling potential in the Planning Area (BLM 2014a).

Table 4-17 summarizes projected new-well counts for the alternatives and the baseline unconstrained projection (only standard lease stipulations would be required) (BLM 2009q). The projected new-well counts and estimated surface disturbance associated with wells described in this section are for the period 2008 through 2027. Appendix T includes well projections by type of oil and gas well by alternative.

Table 4-17. Bighorn Basin Planning Area Projected New-Well Counts by Alternative

Alternative	Total Coalbed Natural Gas Wells	Total Conventional Oil and Gas Wells	Total Oil and Gas Wells	Percent of Total Wells on Federal Mineral Estate
Baseline Unconstrained Projection[1]	150	1,715	1,865	72.6
Alternative A	128	1,567	1,695	69.9
Alternative B	61	907	968	51.8
Alternative C	144	1,671	1,815	71.8
Alternative D	124	1,528	1,652	69.2
Alternative E	59	906	965	51.7
Alternative F	124	1,528	1,652	69.1

Source: BLM 2013a

[1]Only terms and conditions of the standard lease form would be applied; operations would also be subject to existing laws, regulations, Onshore Oil and Gas Orders, and Notices to Lessees.

Methods and assumptions used in this impact analysis include the following:

- Unless otherwise noted, areas that are open to oil and gas leasing will be open to geophysical exploration subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix H.
- Unless otherwise noted, areas closed to oil and gas leasing will be closed to geophysical exploration.
- The BLM can authorize, subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix H, geophysical exploration activities in VRM Class I and II areas because the operations are short-term activities.
- The BLM does not guarantee access to mineral leases that it issues.
- Analysis considers the baseline total unconstrained oil and gas development potential taken from the RFD for oil and gas as summarized in Chapter 3 and applies the alternative constraints from the other resource programs as described in Chapter 2. The RMP will not modify existing leases; as old leases expire and new ones are issued, new leases would be subject to relevant stipulations. However, site-specific COA can be applied to applications for permit to drill (APDs)

on existing leases to avoid adverse impacts to resource values by development per 43 CFR 3101.1-2.

- Reasonable mitigation measures could include modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation requirements. These modifications might occur only through site-specific post-lease actions (e.g., APDs and ROWs) that are supported by onsite conditions and/or project-specific NEPA analysis. Any exceptions, modifications, or waivers to lease stipulations will only be authorized in accordance with applicable regulatory guidelines. Surface-disturbing and other disruptive activities could occur at existing authorized facilities.
- Areas open for oil and gas leasing subject to major constraints have greater adverse impacts on oil and gas leasing, exploration, and development compared to acres subject to either moderate constraints or standard stipulations. All areas identified as open in this analysis are subject to at least standard stipulations. In addition, some of these areas are subject to moderate and/or major constraints. Table 4-18 shows acres open for oil and gas leasing subject to moderate and major constraints, as well as acres closed to oil and gas leasing for each alternative.

Table 4-18. Acres of Oil and Gas Constraints – All Alternatives

Alternative	Constraint Type (acres)		
	Moderate	Major	Closed
Alternative A	1,633,204	889,435	260,792
Alternative B	335,109	932,551	2,464,745
Alternative C	1,334,491	91,956	145,836
Alternative D	1,714,685	1,221,142	292,353
Alternative E	319,671	969,432	2,464,745
Alternative F	1,709,652	1,191,215	324,829

Source: BLM 2013a

- Moderate constraints are any stipulations or COA which may restrict the timing or placement of oil and gas development, but would not otherwise restrict the overall development. Moderate constraints include all TLS, CSUs, areas where surface-disturbing activity is avoided, and VRM Class II areas.
- Major constraints are any stipulations or COA which may restrict the timing or placement of oil and gas developments and may result in an operator dropping the development proposal. Major constraints include NSOs, areas of overlapping TLS that last more than 6 months, areas closed to surface-disturbing activity, areas where surface-disturbing activity is prohibited, and VRM Class I areas. Leaseholders have the right to explore, develop, and produce mineral resources from any valid, existing lease, even if the area containing the lease was proposed to be closed to future leasing.
- Because of overlaps between management restrictions on oil and gas leasing (i.e., CSU, TLS, and NSO), individual restrictions associated with resources and special designations described in this section are not additive. As described in the *Glossary*, the BLM has factored these overlapping restrictions into the overall oil and gas constraints (major, moderate, open, closed) for each alternative, where appropriate. For example, while a TLS restriction is generally considered a moderate constraint, overlapping TLS that restrict the use of an area for 6 months or more are considered a major constraint. In areas where overlapping management is the same and applies

year-round (e.g., two overlapping NSOs), there is no additional or additive effect. Finally, where different types of restrictions overlap (e.g., an area managed as an NSO for cultural resources and closed for wildlife values), the more restrictive management would apply. Maps 18-23 provide a visual representation of constraints by alternative.

- Oil and gas resources are considered unrecoverable in areas designated closed to leasing. They would also be considered unrecoverable in areas open to leasing but where surface use constraints prohibit development operations on areas larger than can be technically and economically developed from offsite locations. Oil and gas resources within leased in-holdings would be considered recoverable.
- Oil and gas development potential is based on the following categories:
  - High potential for hydrocarbon development indicates areas where the average well density is anticipated to be more than 100 wells per township.
  - Moderate potential for hydrocarbon development indicates areas where the average well density is anticipated to be between 20 and 100 wells per township.
  - Low potential for hydrocarbon development indicates areas where the average well density is anticipated to be 2 to fewer than 20 wells per township.
  - Very low potential for hydrocarbon development indicates areas where the average well density is anticipated to be fewer than 2 wells per township.
  - No potential for hydrocarbon development indicates areas where no wells are anticipated.
- Directional drilling viability and offset distance varies with the target formation, the top depth of the target formation, and formation productivity. Directional drilling distances of ¼ mile are assumed to be standard practice in most formations with current technology.
- For the purposes of this analysis, hydrocarbon resources more than ½ mile inside the boundary of an NSO area would generally be unrecoverable.
- Directional drilling potentially increases well development costs by approximately 10 percent to 15 percent for offset distances of up to 2,000 feet (Eustes 2003).
- Directional drilling can increase the risk of unrecoverable hydrocarbon resources in cases when the drill stem gets irretrievably stuck and the production casing cannot be set to the bottom of the production formation.

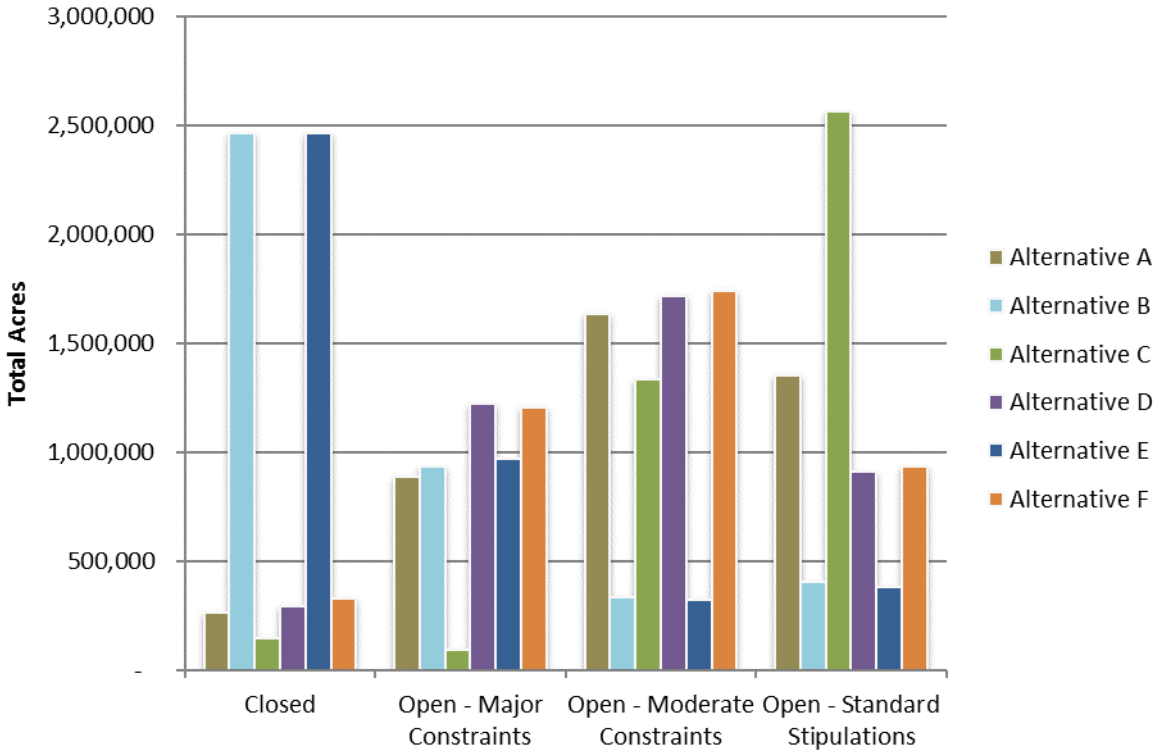
4.2.5.2 Summary of Impacts by Alternative

Management actions that restrict or constrain the potential for oil and gas leasing, development, and exploration (via NSO, CSU, and timing limitations [TLS] restrictions or managing areas as closed) would result in adverse impacts to the development and production of oil and gas; management actions that ease restrictions or maintain areas as open for oil and gas exploration and development would result in beneficial impacts to the development and production of oil and gas. All of the alternatives include management that restricts oil and gas leasing and development to varying levels; alternatives B and E would generally result in the most adverse impacts to oil and gas development and Alternative C the least. Figure 4-3 displays the acreage open to oil and gas development subject to the standard lease form, open with constraints, and closed under each alternative. Projected new well counts under each alternative are listed in Table 4-17. Areas closed to oil and gas development are smallest under Alternative C (145,836 acres) and largest under alternatives B and E (2,464,745 acres). The number of acres within the Planning Area by level of constraint is depicted in Figure 4-3. Impacts to oil and gas exploration and development from the restriction of geophysical exploration would be the greatest

under Alternative E due to closure of the proposed Greater Sage-Grouse Key Habitat Areas ACEC to geophysical exploration. The number of acres within the Planning Area closed to leasing because the management of special designations (e.g., ACECs and National Historic Trails [NHTs]) is depicted in Table 4-19. Additionally, the BLM manages lands with wilderness characteristics as closed to oil and gas leasing under alternatives B and E (471,727 acres of federal mineral estate), under Alternative F (44,538 acres of federal mineral estate), except for the Painted Hills under Alternative F, which are available for leasing with an NSO restriction. Alternatives C, D, and F establish Oil and Gas Management Areas (430,647 acres of federal mineral estate for Alternative C; 441,662 acres of federal mineral estate for alternatives D and F) allowing full development of known oil and gas resources in existing fields and exempting these areas from certain discretionary seasonal wildlife limitations and other restrictions, resulting in beneficial impacts to oil and gas exploration and development. However, alternatives D and F place additional stipulations on oil and gas-related surface disturbances in the Absaroka Front, Fifteenmile, and Big Horn Front MLP analysis areas for the protection of big game, geologic features, and LRP soils. As a result, alternatives D and F could have additional adverse impacts on oil and gas development in these MLP analysis areas compared to alternatives A and C. However, because of the generally low to very low potential for oil and gas development and redundancies with other restrictions on mineral leasing from the management of other program areas, management specific to the MLP is less likely to adversely affect oil and gas development in these areas.

The development potential for leasable oil and gas in the Planning Area ranges from moderate to no potential, depending on location. As shown in Table 4-20, alternatives A, B, E, D, and F all contain areas managed as closed to oil and gas leasing that include some areas with moderate development potential (6,759 acres for Alternative A; 220,758 acres for alternatives B and E; 2,840 acres for Alternative D; 2,834 acres for Alternative F).

Figure 4-3. Oil and Gas Constraints by Alternative



Source: BLM 2013a

Table 4-19. Acres of Federal Mineral Estate Closed to Oil and Gas Leasing due to Special Designations and Other Management Areas[1]

Type of Area	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Wilderness Study Areas	139,127	139,127	139,127	139,127	139,127	139,127
Lands with Wilderness Characteristics	0	471,746	0	0	471,746	44,538
National Historic Trails	0	0	0	0	0	0
National Historic Landmark	0	12,506	72	72	12,506	72
Areas of Critical Environmental Concern	45,456	299,101[2]	6,298	70,447	1,427,803	125,997
Wild and Scenic Rivers	17,261	26,303	7,869	14,324	26,303	14,471
Absaroka Front Management Area	0	252,590	751	87,755	252,590	87,760
Special Recreation Management Areas	0	0	0	0	0	0

Sources: BLM 2009a; BLM 2013a

[1]Acreages provided indicate areas closed to leasing as a direct result of the management of the special designation or other management area. Other areas may be closed to leasing as a result of other overlapping resource considerations.
[2]Greater sage-grouse Key Habitat Areas are closed to oil and gas leasing under Alternative B and Alternative E; however, unlike Alternative E, Alternative B does not designate Key Habitat Areas as an Area of Critical Environmental Concern.

Table 4-20. Acres of Oil and Gas Development Potential and Constraints by Alternative

Development Potential	Constraint	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Moderate	Closed[1]	6,759	220,758	0	2,840	220,758	2,834
	Standard Terms & Conditions	156,143	25,008	201,683	57,445	24,994	57,445
	Moderate Constraints	135,306	27,425	129,453	214,863	27,425	214,633
	Major Constraints	39,668	64,686	6,740	62,728	64,700	62,965
Low	Closed[1]	32,109	935,118	26	3,528	935,118	7,691
	Standard Terms & Conditions	594,108	147,003	1,129,423	410,346	146,057	410,226
	Moderate Constraints	726,909	186,122	611,921	855,510	185,780	850,790
	Major Constraints	422,135	507,018	33,892	505,877	508,306	506,554
Very Low	Closed[1]	79,030	1,095,334	6,082	95,365	109,334	122,210
	Standard Terms & Conditions	549,053	211,221	1,154,146	409,787	190,738	410,925
	Moderate Constraints	739,522	121,455	571,002	627,236	106,359	629,252
	Major Constraints	412,167	351,761	48,543	647,383	387,341	617,385
None	Closed[1]	3,775	74,332	624	51,414	74,332	52,960
	Standard Terms & Conditions	55,233	22,374	80,420	33,705	22,374	33,705
	Moderate Constraints	31,424	96	22,055	16,322	96	14,940
	Major Constraints	15,432	9,062	2,765	4,423	9,062	4,259

Sources: BLM 2009a; BLM 2013a

[1]There are no oil and gas development potential data for Wilderness Study Areas (141,068 acres), and the data in this table do not reflect those areas. All Wilderness Study Areas are closed to new leasable mineral exploration and development (BLM 2012a).

4.2.5.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Under all alternatives, management that results in areas being open, open with constraints, or closed would respectively allow, limit, or prohibit exploration and development in certain areas. This management would result in direct impacts to oil and gas development. Impacts would be similar across alternatives because the definition of areas open subject to the standard lease form, open with moderate constraints, open with major constraints, and closed are the same for all alternatives (see *Glossary*). The severity of these impacts would vary by alternative based on amount of acreage and associated oil and gas development potential. Protective measures for other resources, including limiting or prohibiting access and development or controlling the timing or nature of development, would result in adverse impacts. Restrictions on oil and gas development under each of the alternatives also would result in adverse impacts to the rate of oil and gas exploration, development, and extraction. These impacts would increase costs, both to the operator and the product end user, of exploring for, developing, and extracting oil and gas. Under all alternatives, operators must employ BMPs in the exploration, development, production, and abandonment of oil and gas resources.

Under all alternatives, areas closed to oil and gas leasing would be closed to geophysical exploration and areas open to oil and gas leasing would be open to geophysical exploration, subject to mitigation measures described in Appendix I as appropriate. Managing areas as closed would prohibit oil and gas exploration and subsequent development and extraction. This would result in adverse impacts to exploration and development of fluid mineral resources. In instances where geophysical exploration is allowed subject to mitigation, operators may incur increased costs from the use of more expensive, but less surface-disturbing techniques (e.g., small, portable foot- or helicopter-transported surveying equipment in areas with surface use restrictions). If surface use restrictions or mitigation requirements prevent or discourage an operator from effectively surveying/exploring oil and gas resources, development could be sited based on incomplete information, affecting the potential success of a future well. This could also result in increased costs to the operator and in nonproductive disturbances to land and surface resources. Alternatively, allowing geophysical exploration in areas open to oil and gas development, if performed within the constraints necessary to protect other resources, could result in beneficial impacts to oil and gas exploration and development.

In areas where federal oil and gas leases are or have been issued without stipulations, subsequently placing additional mitigation measures on exploration and development may result in adverse impacts to ongoing or future oil and gas development. Requiring additional stipulations on new leases may constrain exploration, development, production, or other actions that increase the timeframe and cost of operations. Mitigating measures attached to an APD as COA influence how an activity is accomplished, but rarely preclude the activity. Such management actions in complex areas involving impact avoidance to several resources may limit oil and gas operations.

Special designations (e.g., ACECs, NHTs, WSAs) and other management areas (e.g., recreation management areas) may result in adverse impacts to oil and gas exploration and development, depending on their location in relation to oil and gas development potential. These lands may be subject to a variety of restrictions related to oil and gas exploration or development (e.g., closures, NSO restrictions, CSU and TLS stipulations), or require certain BMPs or mitigation to preserve resource and management objectives in these areas. Special stipulations, such as required resource surveys, also may be applied. Discussions of overall constraints for oil and gas for each alternative capture impacts from

these special designations. Respective sections in this chapter discuss specific impacts of the management for each area.

Management actions that prescribe certain BMPs and mitigation would affect all alternatives on a project-specific basis, depending on the overall constraints under each alternative. While specific mitigation measures generally would be consistent, the nature and level of impacts to oil and gas development would vary among alternatives and may also vary based on site-specific conditions that would be evaluated in implementation-level environmental documents. In general, constraints on exploration, development, production, and abandonment of oil and gas resources (e.g., NSO, CSU, or TLS) would increase project timeframes and costs, and may limit the number of well pads and amount of surface disturbance on a lease. This would be an adverse impact. However, such constraints may result in beneficial impacts to other resources in a given area.

Under all alternatives, implementing mitigation measures to reduce air quality emissions from current levels and applying BMPs for oil and gas activities that could affect groundwater resources would require certain technologies and mitigation that may increase project costs. This would result in adverse impacts to oil and gas development.

On split-estate lands (areas with private surface ownership and federal mineral estate), the BLM applies the same stipulations, COAs, and/or conservation measures and as those applied on surrounding BLM-administered lands to the maximum extent permissible under existing authorities and in coordination with the landowner. The BLM would consider the views of the surface owner in these leasing determinations, such as the routing of access roads and location of well pads, which would encourage proactive issue identification and dispute resolution. However, adverse impacts may result from an increase in the timeframe for processing and developing leases, increasing project costs, or the potential relocation of well pads and infrastructure.

When necessary to protect important resources, the BLM would attach COA for operations proposed on existing oil and gas leases within areas designated as closed to leasing, which would exclude surface occupancy and surface disturbance. The BLM would do this to the maximum extent possible without violating lease rights. Such restrictions on occupancy and surface disturbance may limit the operator's ability to extract the federal oil and gas resources under lease. For example, directional drilling from an area outside such a lease to an operator-targeted bottom-hole location in a leased area may not be technically or economically feasible.

Under all alternatives, the BLM would require special status species inventories for surface-disturbing projects in known or suspected special status species habitat. Postponing or modifying projects that may affect special status species would lead to a delay in the development and/or the relocation of well pads, access roads, pipelines, or ancillary facilities.

Subject to valid existing rights, the BLM would prioritize leasing and authorizing development of fluid mineral resources in greater sage-grouse habitat areas in the following order: 1) outside of PHMAs and GHMAs, 2) non-habitat areas inside of PHMAs and GHMAs, and 3) least suitable habitat areas inside of PHMAs and GHMAs. Where adverse effects to greater sage-grouse populations or habitat are anticipated, the BLM would work with the project proponent in developing an APD to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources.

Typical impacts from cultural resource management actions on oil and gas exploration and development would include increased well development costs associated with cultural resource inventories, relocation of projects (well pads, roads, pipelines) to avoid a cultural site, implementation of offsite drilling (directional drilling) techniques, and/or site excavation if avoidance is not possible. Discovery of

previously undocumented cultural features during project construction would delay project implementation while the site is evaluated.

Under all alternatives, management actions for ROWs would allow, limit, or prohibit facilities and infrastructure necessary for the development and extraction of oil and gas resources including access roads, powerlines, and pipelines. This would impact oil and gas development. Federal regulations require ROW grants for access roads, powerlines, or pipelines that cross one lease to access another. Avoiding or excluding these authorizations could limit or prohibit legal access and infrastructure to well pads. Management that limits or prohibits ROW authorizations (ROW avoidance and exclusion areas) would result in adverse impacts to oil and gas development. Designating ROW corridors up front could eliminate or reduce land use conflicts and beneficially affect oil and gas development and pipelines.

Oil and gas exploration and development often occur in grazing allotments. Oil and gas operators would have to abide by mitigation specified in lease stipulations or in the COA for those operations. Mitigation measures required to minimize adverse impacts to livestock grazing would increase the cost of oil and gas exploration and development. These measures would include providing for the upkeep and repair of fences and gates and taking measures to prevent loss of or injury to livestock. The BLM would not expect livestock mitigation to substantially affect the technical or economic viability of oil and gas development.

Reclaiming areas of surface disturbance with native grass and forb species to prevent erosion; monitoring and treating weeds and other nonnative, invasive plant species that occupy areas disturbed by oil and gas development and production; and returning vegetation and habitat to pre-disturbance conditions is required in all cases, increasing project costs.

Under all alternatives, the extent of impacts to oil and gas development from constraints and limitations on exploration and development relates directly to oil and gas development potential in an area. Management actions that constrain development of oil and gas in high-potential areas generally would result in more impacts to development than similar management actions that constrain development in low-potential areas. The RFD for oil and gas describes the potential for oil and gas occurrence and development in the Planning Area (BLM 2014a).

Alternative A

Resource Uses

Under Alternative A, 260,792 acres of BLM-administered mineral estate would be closed to mineral leasing (Map 18). Managing areas as closed to oil and gas leasing would reduce the amount of land available for oil and gas leasing and prohibit development in these areas. This would result in direct adverse impacts to oil and gas development.

Under Alternative A, 889,435 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and major constraints (Map 18). Major constraints to oil and gas exploration and development, such as NSO restrictions or overlapping TLS restrictions, limit or prohibit development in these areas or require certain drilling techniques, BMPs, or other mitigation. This results in adverse impacts to oil and gas exploration and development. In some cases, operations can be modified to accommodate such restrictions, but these modifications can be costly, increase project timeframes, or be otherwise undesirable to oil and gas operators. Companies typically drill oil and gas wells vertically because the costs are lower and drilling problems are less likely, but they could employ directional drilling in an area with an NSO restriction to protect other resources. For example, an operator might be able to place a well pad, access road, or production facility in a less

sensitive area and drill the well directionally to recover reserves underlying the area with the NSO if under certain conditions, such as favorable geologic and drilling conditions. However, even if technically feasible, the increased costs associated with directional drilling may make some drilling activities uneconomical. Because directional drilling has certain limitations, operators may not be able to develop all the oil and gas resources from all the acreage associated with large NSO areas. Companies typically cannot use directional drilling to develop CBNG because the reservoirs are too shallow (BLM 2014a). Because of the costs associated with restrictions, an operator may decide to not develop oil and gas resources in an area with major constraints.

Under Alternative A, 1,633,204 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and moderate constraints (Map 18). Moderate constraints limit the time of construction and operation activities or require specific mitigation or lease stipulations. This would result in adverse impacts to oil and gas leasing. Moderate constraints do not necessarily remove the area from development or exploration of oil and gas or require directional drilling. Under TLS restrictions, development may become more intensive over a shorter period to complete operations before timing restrictions apply. In areas with overlapping TLS restrictions, companies may be limited to narrow timeframes to complete work, which may result in major constraints. In some cases, an operator may have to start development and then postpone operations during specific periods. If the window during which work can be done is too short, a development project may have to proceed in phases, requiring more time to complete, adding to the project's cost, and increasing the time before the investment is recovered. CSU restrictions could require specific lease stipulations to meet other resource management objectives and make the development of oil and gas uneconomical or unattractive to potential operators.

Under Alternative A, 1,354,593 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form only (Map 18). Managing areas open to oil and gas exploration and development allows oil and gas leasing and development in these areas with only standard lease stipulations. This would result in beneficial impacts.

As a result of the oil and gas constraints under Alternative A, projected drilling is reduced from the baseline unconstrained projections. The baseline scenario projects 1,354 federal wells could be drilled in the Planning Area. These include 1,249 conventional wells and 105 CBNG wells. Under Alternative A, 1,184 wells are projected (1,101 conventional wells and 83 CBNG wells). This represents an approximately 13 percent decrease from the baseline, or 148 fewer federal conventional wells and 22 fewer federal CBNG wells. Under Alternative A, 139 fewer federal oil and gas wells are expected to remain in production at the end of the planning period compared to the projected baseline scenario. This represents an approximately 5 percent decrease from the baseline scenario. Abandonment of federal wells is expected to decrease slightly (approximately 3 percent), from 957 wells under the baseline scenario, to 926 wells under Alternative A (BLM 2014a).

Designating ROW exclusion and avoidance areas would prohibit or limit ROW authorizations for roads, pipelines, or other infrastructure that may be necessary for the development of oil and gas resources. This would result in adverse impacts to oil and gas development. Under Alternative A, the BLM manages 940,943 acres as ROW avoidance areas and 61,147 acres as ROW exclusion areas.

Special Designations

Special designations (ACECs, NHTs, WSAs, and WSRs) under Alternative A may result in adverse impacts to oil and gas exploration and development. However, because these areas are generally small, the impacts to overall use of oil and gas resources would generally be limited. In addition to WSAs, Alternative A manages portions of some ACECs and some WSR eligible waterway segments as closed to

oil and gas leasing (Table 4-19). Alternative A also manages areas within ¼ mile of the Nez Perce (Neeme-poo) NHT and Other Historic Trails, seven WSR eligible waterway segments, and the Red Gulch Dinosaur Tracksite ACEC, Big Cedar Ridge, Five Springs Falls, and Upper Owl Creek ACECs as available for oil and gas leasing with an NSO restriction.

Resources

Under Alternative A, restrictions and constraints on oil and gas development would result from management actions to protect resources. The most extensive impacts to oil and gas leasing from management of resources under Alternative A would result from restrictions for greater sage-grouse, raptor nesting, and big game crucial winter range.

Alternative A allows new surface discharges of produced water at the discretion of the Wyoming DEQ and the BLM, and subject to the Wyoming water quality standards, which would generally result in beneficial impacts by giving operators flexibility to determine their preferred method of disposal.

Under Alternative A, adverse impacts to oil and gas development would result from management of greater sage-grouse leks, nesting and early brood-rearing habitat, and winter concentration areas on new and existing leases, including:

- CSU restrictions within ¼ mile of occupied leks
- TLS restrictions in early brood-rearing habitats within 2 miles of occupied leks (834,543 acres)
- TLS restrictions in identified nesting and brood-rearing habitat outside the 2-mile buffer from March 15 to July 15 (CYFO seasonal restrictions are from February 1 to July 31)
- TLS restrictions within winter concentration areas from November 15 to March 14

These restrictions would impose moderate constraints to oil and gas development, which would result in adverse impacts. The impacts of these restrictions would vary across the Planning Area, depending on the projected development potential for oil and gas resources. For BLM-administered lands, management that constrains oil and gas development around greater sage-grouse leks, in nesting and early brood-rearing habitat, and in winter concentration areas would affect approximately 337,712 acres of moderate-potential areas, 400,655 acres of low-potential areas, and 368,485 acres of very-low-potential areas. Restrictions applied in low- and very-low-potential areas may result in only limited impacts to oil and gas development. Impacts to oil and gas development from restrictions that constrain development in moderate-potential areas would be greater than restrictions that constrain development in low- and very-low-potential areas.

Under Alternative A, restrictions on surface disturbances (i.e., TLS stipulations) in raptor nesting areas would prohibit development or require lease stipulations that may make oil and gas development more difficult. This would result in adverse impacts to oil and gas resources. Under Alternative A, designated raptor nest buffer areas would include approximately 337,662 acres of BLM-administered surface. Timing restrictions on surface-disturbing activities in these areas would narrow the available time for construction activities and potentially increase project costs. This may adversely affect oil and gas development. Under Alternative A, TLS restrictions for raptor nesting areas would occur on approximately 47,429 acres with moderate oil and gas development potential, 148,729 acres with low potential, and 125,746 acres with very low potential. As with oil and gas restrictions for greater sage-grouse habitat, impacts from TLS restrictions for raptor nest areas in moderate-potential areas would be greater than restrictions in low- and very-low-potential areas.

Under Alternative A, TLS restrictions in big game crucial winter range (1,324,371 acres) would reduce the time available for oil and gas activities and potentially increase project timeframes and costs. This

would result in adverse impacts to oil and gas resources. In addition, applying CSU restrictions for big game migration corridors, narrow ridges, overlapping big game crucial winter range (72,850 acres), including within the Absaroka Front and Big Horn Front areas, would require lease stipulations that may increase project timeframes and costs. This would result in adverse impacts to oil and gas resources.

Under Alternative A, wildlife seasonal protections may be extended to surface-disturbing and disruptive activities related to project maintenance and operation (including production) on a case-by-case basis. Extending the seasonal protections described above would result in ongoing adverse impacts to oil and gas development by requiring additional coordination to schedule project activities in accordance with seasonal stipulations and potentially increasing project costs.

Alternative A prohibits surface-disturbing activities within 500 feet of surface water and riparian/wetland areas (70,715 acres). Prohibiting surface disturbance in these areas would exclude ROWs in these areas and prohibit the development of oil and gas resources, which would result in adverse impacts to oil and gas development.

Of the areas available for oil and gas leasing, 82,295 acres are in VRM Class II areas, 340,817 acres are in VRM Class III areas, and 642,361 acres are in VRM Class IV areas. In VRM Class I areas, the level of change to the characteristic landscape should be very low; therefore, VRM Class I areas are closed to oil and gas leasing. In VRM Class II areas, the level of change to the characteristic landscape should be low. Oil and gas exploration and development activities may be restricted or limited in VRM Class II areas. VRM objectives in Class II areas may limit the development of facilities. If the BLM approves oil and gas development in these areas, siting, design, and other mitigation may be required to ensure that management objectives for visual resources are met. Objectives for VRM Class III, Class IV, or unclassified area generally allow activities, subject to some level of mitigation.

The nature and extent of impacts to the oil and gas resources from VRM would vary according to the projected oil and gas development potential of the subject lands. Of the areas available for oil and gas leasing, VRM Class II areas include approximately 14,668 acres with a moderate potential for oil and gas resources, approximately 69,597 acres with a low potential for oil and gas resources, and approximately 409,616 acres with a very low potential for oil and gas resources. Impacts to oil and gas development from management as VRM Class II would be greater in moderate-potential lands than in low- and very-low-potential lands, because moderate-potential lands are more likely to be developed than low- and very-low-potential lands.

Alternative B

Resource Uses

Under Alternative B, geophysical exploration is subject to limitations on motorized vehicle use and restrictions on surface-disturbing activities. This would result in adverse impacts to oil and gas development by limiting the access and methods used for oil and gas resource surveys.

Under Alternative B, 2,464,745 acres of BLM-administered mineral estate would be closed to mineral leasing (Map 19). Managing areas as closed to mineral leasing would result in a substantial increase in area closed to oil and gas leasing compared to Alternative A (260,792 acres).

Under Alternative B, 932,551 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and major constraints (Map 19). Managing areas with major constraints would result in a 5 percent increase in area managed with major constraints compared to Alternative A.

Under Alternative B, 335,109 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and moderate constraints (Map 19). Managing areas with moderate constraints would result in an 80 percent decrease in area managed with moderate constraints compared to Alternative A. Managing more area as closed to mineral leasing and with major and moderate oil and gas constraints would likely result in increased oil and gas development on private lands under Alternative B, compared to Alternative A.

Under Alternative B, 405,620 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form only (Map 19). Managing areas as open to oil and gas leasing subject to the standard lease form would result in a 70 percent decrease in area open subject to the standard lease form compared to Alternative A.

As a result of the restrictions implemented under Alternative B, projected drilling is reduced from baseline projections. The baseline scenario projects that 1,354 federal wells could be drilled (1,249 conventional wells and 105 CBNG wells). Under Alternative B, 502 federal wells are projected (479 conventional wells and 23 CBNG wells). This represents an approximately 63 percent decrease from the baseline, or 747 fewer federal conventional wells and 82 fewer federal CBNG wells. Six-hundred ninety (690) fewer federal wells (both conventional and CBNG) are expected to remain in production at the end of the planning period. This represents an approximately 274 percent decrease from the baseline. Abandonment of federal wells is similarly expected to decrease (approximately 17 percent) from 957 wells under the baseline scenario to 795 wells under Alternative B (BLM 2014a). At the end of the planning period, projected total producing wells would be fewer under Alternative B (2,680) than Alternative A (3,182).

Under Alternative B, the BLM does not suspend existing non-producing oil and gas leases in areas closed to mineral leasing and, after such leases expire, would not offer the land for future leasing. This management may result in adverse impacts to the production of federal oil and gas where such resources are present. The respective terms (expiration dates) of such leases cannot be halted at the direction or consent (after application for suspension by the lessee or operator) of the BLM authorized officer, as would be the case if the leases were suspended. This would be the case even if lease suspension was in the interest of conservation of natural resources, encouraged the greatest ultimate recovery of oil and gas, or met other criteria warranting lease suspension (see 43 CFR 3135.2).

Managing areas as ROW avoidance and exclusion areas would result in adverse impacts similar to those described for Alternative A, although to a greater extent. Under Alternative B, the BLM manages 2,710,695 acres as ROW avoidance areas and 225,447 acres as ROW exclusion areas. The total acreage managed as ROW avoidance and exclusion is greater than Alternative A.

Under Alternative B, geophysical exploration is subject to limitations on motorized vehicle use. Areas closed to motorized vehicle use (170,253 acres) and areas where motorized vehicle use is limited to designated roads and trails (2,416,378 acres) would restrict access routes in the Planning Area and may limit the use of seismic technology to obtain subsurface stratigraphic and structural information useful for exploration of oil and gas reserves. This would result in adverse impacts to oil and gas development.

Special Designations

Compared to Alternative A, Alternative B includes more special designations and management areas (including recreation management areas) and places more restrictions on surface-disturbing activities in these areas. This results in more adverse impacts to the development of oil and gas resources. Management in these areas includes closing land to mineral leasing, and NSO and CSU restrictions. Because these areas are larger and have more restrictions, impacts to oil and gas exploration and development are expected to be more extensive than under Alternative A. Table 4-19 shows the

acreages and areas closed to oil and gas leasing due to special designations and other management areas under this alternative. Other impacts from these special designations (NSOs, TLS, and CSUs) are captured in the overall constraints for oil and gas under this alternative described above, and specific management for each area (e.g., ACECs or SRMAs) is discussed in its respective section.

Resources

Management actions to protect resources under Alternative B place greater restrictions and constraints on oil and gas development than Alternative A. The most extensive impacts to oil and gas leasing from management of resources under Alternative B would result from restrictions for greater sage-grouse, raptor nesting, and big game crucial winter range.

Under Alternative B, quantitative air quality modeling of oil and gas field development would be required to determine potential impacts from proposed emissions sources. Air quality modeling of potential oil and gas development may require mitigation strategies for projects that would exceed emission standards.

Alternative B prohibits the authorization of new surface discharges of produced water, which could result in greater adverse impacts compared to Alternative A if operators incur additional transportation or disposal costs, or are required to drill disposal wells.

The most extensive impacts to oil and gas leasing would result from protective restrictions for greater sage-grouse. Under Alternative B, adverse impacts to oil and gas development would result from management of occupied greater sage-grouse leks on future and existing leases including:

- TLS restrictions in nesting and early brood-rearing habitat and within 3 miles of occupied leks (1,526,277 acres) from February 1 to July 31
- TLS restrictions in identified nesting and brood-rearing habitat outside the 3-mile lek buffer (310,749 acres) from February 1 to July 31
- CSU restrictions for all seasonal habitats identified above to allow 1 to 15 acres of well location or 15 acres of habitat removal per 640-acre section

Also under Alternative B, adverse impacts to oil and gas development on new leases would result from:

- NSO restrictions in 0.6 mile of occupied greater sage-grouse leks (146,324 acres)
- NSO restrictions in winter concentration areas from November 15 to March 14
- The designation of greater sage-grouse Key Habitat Areas as closed to mineral leasing (1,490,758 acres)

These restrictions would result in adverse impacts by prohibiting oil and gas development or managing areas with moderate or major constraints to development. The impacts of these restrictions would vary across the Planning Area, depending on the projected development potential for oil and gas. For BLM-administered lands, management that constrains oil and gas development around greater sage-grouse leks, in nesting and early brood-rearing habitat, and in winter concentration areas would affect approximately 337,751 acres of moderate-potential areas, 656,249 acres of low-potential areas, and 548,261 acres of very-low-potential areas. Restrictions applied in low- and very-low-potential areas may result in only limited impacts to oil and gas development. Impacts to oil and gas development from restrictions that constrain development in moderate-potential areas would be greater than restrictions that constrain development in low- and very-low-potential areas. Though these constraints would affect a similar area of moderate development potential to Alternative A, adverse impacts to oil and gas from

management of greater sage-grouse would be greater under Alternative B because of the application of the more restrictive major constraints (NSOs) under Alternative B.

Limiting noise sources at the perimeter of occupied greater sage-grouse leks may require mitigation or technologies that reduce noise levels, which may increase project costs. This may result in adverse impacts to oil and gas development. Oil and gas development activities may be restricted where sound levels cannot be limited below ambient noise levels.

Under Alternative B, restrictions on surface disturbance (including TLS and CSU restrictions) in raptor nesting areas would result in adverse impacts to oil and gas development similar to those described for Alternative A, although to a greater extent due to restrictions in the increased buffer areas. Under Alternative B, raptor nest buffer areas would include approximately 616,869 acres of BLM-administered surface with both CSU and TLS restrictions, which represents an approximately 69 percent increase in area with restrictions compared to Alternative A. Restrictions in raptor nesting areas would occur on approximately 72,717 acres of moderate oil and gas development potential lands, 265,496 acres of low-potential lands, and 207,507 acres of very-low-potential lands. As a result of specific stipulations for ferruginous hawks, lands where greater sage-grouse and raptor habitats overlap could be subject to development restrictions for most of the year (9 months). These specific stipulations are in place to comply with laws such as the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, which provide protection to individuals of a species and not entire species populations.

Managing big game crucial winter range (1,324,371 acres) with an NSO restriction and prohibiting surface-disturbing activities within ½-mile of big game migration corridors would prevent surface occupancy for oil and gas activities and increase project costs. In some cases, it may result in the inability to access oil and gas resources. These adverse impacts to oil and gas development would be greater under Alternative B than under Alternative A, which manages these areas with TLS restrictions (or CSU within certain migration routes). Managing the Absaroka Front Management Area (130,872 acres) as closed to oil and gas leasing would prohibit oil and gas development in this area, which would result in adverse impacts.

The application of the seasonal wildlife protections discussed above to project maintenance and operation (including production) activities would result in ongoing adverse impacts due to the additional burden placed on the operators to comply with seasonal stipulations. These impacts may be more adverse than under Alternative A because Alternative B requires the extension of seasonal wildlife protections for all projects determined to be detrimental to wildlife, whereas Alternative A would apply these protections on a case-by-case basis.

Alternative B prohibits OHV use for notice of staking level casual use actions in limited OHV use areas of the Fifteen Mile and Big Horn Front areas to enhance protection for recreational settings, geologic features, LRP soils, and big game, which could result in adverse impacts to operators due to added time and expense required to perform these casual use activities compared to Alternative A.

Impacts to oil and gas from prohibiting surface disturbance within ¼ mile of riparian/wetland areas (162,887 acres) would result in impacts similar to those described for Alternative A, but to a greater extent due to larger acreages.

Under Alternative B, impacts to oil and gas development from VRM would be similar to those described for Alternative A, although to a greater extent due to more acreage managed as VRM Class I and Class II. Of the areas available for oil and gas leasing, 58,107 acres are in VRM Class II areas, 67,672 acres are in VRM Class III areas, and 158,783 acres are in VRM Class IV areas. The nature and extent of impacts to oil and gas exploration and development from VRM would vary according to the projected development potential of the subject lands. Under Alternative B, of the areas available for oil and gas leasing, VRM

Class II areas include approximately 201,497 acres of moderate oil and gas development potential lands, approximately 962,308 acres of low-potential lands, and approximately 1,237,598 acres of very-low-potential lands. Under Alternative B, VRM Class II areas in moderate development potential areas increase by approximately 186,829 acres compared to Alternative A.

Alternative C

Resource Uses

Under Alternative C, 145,836 acres of BLM-administered mineral estate would be closed to mineral leasing (Map 20). Managing areas as closed to mineral leasing would result in adverse impacts similar to those described for Alternative A, although to a lesser extent. Implementing Alternative C would result in the fewest areas closed to mineral leasing compared to of the other alternatives.

Under Alternative C, 91,956 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and major constraints (Map 20). Managing areas with major constraints would result in adverse impacts similar to those described for Alternative A, although to a lesser extent. Implementing Alternative C would result in a 90 percent decrease in area managed with major constraints compared to alternatives A and B, a 91 percent decrease compared to Alternative E, a 100 percent decrease compared to alternatives D and F.

Under Alternative C, 1,334,491 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and moderate constraints (Map 20). Managing areas with moderate constraints would result in adverse impacts similar to those described for Alternative A, although to a greater extent. Implementing Alternative C would result in an 18 percent decrease in area managed with moderate constraints compared to Alternative A, a 298 percent increase compared to Alternative B, a 22 percent decrease compared to Alternative D, a 317 percent increase compared to Alternative E, and a 22 percent decrease compared to Alternative F.

Under Alternative C, 2,565,742 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form only (Map 20). Managing areas as open to oil and gas leasing subject to the standard lease form would result in beneficial impacts to oil and gas resources similar to those described under Alternative A though to a greater extent. Implementing Alternative C would result in an 89 percent increase in area open subject to the standard lease form compared to Alternative A, a 533 percent increase compared to Alternative B, a 181 percent increase compared to Alternative D, a 568 percent decrease compared to Alternative E, and a 181 percent decrease compared to Alternative F.

As a result of the restrictions implemented under Alternative C, projected drilling is reduced from the baseline projections. The baseline scenario projects that 1,354 federal wells could be drilled (1,249 conventional wells and 105 CBNG wells). Under Alternative C, 1,304 federal wells are projected (1,205 conventional wells and 99 CBNG wells). This represents an approximately 4 percent decrease from the baseline, or 44 fewer federal conventional wells and 6 fewer federal CBNG wells. Under Alternative C, 41 fewer federal wells (both conventional and CBNG) are expected to remain in production at the end of the planning period than projected in the baseline scenario. This represents an approximately 10 percent decrease. Abandonment of federal wells is expected to decrease slightly (approximately 1 percent), from 957 wells under the baseline scenario, to 948 wells under Alternative C (BLM 2009d). Projected total producing wells at the end of the planning period would be the greatest under Alternative C (3,283) compared to Alternative A (3,182), Alternative B (2,680), and Alternative D (3,100).

Under Alternative C, the BLM allows suspension of existing oil and gas leases (producing and non-producing) in areas closed to mineral leasing for reasons such as conservation of natural resources, greatest ultimate recovery of oil and gas, or other reasons outlined by regulation (see 43 CFR 3135.2). If the BLM authorized officer grants a suspension, the respective terms (expiration dates) of such leases are extended for the period of suspension. If the BLM authorized officer does not suspend existing non-producing oil and gas leases and allows them to expire, the BLM would not offer lands in these areas for future leasing. This management may result in adverse impacts to production of federal oil and gas where such resources are present. The BLM automatically extends the terms on producing leases (and leases capable of production) in paying quantities if they comply with applicable regulations (see 43 CFR 3107.2).

Under Alternative C, managing areas as ROW avoidance or exclusion areas would result in adverse impacts similar to those described for Alternative A. Under Alternative C, the BLM manages more acreage (1,173,162 acres) as ROW avoidance areas and less acreage (7,586 acres) as ROW exclusion areas. While Alternative C manages a larger area for ROW avoidance than does Alternative A (a potential adverse effect), the smaller area of ROW exclusion (the most restrictive ROW designation) under Alternative C could reduce overall adverse impacts compared to that alternative.

Special Designations

Alternative C prescribes fewer restrictions on surface-disturbing and disruptive activities for a smaller number of special designation and management areas (including recreation management areas) compared to the other alternatives. Fewer special designations and fewer restrictions in these areas would result in fewer adverse impacts to oil and gas exploration and development compared to the other alternatives. Table 4-19 shows the acreages and areas closed to oil and gas leasing due to special designations and other management areas under this alternative. Other impacts from these special designations (NSOs, TLS, and CSUs) are captured in the overall constraints for oil and gas under this alternative described above, and the specific management for each area (e.g., ACECs or SRMAs) is discussed in its respective section.

Resources

Restrictions and constraints on oil and gas development resulting from management actions to protect resources would be the least under Alternative C. The most extensive impacts to oil and gas leasing from resource management under Alternative C would result from restrictions for greater sage-grouse and raptor nesting areas.

Alternative C allows new surface discharges of produced water and for that water to be put to beneficial use, so long as it is done in a manner that minimizes environmental harm. Although the approval of these discharges would be at the discretion of the Wyoming DEQ and the BLM, and subject to the Wyoming water quality standards, Alternative C, like Alternative A, would generally result in beneficial impacts by giving operators flexibility to determine their preferred method of disposal.

Under Alternative C, there would be adverse impacts to oil and gas development resulting from management of greater sage-grouse leks, nesting and early brood-rearing habitat, and winter concentration areas on new and existing leases (excluding Oil and Gas Management Areas for TLS), including:

- CSU restrictions within ¼ mile of occupied greater sage-grouse leks
- TLS restrictions in greater sage-grouse nesting and early brood-rearing habitat within 2 miles of occupied leks (834,543 acres) from March 15 to July 15

- TLS restrictions in nesting and brood-rearing habitat outside the 2-mile buffer from March 15 to July 15
- TLS restrictions within greater sage-grouse winter concentration areas from November 15 to March 14

These restrictions would impose moderate constraints to oil and gas development, therefore resulting in adverse impacts. The impacts of these restrictions would vary across the Planning Area, depending on the projected development potential for oil and gas. For BLM-administered lands, management that constrains oil and gas development around greater sage-grouse leks and in nesting and early brood-rearing habitat and winter concentration areas would affect approximately 337,712 acres of moderate oil and gas development potential areas, 400,655 acres of low-potential areas, and 368,485 acres of very-low-potential areas. Because these restrictions are similar and would affect the same area as Alternative A, similar impacts to mineral leasing would occur.

Limiting noise sources at the perimeter of occupied greater sage-grouse leks would result in adverse impacts to oil and gas development similar to those described for Alternative B, although to a lesser extent due to the reduced time that this stipulation would apply and the exemption of Oil and Gas Management Areas from this stipulation.

Raptor nest buffer areas are smaller under Alternative C, occupying approximately 82,294 acres of the Planning Area as a whole. Approximately 47,651 acres of BLM-administered surface are within raptor nest buffer areas. These lands are subject to TLS stipulations prohibiting surface-disturbing or disruptive activities within ¼ mile of active nests from February 1 through July 31. Raptor nesting areas affect approximately 7,908 acres with moderate oil and gas development potential lands, 19,985 acres with low-potential lands, and 17,137 acres with very-low-potential lands.

Alternative C would result in the least impact from wildlife restrictions. Alternative C exempts Oil and Gas Management Areas (430,647 acres) and ROW corridors from discretionary wildlife seasonal stipulations, and opens the Absaroka Front Management Area (130,872 acres) to oil and gas leasing and development, unlike alternatives B and D, which restrict oil and gas development in the area to protect wildlife habitat. In addition, Alternative C does not apply seasonal protections to maintenance and operation (including production) actions. Therefore, potential adverse impacts to project costs and schedule described under Alternative A would not occur under this alternative.

In contrast to the other alternatives, Alternative C would not prohibit or require avoidance of surface-disturbing activities in flood plains or riparian/wetland areas. Instead, the BLM authorizes surface-disturbing activities in these areas on a case-by-case basis, resulting in the fewest adverse impacts to oil and gas development in these areas of any alternative.

The types of impacts to oil and gas development from VRM would be similar to those described for Alternative A, although the extent of these impacts would be smaller because the BLM manages more area as the least restrictive VRM Class IV under this alternative. Of the areas available for oil and gas leasing, 237,205 acres are in VRM Class II areas, 322,284 acres are in VRM Class III areas, and 1,370,292 acres are in VRM Class IV areas. The nature and extent of impacts from VRM on oil and gas exploration and development would vary according to the development potential of the subject lands. Of the areas available for oil and gas leasing, VRM Class II areas include approximately 2,978 acres with moderate oil and gas development potential. Approximately 24,516 acres are classified as low-potential lands and approximately 809,339 acres are classified as very-low-potential lands. Under Alternative C, VRM Class II areas in moderate development potential areas decrease by approximately 87 percent compared to Alternative A.

Proactive Management

Establishing Oil and Gas Management Areas (Map 24; 430,647 acres) around intensively developed existing fields (Map 26) would allow for full development of known oil and gas resources in existing field areas. This would result in beneficial impacts to oil and gas exploration and development. The BLM would manage these areas primarily for oil and gas exploration and development and consider all other surface uses secondary. Exempting Oil and Gas Management Areas and ROW corridors from discretionary wildlife seasonal stipulations would result in beneficial impacts to oil and gas development and associated infrastructure in these areas. Oil and gas operators would be able to work in these areas throughout the year, which may provide some stability to what would otherwise be cyclic development due to wildlife-based seasonal restrictions.

Alternative D

Resource Uses

Under Alternative D, geophysical exploration is subject to limitations on motorized vehicle use and restrictions on surface-disturbing activities, resulting in similar adverse impacts as Alternative B.

Under Alternative D, 292,353 acres of BLM-administered mineral estate would be closed to mineral leasing (Map 21). Managing areas as closed to mineral leasing would result in adverse impacts similar to those described for Alternative A, although to a slightly greater extent. Implementing Alternative D would result in an increase in area closed compared to Alternative A (260,792 acres) and Alternative C (145,836 acres).

Under Alternative D, 1,221,142 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and major constraints (Map 21). Managing areas with major constraints would result in adverse impacts similar to those described for Alternative A, although to a greater extent. Implementing Alternative D would result in the greatest area managed with major constraints compared to the other alternatives.

Under Alternative D, 1,714,685 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form and moderate constraints (Map 21). Managing areas with moderate constraints would result in adverse impacts similar to those described for Alternative A, although to a greater extent. Implementing Alternative D would result in a 5 percent increase in area managed with moderate constraints compared to Alternative A, a 412 percent increase compared to Alternative B, and a 29 percent increase compared to Alternative C.

Under Alternative D, 911,814 acres of federal mineral estate are open to oil and gas leasing subject to the terms and conditions of the standard lease form only (Map 21). Managing areas as open to oil and gas leasing subject to the standard lease form would result in beneficial impacts to oil and gas resources similar to those described for Alternative A, although to a lesser extent. Implementing Alternative D would result in a 33 percent decrease in area open subject to the standard lease form compared to Alternative A, a 125 percent increase compared to Alternative B, and a 65 percent decrease compared to Alternative C.

As a result of the restrictions implemented under Alternative D, projected drilling is reduced from the baseline projections. The baseline scenario projects that 1,354 federal wells could be drilled (1,249 conventional wells and 105 CBNG wells). Under Alternative D, 1,143 federal wells are projected (1,064 conventional wells and 79 CBNG wells). This represents an approximately 16 percent decrease from the baseline, or 106 fewer federal conventional wells and 26 fewer federal CBNG wells. Under Alternative D, 172 fewer federal wells (both conventional and CBNG) are expected to remain in production at the

end of the planning period than projected in the baseline scenario. This represents an approximately 43 percent decrease. Abandonment of federal wells is expected to decrease (approximately 4 percent) from 957 wells under the baseline scenario, to 918 wells under Alternative D (BLM 2009d). The projected number of total producing wells at the end of the planning period under Alternative D (3,100) would be less than under Alternative C (3,283) and Alternative A (3,182), but more than under Alternative B (2,680).

Managing areas as ROW avoidance and exclusion areas would result in adverse impacts similar to those described for Alternative A, although to a greater extent. Under Alternative D, the BLM manages more acreage (2,408,662 acres) as ROW avoidance areas but less acreage (40,802 acres) as ROW exclusion areas. The total acreage managed as ROW avoidance or exclusion areas is more than under alternatives A and C, but less than under Alternative B.

Geophysical exploration is subject to limitations on motorized vehicle use under Alternative D, which would result in impacts similar to Alternative B, although to a lesser extent because less area is closed or limited to designated roads and trails.

Special Designations

Alternative D closes more areas to mineral leasing and prescribes more restrictions on surface-disturbing and disruptive activities for special designations and management areas than alternatives A and C, but less than Alternative B. Management in these areas includes closing land to mineral leasing, and NSO and CSU restrictions. Impacts from restrictions in special designations would be similar to those under Alternative A, although to a greater extent because of the size of the affected area. Table 4-19 shows the acreages and areas closed tor oil and gas leasing due to special designations and other management areas under this alternative. Other impacts from these special designations (NSOs, TLS, and CSUs) are captured in the overall constraints for oil and gas under this alternative described above, and the specific management for each area (e.g., ACECs or SRMAs) is discussed in its respective section.

Resources

Restrictions and constraints on oil and gas development resulting from management actions to protect resources would adversely impact oil and gas leasing under Alternative D. The most extensive impacts from management of resources under Alternative D would result from restrictions for greater sage-grouse and raptor nesting.

Like Alternative A, Alternative D allows new surface discharges of produced water at the discretion of the Wyoming DEQ and the BLM, and subject to the Wyoming water quality standards. However, Alternative D also requires monitoring of receiving channels for new discharges, which could trigger additional requirements for reclamation and mitigation that would increase costs to operators to maintain compliance.

Alternative D applies a MLP in the Fifteenmile MLP Analysis Area (Map 35), which includes various restrictions on oil and gas exploration and development to reduce disturbance of unique geological features and LRP soils. Restrictions that could affect leasable mineral development include subjecting oil and gas leases within the Fifteenmile MLP Analysis Area to CSU restrictions, requiring minimum lease sizes of 640 acres and having no more than one oil and gas-related facility, and not exceeding 32 acres of surface disturbance at any given time, per lease. Alternative D generally limits OHV use for notice of staking level casual use activities to within 300-feet of established roads in areas with limited travel designations. As a result of these restrictions, oil and gas exploration and development in the Fifteenmile MLP Analysis Area could experience adverse impacts due to increased costs incurred to design and locate facilities away from sensitive soils and geologic resources and implement other

mitigation requirements. However, because the large majority of the MLP Analysis Area (91 percent) has low potential for oil and gas development, the potential for adverse impacts to development in the area would be limited. Adverse impacts to oil and gas development in the Fifteenmile MLP Analysis Area would be less than under Alternative B, which applies a NSO restriction and prohibits OHV use for notice of staking level casual use actions in the area, and more than alternatives A and C, which only apply case-by-case restriction to surface-disturbing activities.

Under Alternative D, constraints on resource uses in greater sage-grouse PHMAs would be more restrictive to oil and gas development than constraints outside PHMAs, and therefore would result in greater adverse impacts. Managing greater sage-grouse leks, nesting and early brood-rearing habitat, and winter concentration areas inside PHMAs (Map 42 and Map 42a) includes:

- NSO stipulation to prohibit or restrict surface-disturbing activities or surface occupancy within a 0.6-mile radius of occupied sage-grouse leks (116,522 acres)
- TLS stipulation to restrict disruptive activity within a 0.6-mile radius of occupied sage-grouse leks from March 15 to June 30 (116,522 acres)
- TLS to prohibit or restrict surface-disturbing and/or disruptive activities in suitable sage-grouse nesting and early brood-rearing habitat within PHMAs, regardless of distance from the lek from March 15 to June 30.
- TLS to prohibit or restrict surface-disturbing and disruptive activities in greater sage-grouse winter concentration areas that support PHMA populations from December 1 to March 14

Managing greater sage-grouse leks, nesting and early brood-rearing habitat, and winter concentration areas outside PHMAs (Map 42 and Map 42a) includes:

- NSO stipulation to prohibit or restrict surface-disturbing activities or surface occupancy within a ¼-mile radius of occupied sage-grouse leks (4,273 acres)
- TLS stipulation to restrict disruptive activity within ¼ mile of occupied sage-grouse leks from March 15 to June 30 (4,273 acres)
- TLS to prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within 2 miles of the lek or perimeter of any occupied lek from March 15 to June 30
- TLS to prohibit or restrict surface-disturbing and/or disruptive activities in greater sage-grouse winter concentration areas from December 1 to March 14

These restrictions would impose moderate to major constraints to oil and gas development, resulting in adverse impacts. The impacts of these restrictions would vary across the Planning Area, depending on the projected development potential for oil and gas. For BLM-administered lands, constraints on oil and gas development around greater sage-grouse leks, in nesting and early brood-rearing habitat, and in winter concentration areas under Alternative D are more prohibitive and would affect more acreage of moderate- and low-potential areas than alternatives A and C.

Similar to Alternative B, Alternative D would limit noise sources at the perimeter of occupied greater sage-grouse leks to not exceed 10 dBA above ambient noise; however, as new research is completed, Alternative D would establish more specific limitations through coordination with the WGFD and partners, which could result in less adverse impacts than under Alternative B.

Restrictions on surface disturbance in raptor nesting areas under Alternative D would result in similar adverse impacts as those under Alternative A, although to a lesser extent due to smaller buffer areas. TLS and CSU restrictions around raptor nests, which vary by raptor species, would affect a total of

173,892 acres of BLM-administered surface. There would be restrictions in raptor nesting areas on approximately 12,035 acres of moderate oil and gas development potential lands, 58,607 acres of low-potential lands, and 49,507 acres of very-low-potential lands. As a result of specific stipulations for ferruginous hawks, lands where greater sage-grouse and raptor habitats overlap could be subject to development restrictions for most of the year (9 months). These specific stipulations are in place to comply with laws such as the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, which provide protection to individuals of a species and not entire species populations.

Alternative D applies TLS restrictions in big game crucial winter range (1,324,371 acres), which would result in similar impacts as Alternative A. However, Alternative D would exempt Oil and Gas Management areas from discretionary big game seasonal stipulations. This would allow development of oil and gas resources in these areas without these restrictions and would result in beneficial impacts to oil and gas development.

Managing the Absaroka Front Management Area (130,872 BLM-administered surface acres) with a mix of CSU, TLS, NSO, and closed to leasing would prohibit oil and gas development or require lease stipulations that may increase project timeframes and costs. This would be an adverse impact to oil and gas development.

Alternative D also includes an MLP on 253,112 acres in the Absaroka Front MLP Analysis Area and 379,308 acres in the Big Horn Front MLP Analysis Area (Map 35), and applies additional stipulations on oil and gas development and off-road vehicular use to protect big game crucial winter range and migration corridors and recreational settings for hunting in these areas. In Zone 1 of the Absaroka Front MLP Analysis Area, Alternative D requires minimum lease sizes and places limitations on the density and total acreage of oil and gas-related surface disturbance per lease. Areas outside elk crucial winter range require a minimum lease size of 640 acres and a maximum of one oil and gas-related facility that does not exceed 32 acres of surface disturbance per lease, whereas areas inside elk crucial winter range require a minimum lease size of 1,280 acres and a maximum of one oil and gas-related facility that does not exceed 64 acres of surface disturbance per lease. Similar restrictions are applied in Zone 3, with the application of specific CSU and TLS stipulations to protect forest vegetation types and recreation settings for hunting. Although Zone 2 is generally available for oil and gas leasing, parcels must be leased in pairs and require a Master Development Plan to minimize impacts to big game. In order to achieve economically viable production within the Absaroka Front MLP Analysis Area while complying with the restrictions described above, it may be necessary for operators to utilize directional and/or horizontal drilling techniques from multi-well pads, which could increase project costs.

Alternative D applies a NSO restriction within ½-mile of big game migration corridors within the Big Horn Front MLP Analysis Area, which would result in similar adverse impacts as Alternative B. The application of CSU and TLS stipulations, minimum lease size requirements (1,280 acres), and limitations on the density (one location per lease) and total acreage of oil and gas-related surface disturbance (64 acres per lease), would result in similar adverse impacts to oil and gas development as described for elk crucial winter range within Zone 1 of the Absaroka Front MLP Analysis Area.

MLP stipulations on oil and gas development, particularly in areas outside of elk crucial winter range, could result in adverse impacts by limiting exploration and development opportunities and requiring additional mitigation measures that could increase project costs. However, because of the generally low to very low potential for oil and gas development across the majority of the Absaroka Front and Big Horn Front MLP Analysis Areas (99 percent and 100 percent, respectively) and redundancies with restrictions from the management of other programs, the potential for adverse impacts specifically from MLP management would be limited. Overall, the application of MLPs to the Absaroka Front and Big Horn Front MLP analysis areas could result in additional adverse impacts compared to management

under alternatives A and C, which apply less extensive TLS and/or CSU restrictions in big game crucial winter range and migration routes. Management of the Absaroka Front and Big Horn Front MLP analysis areas would result in fewer adverse impacts than management under Alternative B, which closes the entirety of the Absaroka Front MLP Analysis Area to mineral leasing and applies NSO restrictions to big game crucial winter range in the Big Horn Front MLP Analysis Area. Additionally, Alternative D generally allows OHV use within 300 feet of established roads for notice of staking level casual use actions in areas limited to designated road and trails in the Big Horn Front MLP Analysis Area, whereas Alternative B prohibits these actions.

Similar to Alternative B, seasonal wildlife limitations would also apply to project maintenance and operation (including production) activities. Potential adverse impacts from this management would be the same as described under that alternative.

Under Alternative D, surface-disturbing activities are prohibited within 500 feet and avoided up to ¼ mile if needed to protect sensitive resources of perennial surface waters and riparian/wetland areas. Impacts to oil and gas development would be similar to those described for Alternative A. Additionally, avoiding surface-disturbing activities would further prohibit the activity unless the impacts could be mitigated, thus increasing project timeframes and costs associated with mitigation or making oil and gas resources in these areas uneconomical to develop. This would be an adverse impact on oil and gas development.

The types of impacts to oil and gas development from VRM under Alternative D would be similar to those described for Alternative A, although the extent of these impacts would be greater because more area is managed as VRM Class I and Class II under this alternative. Of the areas available for oil and gas leasing, 35,701 acres are in VRM Class II areas, 133,742 acres are in VRM Class III areas, and 542,980 acres are in VRM Class IV areas. The nature and extent of impacts from VRM to oil and gas exploration and development would vary according to the development potential of the subject lands. Of the areas available for oil and gas leasing, VRM Class II areas include approximately 75,428 acres defined as having moderate oil and gas development potential. Approximately 182,737 acres are classified as low-potential lands and approximately 809,339 acres are classified as very-low-potential lands. Under Alternative D, VRM Class II areas in moderate development potential areas increase by approximately 60,760 acres compared to Alternative A.

Proactive Management

Alternative D designates Oil and Gas Management Areas on 441,662 acres (124,683 acres less than under Alternative C) to be managed primarily for oil and gas exploration and development. Designating Oil and Gas Management Areas would result in similar, but less beneficial impacts, than Alternative C due to the reduced acreage under this alternative. Alternative D also may require additional reclamation or compensatory offsite mitigation in Oil and Gas Management Areas where the level and density of development exceeds existing field development and requires that oil and gas development in the Oregon Basin Oil Field results in no net gain of surface disturbance. These stipulations could have an adverse impact by limiting the pace and increasing the costs of development in Oil and Gas Management Areas under Alternative D, whereas Alternative C includes no such restrictions.

Alternative E

Resource Uses

Under Alternative E, lands open to leasing subject to standard lease stipulations, open with constraints, and closed to oil and gas leasing, as well as associated projections of new well development, are similar to Alternative B (Map 22).

Impacts to oil and gas exploration and development from resource uses under Alternative E would be the similar to Alternative B, except within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), where impacts would be greater due to additional constraints on ROW development and surface disturbance. Alternative E would manage a total of 1,610,729 acres as ROW avoidance areas and 1,322,879 acres as ROW exclusion areas, which is greater than any other alternative and would result in the most adverse impacts to oil and gas development.

The management of the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres) is the single largest contributing factor to the increase in ROW exclusion areas under Alternative E, compared to Alternative B. The size of ROW exclusion areas under this alternative (42 percent of the BLM-administered surface in the Planning Area) may affect the ability of project proponents to site future ROWs across BLM-administered lands for projects such as CO_2 for enhanced oil recovery operations or new transmission lines outside of existing corridors. The extensive exclusion areas under Alternative E may also increase the concentration of linear ROWs on and through private lands compared to the other alternatives. Where such exclusion areas occur in large, contiguous blocks (such as the Greater Sage-Grouse Key Habitat Areas ACEC), finding practicable alternative routes that avoid BLM-administered lands may be difficult.

Surface disturbances would be limited to one disturbance per 640 acres and less than 3 percent of the total sage-grouse habitat (subject to valid existing rights), compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. However, the BLM anticipates that even with these additional restrictions, oil and gas wells would be developed and ROWs across BLM-administered land would be approved at the same rate as Alternative B, and impacts would be similar to Alternative B.

As with Alternative B, the BLM does not suspend existing non-producing oil and gas leases in areas closed to mineral leasing and, after such leases expire, would not offer the land for future leasing under Alternative E. However, Alternative E would result in additional adverse impacts to the development of existing oil and gas leases in the Greater Sage-Grouse Key Habitat Areas ACEC (Map 27). Specifically, upon the expiration or termination of existing leases, nominations or expressions of interest for parcels would not be accepted in this ACEC, resulting in greater losses of future oil and gas development opportunities when compared to the other alternatives. Additional conservation measures and appropriate Fluid Mineral best management practices (BMPs) would also apply in the Greater Sage-Grouse Key Habitat Areas ACEC on split estate.

Alternative E would also close the proposed Greater Sage-Grouse Key Habitat Areas ACEC to geophysical exploration, which would limit the use of seismic technology to obtain subsurface stratigraphic and structural information useful for exploration of oil and gas reserves to a greater extent than any other alternative.

CTTM designations for motorized vehicle use are the same as Alternative B, and impacts to oil and gas development would be the same as Alternative B.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), would be the same as Alternative B, and impacts would be similar to Alternative B. Due to the relative size and additional restrictions on surface-disturbing activities, ROW development, and geophysical exploration applied for the Greater Sage-Grouse Key Habitat Areas ACEC, special designation management under Alternative E would result in the most adverse impacts to oil and gas exploration and development of any alternative. Table 4-19 shows the acreages of closures due to special designations and other management under this alternative.

Resources

Restrictions for resource protection are the same as Alternative B, except within the Greater Sage-Grouse Key Habitat Areas ACEC, which applies management actions for the conservation of greater sage-grouse habitat. Restrictions implemented in this ACEC with adverse impacts to oil and gas development would include closure of the area to geophysical exploration and new ROW development, and a lower threshold on allowable surface disturbance. Alternative E also places additional restrictions on the development of infrastructure, such as impoundment ponds/pits, reserve pits, evaporations ponds, and other activities associated with oil and gas development, that could result in the contamination of sensitive water resources. Restrictions and constraints on oil and gas development resulting from management actions to protect resources would therefore be the greatest under Alternative E.

Alternative F

Resource Uses

Under Alternative F, lands closed to oil and gas leasing and open to oil and gas leasing subject to the terms and conditions of the standard lease form are similar to Alternative D. However, Alternative F applies an NSO stipulation within 0.6 mile of occupied sage-grouse leks in the proposed Greater Sage-Grouse PHMAs ACEC and limits anthropogenic disturbances to, on average, no more than one per 640 acres and no greater than 3 percent loss of sagebrush habitat within this ACEC, compared to 5 percent in Alternative D. These management actions would result in greater adverse impacts to oil and gas exploration and development relative to alternatives A and D. Under Alternative F, 1,191,215 acres of federal mineral estate are open to oil and gas leasing subject to major constraints (Map 23), which constitutes an increase over alternatives A, B, C, and E (25 percent, 22 percent, 92 percent, and 18 percent, respectively), and a 2.5 percent decrease compared to Alternative D.

Federal mineral estate open to oil and gas leasing subject to moderate constraints are decreased under Alternative F (1,709,652 acres) in comparison to Alternative D (1,714,685 acres), (Map 23). Implementing Alternative F would result in a 4.5 percent increase in area managed with moderate constraints compared to Alternative A, a 410 percent increase compared to Alternative B, a 28 percent increase compared to Alternative C, a 0.3 percent increase compared to Alternative D, and a 435 percent increase compared to Alternative E.

As a result of the restrictions implemented under Alternative F, projected drilling is reduced from the baseline projections. The baseline scenario projects that 1,354 federal wells could be drilled (1,249 conventional wells and 105 CBNG wells). Under Alternative F, 1,141 federal wells are projected (1,062 conventional wells and 79 CBNG wells). This represents an approximately 16 percent decrease from the baseline, or 187 fewer federal conventional wells and 26 fewer federal CBNG wells. Under Alternative F, 173 fewer federal wells (both conventional and CBNG) are expected to remain in production at the end

of the planning period than projected in the baseline scenario. This represents an approximately 44 percent decrease. Abandonment of federal wells is expected to decrease (approximately 4 percent) from 957 wells under the baseline scenario to 917 wells under Alternative F (BLM 2009c; BLM 2013p). The projected number of total producing wells at the end of the planning period under Alternative F (3,054) would be less than under Alternative D (3,100), Alternative C (3,283), and Alternative A (3,182), but more than under alternatives B and E (2,680).

Management of the Greater Sage-Grouse PHMAs ACEC under Alternative F requires additional consideration and mitigation of impacts for leased mineral estate similar to management of Key Habitat Areas under Alternative E, but to a lesser degree (Map 23). Like Alternative E, the BLM requires a full reclamation bond to insure restoration of disturbed areas to their original condition in the Greater Sage-Grouse PHMAs ACEC and places greater limitations on surface-disturbing activities. Additional conservation measures and appropriate Fluid Mineral BMPs also apply in the Greater Sage-Grouse PHMAs ACEC on split estate. However, unlike Alternative E, Alternative F considers waivers to these stipulations where resource uses do not preclude the achievement of sage-grouse habitat objectives.

Under Alternative F, the BLM manages 2,315,730 acres as ROW avoidance areas and 133,734 acres as ROW exclusion areas. The management of ROW avoidance and exclusion areas would result in the same impacts to those described for Alternative D. However, the BLM anticipates that even with these additional restrictions, ROWs across BLM-administered land would be approved at the same rate as Alternative D, and impacts would be similar to Alternative D.

Similar to Alternative D, geophysical exploration is subject to limitations on motorized vehicle use and restrictions on surface-disturbing activities under Alternative F; however, Alternative F applies additional limitations within the proposed Greater Sage-Grouse PHMAs ACEC, where geophysical exploration is allowed only by helicopter-portable drilling methods in accordance with seasonal timing restrictions. Alternative F CTTM is the same as Alternative D, except that travel within greater sage-grouse PHMAs is limited to designated roads and trails. Impacts from Alternative F would be the same as Alternative D, except in PHMAs where impacts would be more adverse due to additional access constraints. As under all the management alternatives, authorized or permitted uses that specify allowable access are not precluded by travel management designations.

Special Designations

Impacts to oil and gas exploration and development from special designations under Alternative F would be the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres), where more adverse impacts would result due to additional restrictions on surface disturbance, geophysical exploration, and motorized vehicle use. Similar to Alternative D, the impacts from this alternative would be more adverse than alternatives A and C, and less adverse than alternatives B and E. Table 4-19 shows the acreages of closures due to special designations and other management under this alternative.

Resources

Except for lands within the Greater Sage-Grouse PHMAs ACEC, impacts to oil and gas exploration and development from management actions to protect resources would be similar to Alternative D. However, Alternative F limits surface disturbances to one per 640 acres and 3 percent or less of the Wyoming DDCT analysis area, compared to 5 percent under Alternative D. Overall, additional protections for greater sage-grouse under Alternative F would result in more adverse impacts to oil and gas development than alternatives A, C, and D, but less than alternatives B and E.

Proactive Management

The designation and management of Oil and Gas Management Areas under Alternative F is the same as for Alternative D (Map 25); however, in areas where the Oil and Gas Management Area is overlapped by the Greater Sage-Grouse PHMAs ACEC, management for the latter would be applied, resulting in more adverse impacts to oil and gas exploration and development.

4.2.6 Leasable Minerals – Other Solid Leasable Minerals

No other solid leasable minerals are currently leased or produced in the Planning Area. Other solid leasable minerals in the Bighorn Basin are not currently considered economically viable to produce (BLM 2009d). Future demand for other solid leasable minerals will likely increase over time in parts of Wyoming and the U.S. West, but this is not anticipated to result in any new leasing or production in the Planning Area (BLM 2009d). See Section 4.2.2 *Leasable Minerals – Coal* and Section 4.2.3 *Leasable Minerals – Oil Shale* for information on these solid leasable minerals.

4.2.6.1 Analysis of Alternatives

Under alternatives B, D, E, and F, known tar sand deposits/areas, including Sherard Dome and Trapper Canyon, would be closed to leasing. However, the BLM does not anticipate new leasing or development of tar sands, or anticipates only minimal interest in these deposits, during the planning period. Therefore, the BLM anticipates only minimal adverse or beneficial impacts to the exploration or development of these resources under any alternative.

4.2.7 Salable Minerals

Implementing management actions under the alternatives may result in direct impacts that open, limit or deny access to and disposal of mineral materials from public lands in the Planning Area. Adverse impacts to mineral materials disposal can result from management actions that restrict or limit disposals of mineral materials, or that place specific stipulations or mitigation requirements on development activity. Beneficial impacts to mineral materials disposal can result from management that encourages such disposal or opens areas to disposal.

Indirect impacts result from actions that place or remove restrictions or place additional requirements on exploration and development activities for mineral materials. For example, a VRM restriction to protect the integrity of a historic trail that could either prevent or constrain exploration or development of mineral materials, or one that requires the development activity be performed so that it is not readily apparent.

Short-term impacts may include such seasonal restrictions to accessing mineral material resources to protect greater sage-grouse, or delays caused by requiring completion of resource surveys (such as cultural resources) before commencing mining operations. Long-term impacts may include transferring federal mineral estate, including the mineral materials therein, to private ownership, thereby potentially removing the resource from public access.

4.2.7.1 Methods and Assumptions

This analysis focuses on the impacts to mineral materials as a whole in the Planning Area. However, because sand and gravel are the principal salable minerals found in commercial quantities in the

Planning Area, wherever possible, this analysis describes specific impacts to the disposal of sand and gravel. Acreages of occurrence and potential for other mineral materials, such as limestone, were not available at the time of analysis.

The BLM based this analysis on occurrence potential (referred to as "potential" in this analysis) for minerals identified in the *Solid Mineral Occurrence and Development Potential Report, Bighorn Basin Resource Management Plan Revision Project* (BLM 2009d). "Potential" refers to the potential for or the presence (occurrence) of a concentration of one or more mineral resources. It does not refer to or imply potential for development and/or extraction of the mineral resource(s). It does not imply that the potential concentration is or may be economic (i.e., could be extracted profitably). The mineral potential classification system is based on the level of potential and the level of certainty of data supporting the possible existence of minerals. The system classifies level of potential as No (O), Low (L), Moderate (M), High (H), and Not Determined (ND). The system classifies level of certainty as A (lowest certainty), B, C, and D (highest certainty). See *Glossary* or the *Solid Mineral Occurrence and Development Potential Report, Bighorn Basin Resource Management Plan Revision Project* (BLM 2009d) for more information on the mineral potential classification system.

Methods and assumptions used in this impact analysis include the following:

- Existing BLM-approved mineral material sites will remain open to mineral materials disposal.
- The potential for occurrence of mineral materials exists across the Planning Area.
- New mineral materials disposal sites in areas open to mineral materials disposal will be subject to site-specific analysis prior to approval.
- In most cases, demand for mineral materials during the planning period will be directly proportional to the rate of other resource development in a given area. New disposals could be requested to establish closer proximity to development areas, since generally, mineral materials are of low unit value compared to their cost to transport them from source to market.
- The BLM has discretionary authority to permit mineral materials disposal. It may choose to approve or disapprove such sales or permits, on a case-by-case basis, within the Planning Area.
- Common varieties of mineral materials are considered salable under the Materials Act of 1947. Uncommon varieties of such minerals may be locatable and subject to administration under the mining laws, as amended.
- Disposal of topsoil from public lands is prohibited.
- Area closures and surface and timing restrictions could result in adverse impacts by reducing access to mineral materials.
- Known sand and gravel deposits (Map 29), with a rating of high (H) and a certainty level of D, occur particularly along major drainages throughout the Planning Area and are depicted on Map 15 of the *Solid Mineral Occurrence and Development Potential Report, Bighorn Basin Resource Management Plan Revision Project* (BLM 2009d). There are about 352,472 acres of sand and gravel with a known or potential for occurrence in the Planning Area. Refer to the *Solid Mineral Occurrence and Development Potential Report, Bighorn Basin Resource Management Plan Revision Project* (BLM 2009d) for additional, detailed maps of mineral materials potential within the Planning Area.

- Sand and gravel deposits with an occurrence potential rating of moderate and certainty level of C (M/C) exist in small quantities on the western portion of the Planning Area. There are approximately 347,450 acres of known occurrence and 5,022 acres of potential occurrence of sand and gravel in the Planning Area. The remainder of the Planning Area has a rating of low (L) with a certainty level of C (L/C).
- Sand and gravel deposits, which are likely to be developed, appear to be available in sufficient quantity and quality to sustain moderate to large increases in local and regional needs.
- Scoria (clinker) may be found associated with coalbeds which occur in the Mesaverde, Meeteetse, and Fort Union formations. Potential for the occurrence of scoria in the vicinity of these formations was rated as high (H) in the Gebo, Grass Creek, and Meeteetse coal fields with a certainty level of C (H/C).
- The potential for future commercial mining of scoria (clinker) from BLM-administered lands or mineral estate in the Planning Area is estimated to be moderate wherever these resources may be found and available.
- Known common-variety limestone within the Madison Formation has an occurrence potential of high (H) with certainty of D (H/D). Such occurrences are located along parts of the perimeter of the Planning Area. In the remainder of the Planning Area, the potential for limestone occurrence (not including limestone fragments found in colluvium, terrace, or alluvial deposits), is rated as low (L) with a certainty level of C (L/C).
- The development potential for continued and future commercial mining of common-variety limestone from federal mineral estate in the Planning Area is estimated to be moderate to high.
- The potential for the occurrence of common clay is rated as moderate (M) with a certainty level of C (M/C).
- The potential for future commercial mining of common clay from federal mineral estate in the Planning Area is estimated to be low to moderate.
- Throughout the Planning Area, weathered sandstone, siltstone, limestone, and granite covered in part with lichens are present. Sandstones and siltstone outcrops in the Morrison, Cloverly, Mesaverde, Lance, and Fort Union formations are commonly considered to be moss rock if they are partially adorned with colorful lichens. In these formations, there is a high (H) potential for moss rock with a certainty level of D or C (H/D or H/C). Potential for moss rock occurrence in other parts of the Planning Area is rated as low (L) to moderate (M) with a certainty level of B (L/B to M/B).
- The potential for future commercial development of moss rock from federal mineral estate in the Planning Area is estimated to be high in areas where resources exist, and are available for disposal.
- In the Planning Area, flagstone is a mineral material that is typically found in the Chugwater, Cloverly, Sundance, Mesaverde, and Fort Union formations. In outcrops of the lowermost Sundance Formation, occurrence potential for flagstone is high (H) with a certainty level of C (H/C). Elsewhere in the Planning Area, the potential for flagstone is rated as low (L) to moderate (M) with a certainty level of C (L/C to M/C).
- The potential for future commercial development of flagstone from federal mineral estate in the Planning Area is estimated to be high in areas where flagstone resources exist, and are available for disposal.

- Potential for petrified wood to be found mixed in with Quaternary terrace or alluvial deposits, after having been transported from the Absaroka Mountains, is moderate (M) to high (H) with a certainty level of C (M/C to H/C).
- The potential for future commercial development of petrified wood from federal mineral estate in the Planning Area is estimated to be low.

4.2.7.2 Summary of Impacts by Alternative

Principal impacts to the development of mineral materials (e.g., sand and gravel) result from management that prohibits or limits (adverse impacts) or opens (beneficial impact) areas to mineral materials disposal. Such management commonly includes restrictions on surface-disturbing activities or closures to mineral materials disposal. Alternative E would result in the greatest adverse impacts to mineral materials, as this alternative closes 3,144,151 acres to mineral materials disposal, including areas within 0.25 mile of riparian/wetland areas, lands with wilderness characteristics managed to maintain their wilderness characteristics (471,727 acres), and some ACECs. Closures under alternatives B (2,590,220), D and F (374,894 acres), C (343,962 acres), and A (228,649 acres) would result in decreasing adverse impacts to mineral materials disposal.

4.2.7.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Restrictions on development of mineral materials may result in adverse impacts to exploration and development activities when either closures or prohibitions to surface-disturbing activities apply, because the mineral materials could not be accessed. The intensity of impacts is anticipated to vary by alternative. The more acreage closed or prohibited from surface disturbance, the more the adverse impacts to this development of mineral material resources. In addition, closing areas to mineral materials with known or moderate potential would result in more adverse impacts than closing areas with no or low potential.

Management actions common to all alternatives that would adversely affect mineral materials disposal include closing cave and karst areas and WSAs to mineral materials disposal and prohibiting surface disturbance in the Bighorn River Habitat Management Plan (HMP)/Recreation Area Management Plan (RAMP) tracts and parts of the Yellowtail Wildlife Habitat Management Area. Discussions of individual alternatives describe adverse impacts from closures or prohibitions to surface disturbance.

Under all alternatives, new mineral materials disposal in areas open to mineral materials disposal are subject to site-specific analysis before approval. Approval of mineral materials disposal would require appropriate mitigation and site-specific reclamation fees based on a current mining and reclamation plan. The application of mitigation and a site-specific reclamation fee may prescribe certain activities or mitigation that could reduce the economic viability of mineral materials disposal and result in adverse indirect impacts to mineral materials disposal.

Prohibiting the disposal of topsoil in the Planning Area would result in impacts to mineral materials resources. Adverse impacts would result from the continued unavailability to disposal of this mineral materials resource via sale, permit, or free use to qualified entities.

Alternative A

Alternative A would close a total of 228,649 acres, 5 percent of federal mineral estate in the Planning Area, to mineral materials disposal (Map 30). Closing these areas to mineral materials disposal would prohibit the development of mineral materials in these areas, if such deposits were present in a closed area. This may result in long-term adverse impacts to such disposals. Management that prohibits surface-disturbing activities and closes areas to the disposal of mineral materials would result in more adverse impacts in areas with known or moderate potential for the occurrence of mineral materials.

Disposal of sand and gravel would be closed on 19,051 acres with known and potential occurrence in the Planning Area (Map 29).

Resource Uses

Under Alternative A, surface-disturbing activities including mineral materials disposal would be prohibited to protect certain recreational uses, including fishing and hunting access areas (8,025 acres), Five Springs Falls Campground (40 acres), the Cody archery range (102 acres), and certain R&PP lease areas.

Surface-disturbing activities in The Rivers SRMA would be prohibited. Development of mineral materials may be allowed, on a case-by-case basis, in the following areas: Absaroka Foothills, Bighorn River, and West Slope SRMAs, and the Tour de Badlands, Tatman Mountain, Trapper Creek, Paint Rock, Brokenback/Logging Road, South Bighorns, Canyon Creek, Red Canyon Creek, McCullough Peaks, Horse Pasture, Beck Lake, and Newton Lake Ridge areas.

Special Designations

Closures/prohibitions of surface-disturbing activities resulting from special designations under Alternative A that would adversely affect mineral materials disposal include the fossil-concentration area in the Big Cedar Ridge ACEC (264 acres), Red Gulch Dinosaur Tracksite (1,798 acres) and WSAs (141,068 acres). Closures for segments of certain WSR eligible waterway segments comprise approximately 20,000 acres. This alternative also requires the avoidance of surface-disturbing activities in areas in view within ¼ mile of the Nez Perce (Neeme-poo) NHT and significant segments of Other Trails, potentially placing additional stipulations or mitigation on development activity occurring in those areas.

Resources

Management actions for resources that restrict, prohibit, or limit mineral materials disposal would prevent development in these areas. This would result in adverse impacts to mineral materials disposal. Mineral materials disposal are prohibited within 500 feet of surface water and riparian/wetland areas, except where the activity can be mitigated. Mineral materials disposal may be restricted to protect important cultural sites on a case-by-case basis. In addition, on-the-ground surveys and monitoring of surface-disturbing activities for all Potential Fossil Yield Classification (PFYC) 4 and 5 formations and, on a case-by-case basis, PFYC 3 formations, and prohibitions against resuming activities within 50 feet of a paleontological discovery until the BLM authorized officer so allows, may delay development of the resource or require the relocation of facilities.

Mineral materials disposal would be required to conform to the visual objectives that correspond to each area's VRM classification. Under Alternative A, approximately 481,911 acres, or 15 percent, of BLM-administered surface is designated as VRM Class I and II areas where changes to the characteristic landscape should be low. Adverse impacts may result where placement and design of facilities and pits associated with salable mineral mining activity would have to be redesigned, resulting in increased

project costs. Where impacts could not be mitigated, these areas would be effectively closed to mineral materials disposal. The remainder of the Planning Area is classified as VRM Class III or IV, where activities would generally be allowed subject relatively reduced visual mitigation measures.

Alternative B

Closing public lands to mineral materials disposal would result in similar impacts as those described for Alternative A, although to a greater extent because more land would be closed. Alternative B would close or prohibit surface disturbance, therefore prohibiting mineral materials disposal on a total of 2,590,220 acres, or 62 percent, of federal mineral estate in the Planning Area (Map 31); Alternative B closes 2,361,571 more acres to mineral materials disposals than Alternative A.

Disposal of sand and gravel would be closed on 223,378 acres of land with a known or potential for occurrence under Alternative B (Map 29). The amount of area closed to sand and gravel disposal in known and potential areas is greater than under Alternative A, which would result in more adverse impacts to mineral materials.

Resource Uses

Under Alternative B, the BLM would prohibit surface-disturbing activities including mineral materials disposal to protect recreational uses, as described under Alternative A for fishing and hunting access areas, the Five Springs Falls campground, the Cody archery range, and certain R&PP lease areas. In addition, surface-disturbing activities are prohibited in the following recreation management areas: the Red Canyon Creek, the West Slope, Canyon Creek, McCullough Peaks, Horse Pasture, Beck Lake, Newton lake Ridge, and The Rivers SRMAs, as well as the Tour de Badlands, Tatman Mountain, Trapper Creek, Paint Rock, and Brokenback/Logging Road RMZs.

The Absaroka Foothills and Bighorn River SRMAs, and the Basin Gardens Play Area RMZ and Basin Gardens RMZ, are closed to the development of mineral materials under this alternative.

Special Designations

The management of special designations under Alternative B would result in greater adverse impacts on the disposal of mineral materials than Alternative A due to the severity of restrictions and the larger number of these areas. Specific closures/prohibitions of surface-disturbing activities resulting from special designations include the fossil-concentration area in the Big Cedar Ridge ACEC and the Brown/Howe Dinosaur Area, Carter Mountain, Five Springs Falls, Chapman Bench, Clarks Fork Basin/Polecat Bench, Clarks Fork Canyon, Foster Gulch Paleontological Area, McCullough Peaks South Paleontological Area, Rainbow Canyon, Rattlesnake Mountain, and Sheep Mountain ACECs, approximately 200,000 acres. Other closures/prohibitions include within 3 miles and in view within 5 miles of the Heart Mountain Relocation Center National Historic Landmark, the Nez Perce NHT, and Other Trails, as well as all land in WSAs (141,068 acres). Additionally, closures along segments of certain WSR suitable waterway segments comprise approximately 20,000 acres.

Under Alternative B, all lands with wilderness characteristics would be managed to preserve their wilderness characteristics and would be closed to the disposal of mineral materials. Closures on these lands comprise 476,349 acres. In comparison, Alternative A does not include specific management for mineral materials disposal in lands with wilderness characteristics.

Resources

Management actions for resources that restrict, prohibit, or limit mineral materials disposal would prevent development in these areas. This would result in adverse impacts to mineral materials disposal.

Under Alternative B, adverse impacts to mineral materials would generally be greater than under Alternative A.

Disposal of mineral materials would be prohibited within ¼ mile of riparian/wetland areas, Blue or Red Ribbon waters (trout streams), certain rivers, big game crucial winter range (1,324,371 acres), and within ¼ mile of waters containing special status fish species.

Mineral materials disposal would be prohibited within 3 miles and in view within 5 miles of important cultural resources. Management to protect paleontological resources may have a greater effect under Alternative B than the other alternatives, because surveys and monitoring would be required for surface disturbance in PFYC 3, 4, and 5 formations, and permission from the authorized officer would be required to resume activities within 100 feet of a paleontological discovery.

VRM Class I and II areas under Alternative B would constitute 1,939,213 acres, or 61 percent, of BLM-administered surface. Impacts to mineral materials disposal would be similar to Alternative A, although to a greater extent because more acreage would be subject to increased VRM restrictions. Alternative B would result in more impacts from constraints associated with VRM classifications than Alternative A.

Alternative C

Closing areas to mineral materials disposal would result in similar impacts as those described for Alternative A, although to a greater extent because more area is closed. Alternative C would close or prohibit surface disturbance on a total of 343,962 acres, or 8 percent, of federal mineral estate in the Planning Area to the disposal of mineral materials (Map 32), more acreage than under alternatives A and less acreage than under Alternative B.

Disposal of sand and gravel is closed on 36,940 acres with known or potential occurrence areas in the Planning Area under Alternative C (Map 29). The acreage closed to sand and gravel disposal in known and potential areas is more than under Alternative A, but less than under Alternative B.

Resource Uses

Managing resource uses under Alternative C would result in the least adverse impacts to mineral materials disposal compared to the other alternatives. Mineral materials operations in the following recreational use areas could be allowed on a case-by-case basis: fishing and hunting access areas, the Five Springs Falls campground, the Cody Archery Range, and certain R&PP lease areas.

Special Designations

Management of special designations under Alternative C would have the least adverse impact on the disposal of mineral materials in relation to the other alternatives. Specific mineral materials disposal closures under this alternative include within ¼ mile and in view within 1 mile of the Heart Mountain Relocation Center National Historic Landmark, the Nez Perce NHT, and Other Trails (with exceptions), as well as on lands in WSAs (141,068 acres). ACECs and other special designations would not adversely affect mineral materials under Alternative C, except in the Brown/Howe Dinosaur Area ACEC, where mitigation, paleontological sensitivity surveys, and monitoring are required for surface-disturbing activities.

Resources

Management actions for resources that restrict, prohibit, or limit mineral materials disposal would prevent development in these areas. This would result in adverse impacts to mineral materials disposal.

Under Alternative C, adverse impacts to mineral materials disposal would generally be less than under the other alternatives.

Under Alternative C, mineral materials disposal would be allowed in flood plains or riparian/wetland areas on a case-by-case basis.

Areas within ¼ mile and in view within 1 mile of important cultural sites would be closed to disposal of mineral materials. Impacts from management to protect paleontological resources would be similar to Alternative A, except that potential delays due to surveying and monitoring of surface-disturbing activity would affect a smaller area because this management applies only in PFYC 5 areas.

VRM Class I and II areas under Alternative C would constitute 474,003 acres, or 15 percent, of BLM-administered surface. Impacts to mineral materials disposal would be similar to Alternative A, although to a lesser extent because less acreage would be subject to VRM Class I and II restrictions. Alternative C would result in the fewest impacts from constraints associated with VRM classifications.

Alternative D

Alternative D closes the least amount of land to mineral materials disposal, and therefore results in the least impacts to salable minerals compared to the other alternatives. Alternative D would close or prohibit surface disturbance, thereby excluding mineral materials disposal, on a total of 374,894 acres, or 4 percent, of federal mineral estate in the Planning Area (Map 33), the least of all alternatives.

Alternative D would close 41,227 acres to disposal of sand and gravel, including less than 1 percent of the areas where there is known or occurrence of sand and gravel (Map 29). The amount of area closed to sand and gravel disposal in known and moderate potential areas is the least of all alternatives, thereby resulting in the fewest adverse impacts.

Resource Uses

Under Alternative D, surface-disturbing activities are allowed, including salable minerals exploration and development, in recreational sites and trails on a case-by-case basis if the effects can be avoided or mitigated. While this would result in less of an impact than alternatives A and B, which prohibit surface-disturbing activities near recreation sites, an adverse impact would result from project delays and costs associated with mitigation. Similar impacts would result by requiring avoidance, minimization and/or compensation for all surface-disturbing activities in the following areas: Bighorn River SRMA and ERMA; West Slope of the Bighorns SRMA (including Canyons RMZ and Brokenback/Logging Road RMZ); Middle Fork of the Powder River SRMA; Canyon Creek SRMA; campgrounds, trailheads, day use areas, river access sites, and similar recreation sites in The Rivers SRMA; Basin Gardens Play Area SRMA; and the Horse Pasture SRMA.

Development of mineral materials may be allowed, on a case-by-case basis, in the following areas: Absaroka Mountain Foothills SRMA, Absaroka ERMA, Beck Lake SRMA, Newton Lake Ridge SRMA, Basin Gardens area, and Tour de Badlands and Tatman Mountain RMZs.

Special Designations

Based on the types of restrictions and acreage affected, Alternative D would result in the second-greatest extent of adverse impacts on the disposal of mineral materials from special designations. Specific closures/prohibitions of surface-disturbing activities resulting from special designations include the fossil-concentration area in the Big Cedar Ridge ACEC and the Five Springs Falls, Clarks Fork Canyon, Paleocene-Eocene Thermal Maximum (PETM), and Sheep Mountain ACECs, for a total of 34,279 acres.

Alternative D also would prohibit mineral materials disposal within the 72 acres of the Heart Mountain Relocation Center National Historic Landmark Urban Center, while surface-disturbing activities would be avoided within 3 miles of the Nez Perce (Neeme-poo) NHT and up to 2 miles of other Historic Trails. Under Alternative D, WSAs would be closed to mineral materials disposal (141,068 acres).

Resources

With the exception of activities within important greater sage-grouse habitats, such as within 0.6 mile of occupied leks in PHMAs and a 500-foot buffer for surface waters and riparian/wetland areas, few management actions explicitly prohibit surface-disturbing activities or mineral materials disposal to protect other resources under Alternative D. However, several management actions require avoidance and would prohibit surface-disturbing activity unless the impacts can be mitigated, resulting in adverse impacts to mineral materials disposal through increased costs and delays associated with mitigation. Under Alternative D, some of the areas where surface-disturbing activity must be avoided include areas up to ¼ mile if needed to protect surface waters and riparian/wetland areas; within ¼ mile of any WGFD-rated Blue or Red Ribbon fisheries; and within big game crucial winter range from November 15 through April 30.

Alternative D prohibits mineral materials disposal for resource protection in the Chapman Bench Management Area (3,425 acres).

Surface-disturbing activities would be avoided under Alternative D to protect the foreground of important cultural resources up to 3 miles. This would increase costs associated with mitigation or prohibit disposal if the impacts cannot be mitigated, which would adversely affect the disposal of mineral materials. Impacts from management to protect paleontological resources would be the same as Alternative A. Unlike A, permission from the authorized officer would be required to resume activities within 100 feet of a paleontological discovery.

VRM Class I and II areas under Alternative D would constitute 872,939 acres, or 27 percent, of BLM-administered surface. Impacts to mineral materials disposal would be similar to Alternative A, although to a greater extent because more acreage would be subject to more stringent VRM restrictions.

Alternative E

Under Alternative E, closing public lands to mineral materials disposal would result in similar impacts as Alternative B, although to a greater extent because more land would be closed. Alternative E would close areas or prohibit surface disturbance, therefore prohibiting mineral materials disposal, on a total of 3,144,151 acres, or 75 percent, of federal mineral estate in the Planning Area (Map 34). Alternative E represents the largest acreage of mineral materials closures compared to the other alternatives, and approximately 100 percent more acreage than Alternative A.

Disposal of sand and gravel would be closed on 261,552 acres of land with a known or potential for occurrence of sand and gravel under Alternative E (Map 29). The amount of area closed to sand and gravel disposal in known and moderate potential areas is greater under Alternative E than under any other alternative, which would result in more adverse impacts to mineral materials than the other alternatives. Specifically, these additional closures to sand and gravel disposal may eliminate existing sources of sand and gravel in the area, requiring the sourcing of these minerals from more distant sites.

Resource Uses

Closing public lands to mineral materials disposal would result in similar impacts as those described for Alternative B, although to a greater extent due to the closure of the Greater Sage-Grouse Key Habitat

Areas ACEC. Mineral materials closures outside this ACEC are the same as Alternative B, and impacts would be the same as Alternative B.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), would be the same as Alternative B, and impacts would be similar to Alternative B. Due to the relative size and additional restrictions on surface-disturbing activities applied for the Greater Sage-Grouse Key Habitat Areas ACEC, special designation management under Alternative E would result in the most adverse impacts to mineral materials disposal of any alternative.

Resources

Impacts to salable minerals from resource management actions would be similar to Alternative B, but slightly greater in the Greater Sage-Grouse Key Habitat Areas ACEC due to additional limitations on surface disturbance and closure of the area to mineral materials disposal for the protection of greater sage-grouse. Greater long-term adverse impacts would result from the requirement that salable mineral pits no longer in use be restored to meet sage-grouse habitat conservation objectives under Alternative E.

Alternative F

Management of salable minerals under Alternative F is the same as Alternative D (Map 33), and impacts would be consistent with those described under Alternative D.

Resource Uses

Impacts from the management of mineral materials disposal and surface-disturbing activities under this alternative would be the same as Alternative D in areas outside the Greater Sage-Grouse PHMAs ACEC. More adverse impacts would occur inside the ACEC, where anthropogenic disturbances are limited to one per 640 acres and no greater than 3 percent loss of sagebrush habitat within this ACEC, compared to 5 percent under Alternative D. This alternative would therefore result in greater adverse impacts to salable minerals than Alternative D, but less than alternatives A, B, and E, which close more areas to mineral materials disposal.

Special Designations

Impacts to mineral materials disposal from special designations under Alternative F would be the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres), where more adverse impacts would result due to additional restrictions on surface disturbance.

Resources

Impacts to salable minerals from resource management actions would be similar to Alternative D, but slightly more adverse within the Greater Sage-Grouse PHMAs ACEC due to additional limitations on surface disturbance. Similar to greater sage-grouse Key Habitat Areas under Alternative E, greater long-term adverse impacts would result from the requirement that salable mineral pits no longer in use be restored to meet sage-grouse habitat conservation objectives.

4.3 Fire and Fuels Management

This section describes potential impacts on fire and fuels management from management of other resource programs. Implementation of the alternatives would affect the planning, management, implementation, and cost of fire management. Direct impacts involve restrictions on fire and fuels management. Indirect impacts include actions resulting in a change in risk or incidence of wildland fires; size, intensity, or destructive nature of wildland fires; fire suppression costs; and fuel loading. For example, mechanical treatments used to manage or reduce fuel loads result in indirect impacts by reducing the risk or incidence of wildland fire.

Fire is an integral part of natural ecosystem function; however, the natural fire regime has been altered in the Planning Area. While the alteration of the natural fire regime (also referred to as Fire Regime Condition Class or Vegetation Condition Class) is considered an adverse impact to fire ecology, actions contributing to an increase in the incidence of wildfires or that limit the ability to effectively fight wildfires in areas where use of fire would not meet resource objectives are considered adverse impacts to fire management. For example, actions limiting fire suppression tactics, thereby resulting in large burn areas or more intense fires, would be considered adverse impacts. Management that increases the ability to effectively and efficiently respond to and control wildfires and management that helps meet resource objectives are considered beneficial impacts.

Management restricting the intensity and effectiveness of fuels treatments would result in increased fuel loading and increased fire hazard. Wildland fuels management objectives are to "manage fuels to restore and maintain landscapes, and promote fire-adapted communities and infrastructure. Fire and fuels management actions will focus on restoring natural fire regimes and frequencies, and accomplishing Desired Plant Community objectives" and to "restore natural fire regimes and frequencies to the landscape, and utilize fire and vegetation treatments to accomplish Desired Plant Community objectives." Management that increases the effectiveness of and ability to meet these objectives would result in beneficial impacts.

For the purpose of this analysis, short-term impacts to fire and fuels management include impacts occurring within 5 years. Long-term impacts are those remaining or occurring after 5 years. The BLM anticipates short- and long-term impacts to fire and fuels management. Long-term impacts generally include impacts to the overall management of fire and fuels in the Planning Area. Short-term impacts to fire and fuels result from surface disturbance that increases the potential for the establishment of invasive species and other fuels.

The following description of impacts is organized into three sections: wildfires (unplanned ignitions), prescribed fires (planned ignitions), and stabilization and rehabilitation following fire. Methods and assumptions are described under the first section only, wildfires (unplanned ignitions), but apply to all three sections.

4.3.1 Wildfires (Unplanned Ignitions)

4.3.1.1 Methods and Assumptions

Wildland fire is a general term describing any non-structure fire that occurs in vegetation and/or natural fuels. In addition to discussions of impacts specific to wildfire management, this section also discusses general impacts that could apply to both wildfire and prescribed fire management. These general impact discussions use the term "wildland fire management" to indicate that they apply to both wildfire and prescribed fire management; impact discussions specific to wildfire management use that term.

The analysis of impacts on fire and fuels management is based on the following assumptions, which apply to wildfires, prescribed fires, and stabilization/rehabilitation:

- Wildfires in wildland urban interface areas typically will be suppressed with unlimited tactics.
- Suppression costs are expected to be similar between all the alternatives.
- Fire regime condition class (FRCC) inventories performed for the *Northern Zone Fire Management Plan* (BLM 2004b) are still accurate.
- Air quality currently is not affecting the ability to conduct prescribed burns; however, the more stringent air quality standards are, the more likely they will be to affect the ability to perform prescribed burns.
- Compared to limited tactics, unlimited tactics would reduce the amount of acres burned annually, but increase the amount of surface disturbance from suppression activities and result in the need for more rehabilitation of damage caused by suppression activities. Unlimited fire suppression tactics also alter the condition class of the vegetation by preventing wildfire to play its appropriate role in maintaining fire-adapted ecosystems.
- Nonnative species alter the risk of wildland fire. Current BLM policy is to ensure seeds used for rehabilitation are free of noxious weeds when reseeding is necessary.
- Annual bromes (e.g., cheatgrass) and invasive species can elevate the risk of fire and actually alter the natural fire regime; therefore, alternatives contributing to the invasion and spread of invasive species are anticipated to adversely affect fire and fuels management.
- In areas of cultural resource sensitivity, use of heavy equipment typically is limited to existing roads and trails, except where human safety is at risk.
- Cultural resource surveys are conducted, where applicable, for all prescribed burns, other fuel treatments, and rehabilitation.
- Current policy (BLM Manual 1745) requires use of native plant species for rehabilitation, except in certain situations (e.g., when native seeds are not available or resource management objectives cannot be met with native species).

4.3.1.2 Summary of Impacts by Alternative

All alternatives use wildland fires (wildfires managed for resource benefit and prescribed fires) to restore fire-adapted ecosystems and reduce hazardous fuels. Alternative C would result in the greatest potential for adverse impacts from human caused, unplanned ignitions due to increased access and additional travel routes. Conversely, Alternative C would also result in the greatest beneficial impacts from active fuels management (i.e., this alternative allows the widest use of fuels treatments) and the greatest ability to employ fire suppression tactics, followed by alternatives A, D, F, B, and E. Alternative C includes the greatest amount of mechanical fuels treatments by acreage (60,000 acres), followed by alternatives A, D, and F (30,000 acres each), and alternatives B and E (5,000 acres each), resulting in beneficial impacts to fire and fuels management by reducing fuels and thereby the potential for fire spread and severity. Fire suppression restrictions (e.g., prohibiting the use of heavy equipment on fragile soils) increase the potential for wildfire spread in the short term and may increase the need for stabilization and rehabilitation as more wildfires occur. However, intensive fire suppression that reduces the natural role of fire in the ecosystem may result in large catastrophic wildfires in the long term that require more intensive stabilization and rehabilitation activities. Under all of the alternatives, implementing the BLM Emergency Stabilization and Rehabilitation standards in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a) would prescribe activities that would

allow rehabilitation of areas following a wildfire and reduce the potential for future fires in burned areas.

4.3.1.3 Detailed Analysis of Alternatives

This section divides the analysis of impacts to fire and fuels management from the alternatives into three areas – impacts from restrictions from resources and special designations, impacts from resource uses, and impacts from proactive management actions. This analysis groups special designations with resources because the resource values within the special designations are the reason for management that would limit or restrict fire and fuels management techniques in these areas.

Impacts Common to All Alternatives

Restrictions from Resources and Special Designations

Although certain management of other resource programs and special designations may limit fire suppression tactics, in cases where human life or safety may be at risk, emergency fire suppression tactics would be used and would become a higher priority than any resource protection or management stipulations.

Avoiding the use of waters that contain high-risk aquatic invasive species for suppression activities (except in cases where public and firefighter safety are threatened) may limit fire suppression activities when other sources of water are unavailable or inadequate to meet fire suppression. This would adversely impact wildfire management.

Avoiding the aerial application of fire suppressant chemicals within 300 feet of perennial waters and restricting the use of fire retardant chemicals as appropriate to protect rock art and water quality would limit the potential to effectively control fires in these areas. This would adversely affect the management of wildland fires.

Suppressing fires that threaten greater sage-grouse habitats and crucial winter wildlife habitat within Wyoming big sagebrush communities and conducting fire management activities to minimize overall wildfire size and frequency in sagebrush plant communities where greater sage-grouse habitat objectives are at risk may create adverse impacts to fire ecology by affecting the natural fire regime in the ecosystem. Actions that suppress the natural role of fire in the ecosystem may result in fuels accumulation and eventually lead to larger and more intense fires. However, suppressing fires in these areas may also decrease the incidence of damaging wildfires to sagebrush habitat and greater sage-grouse and enhance the ability to manage fires in these areas. In some scenarios, a proactive fire management approach may be advisable (e.g., establishing fuels treatments at strategic locations to minimize the size of wildfire and limit further loss of greater sage-grouse habitat) and could result in long-term benefits to fire and fuels management by reducing the incidence and spread of wildfire in greater sage-grouse habitat.

Standard operating procedures would influence the way wildfire suppression tactics may take place within habitat deemed important for special status species. If additional species become listed under the ESA, it is likely that the conservation measures developed to protect and restore such species would have long-term impacts on the types and timing of vegetation treatments allowable within their important habitats.

Prohibiting the use of bulldozers in areas of important cultural resources or historic trails for fire suppression, unless an archeologist and/or resource advisor is present, may have adverse impacts on

fire and fuels management by limiting the ability to effectively fight wildfires in these areas depending on availabilities and response times of archeologists and/or resource advisors. Assigning an archeologist and/or resource advisor to all fires with heavy equipment employed beyond minimum impact suppression techniques may delay fire suppression activities and adversely impact fire management.

Under all alternatives, management of vegetation and invasive species would result in long-term impacts to fire and fuels management. Under all alternatives, vegetation that does not meet DPC has the highest risk of losing important ecosystem components. Mechanical treatment in these areas may not be sufficient to diversify fuel conditions and reduce the potential for wildland fire occurrence or spread. Management actions that limit the potential for the spread or establishment of invasive species would generally have a beneficial impact to fire and fuels management. As invasive species dominate plant communities, fuels tend to build up in these areas. In general, invasive species and grasses, such as cheatgrass, are highly flammable and their presence can result in increased incidence and spread of fire. Long-term adverse impacts to fire and fuels management may result from annual increases in invasive species establishment and spread. Establishment and spread of invasive species would result in alterations of the fire behavior and fire ecology in the Planning Area, and may change the management response to fire.

Under all alternatives, management for wildland fire in special designations would create long-term impacts to fire and fuels management. Typically, areas that include special designations (e.g., ACECs or eligible WSRs) include management that prohibits the use of fire suppression techniques, such as the use of heavy equipment or fire retardant and chemicals, that would affect the resources and characteristics for which the area is designated.

Resource Uses

Allowing the sale of permits to meet public demand for personal use of posts, poles, firewood, sawlogs, Christmas trees, and other vegetative products may reduce fuel loading in those areas. The reduction in fuel loading would decrease the complexity of suppression operations and increase firefighter and public safety.

Under all alternatives, land tenure adjustments may affect fire and fuels management due to ownership changes and the response to fire and fuels in lands managed by private or state owners. Isolated public land parcels within or near private lands may increase the complexity of BLM involvement in the suppression of wildfires and management of fuels, particularly in wildland urban interface areas. Land tenure adjustments that create larger blocks of public land by reducing inholdings would benefit BLM's fire and fuels management by decreasing such complexities.

The management of livestock grazing using the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N) would maintain enough fine fuels to allow for the use of wildland fire for resource benefit, where appropriate. In addition, adherence to these standards and guidelines would reduce the potential for conversion of healthy rangelands into invasive species (e.g., cheatgrass) dominated systems, which may reduce the frequency and spread of fires. Vegetation management actions to meet the *Wyoming Standards for Healthy Rangelands* would also result in a diversity of age-class, cover, and fuel loads in all plant communities that may reduce the size and intensity of wildfires in the long term.

Proactive Management

Under all alternatives, the response to wildland fire would be based on the ecological, social, and legal consequences of the potential action; the circumstances under which a fire occurs; the likely

consequences to firefighter and public safety and welfare; natural and cultural resources; and values to be protected.

Maintaining and implementing an FMP to address fire management on a landscape scale and to meet DPC objectives and resource management objectives would result in long-term beneficial impacts to fire and fuels management. The FMP would define a program to manage wildland fires based on the RMP and provides for firefighter and public safety; fire management strategies, tactics, and alternatives; and addresses values to be protected consistent with management objectives, activities in the area, and federal, state, and local laws and regulations.

Cooperating with other agencies and landowners to conduct landscape level fuel treatments would have beneficial impacts on fire and fuels management by enhancing coordinated fuels management and restoring fire-adapted ecosystems.

Reducing hazardous fuels in the wildland urban interface would result in long-term beneficial impacts to fire and fuels management by limiting the incidence and spread of fires in these areas. Reducing the incidence and spread of fire in wildland urban interface areas would reduce the complexity of managing wildfires that cross ownership boundaries. Protecting homes and other structures from wildfires would result in long-term impacts to fire and fuels management by requiring fire suppression or fuels treatments in these areas.

Achieving a balance between treating areas that have departed from the historic fire regime (FRCC 3) and areas that are functioning within an appropriate fire regime (FRCC 1) would result in beneficial impacts on fire and fuels management. Treatment in FRCC 3 areas to return the fire ecology to the appropriate historic fire regime, along with stabilization and rehabilitation, would help decrease fuel loading in these areas and reduce the potential for future catastrophic fires in areas that have departed from their historic fire regime. Treating areas that are functioning within an appropriate fire regime (FRCC 1) would ensure that fire and fuels management maintains resource objectives within these areas. Balancing treatments in these areas would allow for an effective approach to managing fires based on FRCC and the appropriate fire regime and ecology in these areas. To varying degrees, vegetation treatments under all the alternatives would result in improvement in FRCC in the Planning Area and movement towards DPC for the treated areas.

Alternative A

Surface Disturbance

Surface disturbance results in adverse impacts to fire and fuels management by increasing the potential for invasive species establishment and spread in disturbed areas and, subsequently, the occurrence and severity of unplanned ignitions. Under Alternative A, the BLM projects a total of 136,253 acres of short-term surface disturbance on BLM-administered land during the life of the plan. After reclamation, a total of 15,646 acres of long-term surface disturbance is projected under Alternative A.

Restrictions from Resources and Special Designations

The management actions restricting fire suppression and fuels management discussed below would result in adverse impacts to wildfire management under Alternative A.

Reviewing the impacts of fire suppression to special status plant species on a case-by-case basis may limit fire suppression tactics in these areas, and thus may result in adverse impacts to fire and fuels management.

Prohibiting the use of heavy equipment for fire suppression in the Red Gulch Dinosaur Tracksite ACEC, the Carter Mountain ACEC, the Five Springs Falls ACEC, and the Little Mountain ACEC would result in adverse impacts to fire and fuels management by limiting the available techniques for fire suppression and mechanical treatment in these areas. Management objectives in special designations and SRMAs would help guide the response to wildland fire under Alternative A.

Prohibiting the use of chemical and dye retardants in the Red Gulch Dinosaur Tracksite ACEC would limit the available techniques for fire suppression in these areas, which may result in adverse impacts to fire and fuels management by limiting the ability to suppress wildfires in these areas.

Prohibiting the use of motorized and mechanized vehicles to suppress fires in certain WSR eligible waterway segments in the WFO, and prohibiting fire retardant along BLM-administered land within certain WSR eligible waterway segments would result in adverse impacts to fire and fuels management. Prohibiting the use of motorized vehicles to suppress fires may limit response times and efficiency of fighting wildfires in these areas and lead to increased wildfire severity and spread. Prohibiting fire retardant within certain WSR eligible waterway segments would result in adverse impacts by limiting fire suppression techniques in these areas.

Managing areas as VRM Classes I (141,127 acres) and II (340,784 acres) may limit the type or location of hazardous fuels reduction techniques when they alter the visual character of the landscape. Such restrictions may lead to an increase in fire size and spread in VRM Class I and II areas and adjacent areas. Fire and fuels management may benefit in VRM Class III and IV areas, where a wider range of hazardous fuel reduction techniques with the potential to alter the visual character of the landscape would be allowed.

Resource Uses

Mineral resources development may affect fire and fuels management by developing new facilities and associated infrastructure. Such development may change BLM's response to wildland fire due to increased human presence (i.e., workers) and the location of facilities in the Planning Area. Mineral exploration and development may also result in adverse impacts by increasing the potential for human caused fires in these areas.

Using wildland fire to revitalize decadent forest stands, improve forest stand density, and increase cover would result in beneficial impacts to fire and fuels management by helping reach DPC objectives and restoring areas to FRCC 1 and 2. Allowing a variety of silvicultural practices and cutting methods under Alternative A would have beneficial impacts on fire and fuels management by increasing the options available for fuels treatments. Managing forests and woodlands to meet forest and rangeland health standards would reduce hazardous fuel accumulations and reduce the potential for catastrophic wildfires.

The designation of utility corridors and authorization of ROWs may have beneficial impacts on fire and fuels management by removing or reducing built up fuels and by serving as fuel breaks and fire lines. Utility corridors and access road ROWs may also result in beneficial impacts by providing access for firefighters and other fire and fuels management activities. Alternately, the designation of ROWs and increased human presence associated with the construction and use of ROWs may increase the potential for unplanned ignitions in the Planning Area.

Travel and transportation management would result in both adverse and beneficial impacts to the management of wildland fires. Travel designations that allow access may result in adverse impacts due to increased incidence of human caused fires. Allowing access to more remote locations may also increase the potential for fire in areas that are more difficult to respond to and where fires are

subsequently more difficult to control. Alternatively, travel routes may result in beneficial impacts by increasing access, response time, and flexibility in management when responding to fires.

Under Alternative A, management for recreation in the Planning Area would have long-term impacts to wildfires. Recreation use would result in the increased risk of human caused unplanned ignitions from campfires, vehicles, cook stoves, other recreation related activities. The risk of recreation-related wildfire would be highest around campgrounds, trailheads, and recreation management areas where recreational use is greatest.

Livestock grazing management would result in short-term and long-term impacts to fire and fuels management. Livestock grazing primarily affects the distribution, amount, height, and vigor of herbaceous species such as perennial grasses, which can determine fire characteristics. Livestock grazing can contribute to a reduction of fine fuels, which may reduce the spread of wildland fire. A decrease in fire spread may result in an increased accumulation of larger fuel sources such as shrub vegetation between fires, which may contribute to larger fires in the long term. Properly managed livestock grazing may also reduce flame length, fire line intensity, and rate of spread, which would have a beneficial impact on suppression activities. Fire line intensity and flame length are important measures of potential suppression success.

Proactive Management

Alternative A bases the response to wildland fire on ecological, social, and legal consequences; the circumstances under which a fire occurs; the likely consequences on firefighter and public safety and welfare; natural and cultural resources; and values to be protected.

Alternative A uses wildland fires (wildfires managed for resource benefit and prescribed fires) to restore fire-adapted ecosystems and reduce hazardous fuels. This use of wildland fire would reduce the need for mechanical fuels treatment and the potential for large-scale fires in the long term, while also helping to meet resource objectives. This would result in beneficial impacts to fire and fuels management. Under Alternative A, the BLM projects approximately 30,000 acres of mechanical fuels treatment would occur during the life of the plan (Appendix T). Mechanical fuels treatments would result in beneficial impacts to fire and fuels management by reducing fuel buildup, the potential for fire spread, and fire severity.

Alternative B

Surface Disturbance

Adverse impacts to fire and fuels management from surface disturbance would be similar to those described under Alternative A, though to a lesser degree. Under Alternative B, the BLM projects a total of 73,940 acres of short-term surface disturbance on BLM-administered land during the life of the plan. Implementing Alternative B would result in a 46 percent decrease in short-term surface disturbance on BLM-administered land compared to Alternative A. After reclamation, the BLM projects a total of 10,893 acres of long-term surface disturbance under Alternative B. Implementation of Alternative B would result in a 31 percent decrease in long-term surface disturbance on BLM-administered land compared to Alternative A.

Restrictions from Resources and Special Designations

Management actions restricting fire suppression, fuels management, or wildland fire planning would result in adverse impacts to wildland fire management. In general, restrictions on fire management for the protection of resource objectives are greater under Alternative B than under Alternative A.

Alternative B includes similar fire suppression and heavy equipment restrictions as Alternative A, with several exceptions. Alternative B prohibits fire suppression and the use of chemicals within ¼ mile of any known special status plant species population. In addition, restrictions on motorized vehicles to suppress fires and restrictions on the use of fire retardants apply to all WSR suitable waterway segments. Alternative B includes more special designations and recreation management areas, which would restrict the response to wildfire in these areas to protect the resource characteristics for which the areas were designated.

Adverse impacts to fire and fuels management from VRM allocations would be similar to those described under Alternative A, though to a greater extent due to more area allocated as VRM Class I and II under Alternative B.

Resource Uses

Under Alternative B, management actions for minerals would have similar impacts as those described under Alternative A, though to a lesser degree due to decreased minerals development under Alternative B.

Using natural processes to revitalize decadent forest stands, improve forest stand density, and increase canopy cover would result in short-term adverse impacts on fire and fuels management by limiting the use of some wildland fire as a fuels management technique. However, using natural processes for fuels management may result in long-term beneficial impacts by returning fire to its natural role in the ecosystem.

Impacts to fire and fuels management from the utility corridors designated under Alternative B would be similar to those under Alternative A, though to a lesser degree as less acreage is designated as ROW corridors. Managing more acreage as ROW avoidance and exclusion areas would reduce the prevalence of fuel breaks and fire lines but would also decrease human presence and the potential for unplanned ignitions.

The beneficial and adverse impacts to fire and fuels management from travel and transportation management under Alternative B would be similar to those described under Alternative A, though to a lesser degree due to increased restrictions and less area available for motorized travel.

Management for recreation would have similar impacts to fire and fuels management described under Alternative A, though to a greater degree. Alternative B includes fewer upgrades to sites already developed for recreational use, but the increased area managed as SRMAs—and associated new development—may increase the potential for unplanned ignitions in these areas due to increased recreation activity.

The types of impacts on fire and fuels management from livestock grazing would be similar to those described for Alternative A. However, all these impacts would occur to a much lesser degree because a larger area is closed to livestock grazing under this alternative (1,984,211 acres versus 5,009 acres under Alternative A).

Proactive Management

Under Alternative B, response to wildland fires may vary from full suppression in areas where fire is undesirable, to monitoring fire behavior in areas where fire can be used as a management tool, based on resource goals and objectives. Alternative B utilizes wildland fires and other treatments to restore fire-adapted ecosystems and to reduce hazardous fuels. Mechanical fuels treatments would be similar to those described under Alternative A, though to a lesser degree since only 5,000 acres are projected for mechanical fuels treatments under Alternative B (an approximately 83 percent decrease from

Alternative A) (Appendix T). Mechanical fuels treatment under Alternative B would result in fewer beneficial impacts than under Alternative A.

Although the use of fire suppression under Alternative B is more restricted than under Alternative A, the BLM anticipates that proactive management to employ wildland fire (wildfires managed for resource benefit and prescribed fires) to achieve management objectives and to restore fire-adapted ecosystems would result in long-term beneficial impacts to fire and fuels management throughout the Planning Area. Under Alternative B, the emphasis on restoring the natural role of fire in the ecosystem may result in adverse impacts in the short term as reduced mechanical fuel treatments may result in an increased incidence of fire. In the long term, it is unlikely that beneficial impacts to fire and fuels would result due to historic fire suppression activities, changes to fuel loading, and human occupancy and use of the Planning Area. Long-term restoration of natural conditions is less likely than under Alternative A. The greater restrictions on mechanical fuels treatments and suppression under Alternative B would result in greater potential adverse impacts to private lands as unplanned ignitions, and subsequent wildfires that may spread to private lands, are more likely under this alternative.

Alternative C

Surface Disturbance

Impacts to fire and fuels management from surface disturbance would result in similar impacts as those described under Alternative A, though to a greater degree. Under Alternative C, the BLM projects a total of 245,642 acres of short-term surface disturbance on BLM-administered land during the life of the plan. Implementing Alternative C would result in an 80 percent increase in short-term surface disturbance on BLM-administered land compared to Alternative A, a 233 percent increase compared to Alternative B. After reclamation, a total of 41,485 acres of long-term surface disturbance is projected under Alternative C. Implementing Alternative C would result in a 164 percent increase in long-term surface disturbance on BLM-administered land compared to Alternative A, a 282 percent increase compared to Alternative B.

Restrictions from Resources and Special Designations

Management actions restricting fire suppression, fuels management, or wildland fire planning would result in adverse impacts to wildland fire management. In general, Alternative C contains the fewest restrictions on fire management for the protection of other resource objectives.

Fire suppression impacts due to special status plant species are the same as under Alternative A.

Besides the restrictions and impacts described under *Impacts Common to All Alternatives*, Alternative C includes no other specific restrictions on fire and fuels management related to resource objectives or special designations. Alternative C would allow for the highest level of fire suppression compared to the other alternatives.

Impacts to fire and fuels from VRM allocations would be similar to those described under Alternative A, though to a slightly lesser extent because a smaller area is managed as VRM Class I and II.

Resource Uses

Management for minerals would result in impacts similar to those described under Alternative A, though to a greater extent due to more minerals development under Alternative C.

Using logging and timbering instead of wildland fire and other natural processes to revitalize decadent forest stands, improve forest stand density, and increase canopy cover would result in long-term

adverse impacts on fire and fuels management by limiting the natural role of wildland fire in ecosystems. However, logging and timbering would result in short-term beneficial impacts by reducing fuel loads and the possibility of catastrophic fires.

Impacts to fire and fuels management from the utility corridors designated under Alternative C would be similar to those under Alternative A, but to a lesser degree because the BLM designates fewer corridors under this alternative, though more than alternatives B and D. ROW avoidance or exclusion acreage under Alternative C would result in similar impacts to those under Alternative A, but to a greater degree.

Impacts to fire and fuels management from travel and transportation management under Alternative C would be similar to those described under Alternative A, though to a greater degree. Alternative C has fewer areas closed to travel and more area open to cross-country motorized travel compared to other alternatives.

Under Alternative C, impacts to fire and fuels management from recreation would be similar to those described under Alternative A, though to a greater degree due to an increase in the development of recreation sites and facilities. Alternative C manages fewer areas as SRMAs compared to the other alternatives. However, based on projected surface disturbance (Appendix T) Alternative C would lead to the development of the most recreation sites and the largest increase in the potential for unplanned ignitions in these areas.

Management for livestock grazing would result in impacts similar to those described for Alternative A.

Proactive Management

Under Alternative C, the response to wildfire would be the same as that described for Alternative B.

Under Alternative C, the BLM would use wildland fire (wildfires managed for resource benefit and prescribed fires) to restore fire-adapted ecosystems for commodity production and to reduce hazardous fuels. Alternative C places more emphasis on fire and fuels management for the use of resources compared to Alternative B, which utilizes wildland fire to restore the natural processes of ecosystems.

Impacts from mechanical fuels treatments would be similar to those described for Alternative A, although to a greater degree because 60,000 acres are projected for mechanical fuels treatments under Alternative C (a 100 percent increase compared to Alternative A) (Appendix T). The use of mechanical fuels treatment under Alternative C would be greater than under alternatives A, B, and D.

Alternative D

Surface Disturbance

Impacts to fire and fuels management from surface disturbance would result in similar impacts as those described under Alternative A, though to a greater degree. Under Alternative D, a total of 140,175 acres of short-term surface disturbance is projected on BLM-administered land during the life of the plan. Implementing Alternative D would result in a 3 percent increase in short-term surface disturbance on BLM-administered land compared to Alternative A, a 90 percent increase compared to Alternative B, and a 43 percent decrease compared to Alternative C. After reclamation, a total of 18,306 acres of long-term surface disturbance is projected under Alternative D. Implementing Alternative D would result in a 17 percent increase in long-term surface disturbance on BLM-administered land compared to Alternative A, a 69 percent increase compared to Alternative B, and a 56 percent decrease compared to Alternative C.

Restrictions from Resources and Special Designations

Management actions restricting fire suppression, fuels management, or wildland fire planning would result in adverse impacts to fire and fuels management. In general, restrictions on fire management for the protection of other resource objectives under Alternative D are greater than under alternatives A and C, but less than under Alternative B.

Allowing the application of fire suppression chemicals within ¼ mile of known or documented populations of BLM special status plant species with the consent of the authorized officer would result in the least adverse impact to the use of suppression tactics of any alternative.

Special designations under Alternative D would result in similar adverse impacts to fire and fuels management as those under Alternative A, but to a greater degree. In addition to the ACECs restricting fire suppression tactics that are similarly designated under Alternative A, the BLM restricts the use of heavy equipment during fire suppression operations over important caves and cave passages in the Craig Thomas Little Mountain Special Management Area (SMA). Unlike alternatives A and B, Alternative D does include WSR eligible or suitable waterway segments that would restrict the use of fire suppression techniques along these waterways.

Impacts from allocation of VRM Class I and II areas would be similar to those described under Alternative A. Due to the area allocated as VRM Class I and II, adverse impacts to fire and fuels management from VRM allocations would be greater than those under alternatives A and C, but less than those under Alternative B.

Resource Uses

Under Alternative D, mineral resource exploration and development would have similar impacts to those under Alternative A, though to a lesser degree due to decreased minerals development projected under Alternative D. Adverse impacts from management of mineral resources under Alternative D would be greater than Alternative B, but less than Alternative C.

Forests, woodlands, and forest products management under Alternative D would result in similar impacts to those under Alternative A.

Impacts to fire and fuels management from the designation of utility corridors under Alternative D would be similar to those described under Alternative A, though to an extent similar to Alternative C as a similar acreage is designated for ROW corridors. Alternative D manages more acreage as ROW avoidance or exclusion areas than alternatives A and C, but less than Alternative B, with proportional impacts.

Impacts to fire and fuels management from travel and transportation management under Alternative D would be similar to those described under Alternative A, fewer than under Alternative C, and greater than under Alternative B.

The impacts to fire and fuels management from recreation would be similar to those under Alternative A, but to a greater degree. Management of SRMAs under Alternative D would result in similar impacts to those under Alternative B, but to a lesser degree.

Livestock grazing management under Alternative D would result in similar impacts to fire and fuels management as those under Alternative A. Emphasizing livestock grazing as a tool to improve resource conditions may result in beneficial impacts if grazing reduces fine fuels in certain areas (Diamond et al. 2009).

Proactive Management

Under Alternative D, the response to wildland fire would be the same as described under Alternative B. Fire and fuels management would result in similar impacts, in degree and extent, as those described under Alternative A. Under Alternative D, emphasizing the use of wildland fires (wildfires managed for resource benefit and prescribed fires) and other vegetation treatments to accomplish resource management objectives may result in additional beneficial impacts to fire and fuels management.

Alternative E

Surface Disturbance

Adverse impacts to fire and fuels management from surface disturbance would be the same as alternatives A and B, but to a lesser degree. Under Alternative E, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, and pipelines) in greater sage-grouse Key Habitat Areas to not exceed one disturbance per 640 acres and cover less than 3 percent of the total sage-grouse habitat, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. This restrictive management could reduce potential disturbance-related invasive species spread and subsequent increases in fire severity when compared to the other alternatives. Among the alternatives, Alternative E would result in the least amount of short- and long-term surface disturbance on BLM-administered land (71,829 acres and 10,676 acres, respectively). Implementing Alternative E would result in a 48 percent decrease in short-term surface disturbance on BLM-administered land compared to Alternative A, a 3 percent decrease compared to Alternative B, a 71 percent decrease compared to Alternative C, and a 49 percent decrease compared to Alternative D. Implementing Alternative E would result in a 32 percent decrease in long-term surface disturbance on BLM-administered land compared to Alternative A, a 2 percent decrease compared to Alternative B, a 74 percent decrease compared to Alternative C, and a 42 percent decrease compared to Alternative D.

Restrictions from Resources and Special Designations

Under Alternative E, management actions restricting fire suppression, fuels management, or wildland fire planning would result in the greatest adverse impacts to wildland fire management. In general, restrictions on fire management for the protection of resource objectives are greater under Alternative E than under the other alternatives. Under Alternative E, the BLM designs and implements fuels treatments in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres) with an emphasis on protecting existing sagebrush ecosystems and the benefits of fuel breaks would be evaluated against the additional loss of sagebrush cover. In greater sage-grouse Key Habitat Areas, sagebrush canopy cover may not be reduced to less than 15 percent unless a fuels management objective requires an additional reduction in sagebrush cover to meet strategic protection of priority sage-grouse habitat and conserve habitat quality for the species. Additional limits on fuels management (based on habitat type and invasive species composition) also apply in the Greater Sage-Grouse Key Habitat Areas ACEC under Alternative E, but with exceptions to allow fuels treatments that would limit wildfire risk. In areas outside of the Greater Sage-Grouse Key Habitat Areas ACEC, fire suppression and fuels management are the same as Alternative B, and impacts to fire and fuels management would be the same as described under that alternative.

Visual Resource Management (VRM) under Alternative E is the same as Alternative B, and impacts to fire and fuels management would be the same as Alternative B.

Resource Uses

Under Alternative E, management actions for minerals would have similar impacts as alternatives A and B, though to a lesser degree due to additional restrictions on minerals development under Alternative E.

Management of utility corridors under Alternative E is the same as Alternative B, and impacts to fire and fuels management would be the same as Alternative B. Alternative E manages more acreage as ROW exclusion areas than any other alternative, which would reduce the prevalence of fuel breaks and fire lines but would also decrease human presence and the potential for unplanned ignitions to a greater degree than under the other alternatives. Impacts to fire and fuels management from the management of forests, woodlands, and forest products; travel and transportation; recreation; and livestock grazing under Alternative E would be the same as Alternative B. As under Alternative B, closure of the greater sage-grouse Key Habitat Areas to livestock grazing may contribute to a buildup of fine fuels, which would facilitate the spread of larger wildland fire in the short term; however, the return to a more natural fire regime would reduce the potential for larger catastrophic wildfires in the long term.

Proactive Management

Under Alternative E, response to wildland fires, mechanical fuels treatment, and use of wildland fires to achieve management objectives are the same as Alternative B for areas outside of the Greater Sage-Grouse Key Habitat Areas ACEC, and impacts to fire and fuels management would be the same as Alternative B. Inside the Greater Sage-Grouse Key Habitat Areas ACEC, Alternative E focuses fuels treatments on interfaces with human habitation or significant existing disturbances, designs fuels management projects to reduce wildland fires, and applies seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present. Compared to the other alternatives, management methods applied under Alternative E for the protection of greater sage-grouse may result in the greatest short-term adverse impact to fire and fuels management by limiting the types of treatments used, but would decrease the risk of large, catastrophic fires in the long term through a return to natural fire regimes.

Alternative F

Surface Disturbance

Adverse impacts to fire and fuels management from surface disturbance under Alternative F would be greater than those described under Alternative A, but less than under Alternative D. Management practices relating to surface disturbance are the same as Alternative D, except within areas of the proposed Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). In this ACEC, the BLM manages the density of disturbance to not exceed an average of one disruptive activity location per 640 acres and cover less than 3 percent of the total sage-grouse habitat, compared to a larger allowable disturbance of 5 percent in under Alternative D. This management would reduce potential disturbance-related invasive species spread and subsequent increases in fire severity when compared to Alternative D. Total short- and long-term surface disturbances on BLM-administered land under Alternative F would be 137,064 acres and 17,663 acres, respectively. Implementing Alternative F would result in a 1 percent increase in short-term surface disturbance on BLM-administered land compared to Alternative A, an 86 percent increase compared to Alternative B, a 44 percent decrease compared to Alternative C, a 2 percent decrease compared to Alternative D, and a 92 percent increase compared to Alternative E. Implementing Alternative F would result in a 14 percent increase in long-term surface disturbance on BLM-administered land compared to Alternative A, a 64 percent increase compared to Alternative B, a

57 percent decrease compared to Alternative C, a 2 percent decrease compared to Alternative D, and a 66 percent increase compared to Alternative E.

Restrictions from Resources and Special Designations

Special designations under Alternative F would result in similar adverse impacts to fire and fuels management as those under alternatives A and D, but to a greater degree due to additional protections for other resource objectives within the Greater Sage-Grouse PHMAs ACEC. Similar to Alternative E, Alternative F designs and implements fuels treatments in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres) with an emphasis on protecting existing sagebrush ecosystems and the benefits of fuel breaks would be evaluated against the additional loss of sagebrush cover. In greater sage-grouse PHMAs, sagebrush canopy cover may not be reduced to less than 15 percent unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of priority sage-grouse habitat and conserve habitat quality for the species. Additional limits on fuels management would also apply in the Greater Sage-Grouse PHMAs ACEC under Alternative F, including seasonal restrictions for implementing fuels management treatments.

In areas outside of the Greater Sage-Grouse PHMAs ACEC, management for fire suppression and fuels management are the same as Alternative D, and impacts to fire and fuels management would be the same as Alternative D.

VRM under Alternative F is the same as under Alternative D, and impacts to fire and fuels management would be the same as Alternative D.

Resource Uses

Under Alternative F, mineral resource exploration and development would have similar impacts as Alternative D, though to a lesser degree due to decreased minerals development projected under Alternative F.

Impacts to fire and fuels management from travel and transportation management under Alternative F would be similar to Alternative D, but to a lesser degree because travel is limited to designated roads and trails on a larger acreage under Alternative F.

Overall, impacts from livestock grazing management on wildfires would be similar to under Alternative D, and reduced compared to impacts under alternatives B and E that close greater-sage grouse Key Habitat Areas to livestock grazing and may increase the potential for wildfires from fine fuel buildups. Alternative F focuses on implementing grazing management to strategically reduce fine fuels in greater sage-grouse PHMAs (35 percent of BLM-administered surface lands), and could reduce the potential for wildfires in the long term in these areas.

Impacts to fire and fuels management from the management of forests, woodlands, and forest products; lands and realty; ROWs; recreation; and livestock grazing under Alternative F are the same as those described under Alternative D.

Proactive Management

Under Alternative F, the response to wildland fire mechanical fuels treatment and use of wildland fires to achieve management objectives are the same as Alternative D for areas outside of the Greater Sage-Grouse PHMAs ACEC, and impacts to fire and fuels management would be the same as Alternative D. Inside the Greater Sage-Grouse PHMAs ACEC, Alternative F designs fuels management projects to reduce wildland fires and apply seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present. Compared to the other alternatives, management methods applied under Alternative F for the protection of greater sage-grouse may result in more

adverse impacts to fire and fuels management when compared to alternatives A, C, and D by limiting the types of treatments used.

4.3.2 Prescribed Fires (Planned Ignitions)

Prescribed fires can be implemented as a tool to meet resource objectives, such as for wildlife habitat enhancement, forage production, and fuel reduction.

Impacts described above in Section 4.3.1 *Wildfires (Unplanned Ignitions)* for wildland fires would apply to prescribed fires. Prescribed fires, a type of wildland fire, include any fire intentionally ignited by management under an approved plan to meet specific objectives. Restrictions on fire management techniques and equipment would apply to the management and control of prescribed fires. This section describes only impacts specific to managing prescribed fires. Prescribed fire that has exceeded, or is expected to exceed, prescription parameters or otherwise meets the criteria for conversion to wildfire is considered an escaped prescribed fire. This may occur when a prescribed fire burns out of control or moves outside established fire lines due to wind or other factors; under these circumstances, the escaped prescribed fire is classified as a wildfire.

Direct impacts to prescribed fire include restrictions or stipulations from other resources prohibiting or limiting prescribed fires in certain areas or at certain times of the year. Prescribed fire can result in short-term adverse impacts associated with the actual fire event. However, prescribed fire reduces fuel loads and the potential for larger-scale catastrophic fires and aids in the achievement of vegetation and resource objectives. This typically results in long-term beneficial impacts to resources and ecosystems.

4.3.2.1 Methods and Assumptions

Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes methods and assumptions used in the analysis of impacts to fire and fuels management (including prescribed fire). This analysis focuses on impacts to the management of prescribed fires.

4.3.2.2 Summary of Impacts by Alternative

The use of prescribed fire to achieve measurable objectives and to reduce fuel loading would result in beneficial impacts to fire and fuels management. Conversely, restricting the use of prescribed fire would result in adverse impacts to fire and fuels management, such as the ability to reduce fuel loads. Limiting the use of prescribed fire may also affect the ability of the fire and fuels program to meet fire management goals. Alternative E would restrict the use of prescribed fire the most, followed by alternatives B, D, F, A, and C, respectively. Alternative C would result in the greatest beneficial impacts to fire and fuels management from the use of prescribed fire compared to the other alternatives. Alternative C would impose the fewest restrictions on the use of prescribed fire, resulting in the application of prescribed fire on a projected 80,000 acres over the life of the plan, followed by alternatives A, D, and F (40,000 acres each), Alternative B (20,000 acres), and Alternative E (18,000 acres). Alternatives D and F also emphasize the use of prescribed fire to meet resource management objectives, but apply greater restrictions on its use compared to Alternative C.

4.3.2.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Managing prescribed fires to comply with Wyoming DEQ air quality standards and smoke management rules may result in adverse impacts to the management of prescribed fires by limiting the scale and extent of prescribed fires necessary to achieve fuel reduction targets and other resource objectives.

Maintaining and implementing an FMP, consistent with this RMP to address fire management on a landscape scale and to meet DPC objectives and resource management objectives would result in long-term impacts to the management of prescribed fire.

In order to implement and document a prescribed fire, NEPA compliance requires an interdisciplinary team to conduct site-specific analysis, including ESA and NHPA consultation. In accordance with current BLM prescribed fire policy, a Prescribed Fire Plan is required for prescribed fires. The Prescribed Fire Plan is a site-specific implementation document containing specific resource objectives, prescription criteria, and provisions for suppression if the fire escapes. The presence of resources identified during surveys (e.g., cultural sites, sensitive species habitat) would determine the parameters of prescribed fires in these areas and may prohibit prescribed fire or require specific mitigation or BMPs to ensure prescribed fire is implemented consistent with resource objectives. Additional restrictions on surface-disturbing activities (which include mechanical fuels treatments and prescribed fires) for the protection of resource values identified in the alternatives would further limit the use of prescribed fire in certain areas.

The use of prescribed fire would result in long-term beneficial impacts to fire and fuels management by moving areas towards DPC, reducing fuel loading, and reducing the potential for future catastrophic fires. However, through the removal of existing vegetation and exposure of soil, prescribed fire may increase the potential for the establishment and spread of invasive species (such as cheatgrass) which may increase the incidence and spread of fire.

Taking into account invasive herbaceous species, Fire Regime Groups, and FRCCs when considering treatments, including prescribed fire, would result in beneficial impacts to fire and fuels management. Planning prescribed fires in consideration of invasive species may limit the potential for invasive species establishment and spread, which may decrease the potential for fire incidence and spread and reduce the potential for future prescribed fire or other treatments. Implementing prescribed fires based on FRCC would concentrate prescribed fire activity in areas that would benefit from treatments, and may help return areas to their historic fire regimes.

In determining whether the use of prescribed fire is appropriate in a given scenario, the BLM must consider the requirement under all alternatives that a Burn Plan proposing the use of prescribed fire in greater sage-grouse or crucial winter wildlife habitats must be supported by NEPA analysis detailing how the proposed treatment would support species conservation objectives and minimize potential risks. This requirement would place greater limitations on BLM's ability to proactively manage wildland fires.

Under current BLM policy, areas where prescribed burns occur are generally deferred from livestock grazing for at least two consecutive growing seasons, based on management objectives consistent with the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N). The BLM may adjust the two-growing-seasons deferment requirement based on environmental conditions and management objectives. Prescribed burns generally are not possible where domestic livestock producers are unable to absorb the cost of the deferral period. This policy may restrict the ability to use prescribed fire as a

management tool in certain areas. This may adversely affect the management of prescribed fire. Wild horses in HMAs also could adversely affect burned areas.

Alternative A

Surface Disturbance

Surface disturbance can result in the establishment of invasive species, which increases the potential for fire occurrence and spread. In areas where invasive species become established or spread after surface disturbance, the BLM may use prescribed fire as a management tool to reduce these fuels. Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes total surface-disturbance acreages and compares alternatives.

Implementation of Alternative A is projected to result in 40,000 acres of short-term surface disturbance on BLM-administered land from prescribed fire. No long-term surface disturbance is projected (Appendix T).

Restrictions from Resources and Special Designations

Closing all BLM-administered land in WSR eligible waterway segments to vegetative treatments (including prescribed fire) would result in adverse impacts to fire and fuels management. Prohibiting prescribed fire in these areas would limit the tools available to manage hazardous fuels in these areas, which may increase the potential for larger-scale fires.

Restrictions on heavy equipment and fire suppression activities identified for wildland fire under Section 4.3.1 *Wildfires (Unplanned Ignitions)* would apply to prescribed fires in WSR eligible waterway segments. These restrictions would require other techniques for the control of prescribed fires, if the BLM implemented prescribed fires in these areas.

Management that prohibits or limits surface-disturbing activities for the protection of resources values would result in adverse impacts to fire and fuels management by prohibiting or limiting prescribed fires in these areas. Restrictions on prescribed fires (and other mechanical fuels treatments) may result in the accumulations of fuels and the potential for large-scale catastrophic fires in these areas, which may result in greater adverse impacts in the long term to the resource values for which restrictions are applied. Restrictions for the protection of resources that would limit or prohibit prescribed fire under Alternative A such as prohibiting surface-disturbing activities within 500 feet of surface water, TLS in big game crucial winter ranges, and CSU restrictions within ¼ mile of occupied greater sage-grouse leks would result in adverse impacts.

Resource Uses

Management of ROWs and minerals that increases the amount of roads and the linear clearing of vegetation may result in beneficial impacts to prescribed fire. These linear clearings can serve as fire breaks or fire lines for the control of prescribed fire and reduce the need to clear additional vegetation for the control of prescribed fire.

Proactive Management

Under Alternative A, and in accordance with the Northern Zone FMP, the BLM would use prescribed fire to meet other resource management objectives (e.g., wildlife habitat or range condition) and to reduce hazardous fuels. The BLM would implement prescribed burns on 150 to 500 acres of BLM-administered land per year (totaling approximately 40,000 acres), based on the potential for initial burns, and then as needed to maintain historic vegetation and disturbance regimes.

As described in the FMP, the BLM would perform baseline and post-treatment monitoring following prescribed fire. Post-treatment monitoring is required to determine the accomplishment of direct treatment objectives and resource management objectives. Direct treatment objectives usually are attributes such as plant mortality, fuel consumption, burn pattern (mosaic), and total acreage. Resource management objectives usually concern post-treatment vegetation attributes such as cover, frequency, production, density, and stocking level of a desired species.

Implementation of the Northern Zone FMP would result in long-term impacts to fire and fuels management by requiring the following activities following a prescribed fire:

- Pre and post Fire Regime and Condition Class evaluation
- At least one photo point location, which can be returned to, preferably taken in four opposing directions both pre- and post-treatment
- A Northern Zone Fuels Treatment Monitoring Form completed and filed in the Range Improvement Projects project file
- A geographic information system (GIS) database that includes a completed attribute table and pre- and post-treatment shape files of the treatment perimeter

In addition, the BLM will evaluate a representative number and type of treatments to document the effectiveness of modifying fire behavior. For example, the zone fuels specialist may calculate pre- and post-treatment fire behavior for at least each fuel model treated in the zone.

These activities would provide appropriate evaluation and documentation of prescribed fire activities, which may increase the efficiency and effectiveness of future prescribed fire activities to meet resource objectives and reduce fuel loading.

Alternative B

Surface Disturbance

Surface disturbance may result in the establishment of invasive species, which increases the potential for fire occurrence and spread. In areas where invasive species become established or spread after surface disturbance, the BLM may use prescribed fire as a management tool to reduce these fuels. Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes total surface-disturbance acreages and compares alternatives.

Implementing Alternative B is projected to result in 20,000 acres of short-term surface disturbance on BLM-administered land from prescribed fires (Appendix T). Short-term surface disturbance from prescribed fire would be less than under Alternative A. No long-term disturbance is projected.

Restrictions from Resources and Special Designations

Restrictions that limit or prohibit prescribed fire for the protection of resource values would result in similar impacts to those described under Alternative A, though to a greater degree. In general, management under Alternative B focuses on the protection and conservation of resources and resource values. Under Alternative B, restrictions on surface-disturbing activities for the protection of resources that would limit or prohibit prescribed fire would be greater than under Alternative A.

Under Alternative B, the BLM seasonally stipulates fuels treatments (including prescribed fire) in the Chapman Bench, Clarks Fork Canyon, Rattlesnake Mountain, and Sheep Mountain ACECs, as well as the Absaroka Front Management Area. Seasonal stipulations may adversely affect fire and fuels management by limiting prescribed fire as a tool for fuels reduction in these areas.

Closing all WSR suitable waterway segments to prescribed fire would result in the same impacts as those described under Alternative A.

Restrictions on heavy equipment and fire suppression activities identified for wildland fire under Section 4.3.1 *Wildfires (Unplanned Ignitions)* would apply to prescribed fires in WSR suitable waterway segments. These restrictions would require other techniques for the control of prescribed fires, if the BLM implements prescribed fires in these areas.

Alternative B also prohibits surface-disturbing activities within ¼ mile of, or within riparian/wetland areas, which would limit the use of mechanical vegetation treatments and prescribed fire necessary to restore ecosystem health in some kinds of riparian systems. This would result in a greater impact than Alternative A which limits surface-disturbing activity within 500 feet of riparian/wetland areas.

Alternative B includes more special designations where management is prescribed for the protection of resource values than Alternative A. As a result, prescribed fire and other fuels treatments are decreased in these areas more than under Alternative A.

The restrictions on prescribed fire use under Alternative B would likely result in greater adverse impacts to private lands, as the potential for wildfires starting in heavily fuel-laden areas spreading onto private lands would be greater under Alternative B, compared to Alternative A.

Resource Uses

Impacts to prescribed fire from management for ROWs and minerals would result in similar impacts as those described under Alternative A, though to a lesser degree due to decreased mineral activity and more acreage managed as ROW avoidance or exclusion areas. Designating less area for utility corridors than Alternative A would result in similar beneficial impacts, but to a lesser degree.

Proactive Management

Under Alternative B, the BLM would use wildland fires (wildfires managed for resource benefit and prescribed fires) and other vegetative treatments to restore fire-adapted ecosystems for natural resource systems and to reduce hazardous fuels. Prescribed fire would reduce fuels and the potential for future large-scale catastrophic fires. This would result in beneficial impacts to fire and fuels management. Under Alternative B, the BLM would use habitat enhancement treatments (including prescribed fire) in sagebrush communities on at least 200 acres of BLM-administered land per year; prescribed fire would occur on a total of approximately 20,000 acres over the life of the plan.

Management identified in the Northern Zone FMP for prescribed fire monitoring may be carried forward under Alternative B, consistent with management under this alternative. Impacts would be the same as those described for Alternative A.

Alternative C

Surface Disturbance

Surface disturbance may result in the establishment of invasive species, which increases the potential for fire occurrence and spread. In areas where invasive species become established or spread after surface disturbance, the BLM may use prescribed fire as a management tool to reduce these fuels. Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes total surface-disturbance acreages and compares alternatives.

Implementing Alternative C is projected to result in 80,000 acres of short-term surface disturbance on BLM-administered land from prescribed fires (Appendix T). Short-term surface disturbance from

prescribed fires would be greater than under alternatives A, B, and D. No long-term surface disturbance is projected.

Restrictions from Resources and Special Designations

Seasonally stipulating fuels treatments in the Absaroka Front Management Area would result in the same impacts as those described under Alternative B.

Restrictions that limit or prohibit prescribed fire for the protection of resource values would result in similar impacts to those described under Alternative A, though to a lesser degree. In general, Alternative C reduces restrictions for the protection of resources, allowing greater use of prescribed fire compared to the other alternatives.

Resource Uses

Impacts to prescribed fire from minerals development under Alternative C would result in similar impacts as those described under Alternative A, though to a greater degree. Alternative C is projected to result in the greatest amount of oil and gas development, and the amount of roads would increase proportionally. Alternative C designates the second-largest area for utility corridors, which would result in proportional beneficial impacts to prescribed fire. Impacts from ROW management would result in similar impacts to those under Alternative A, although to a lesser degree because the BLM would manage more acreage as ROW avoidance or exclusion areas.

Proactive Management

Utilizing wildland fires (wildfires managed for resource benefit and prescribed fires) to restore fire-adapted ecosystems would result in the same impacts as those described under Alternative B. Under Alternative C, the BLM would implement prescribed fire and other treatments in sagebrush communities as opportunities and funding allow; prescribed fire would occur on approximately 80,000 acres.

Management identified in the Northern Zone FMP for prescribed fire monitoring may be carried forward under Alternative C, consistent with management under this alternative. Impacts would be the same as those described for Alternative A.

Alternative D

Surface Disturbance

Surface disturbance may result in the establishment of invasive species, which increases the potential for fire occurrence and spread. In areas where invasive species become established or spread after surface disturbance, the BLM may use prescribed fire as a management tool to reduce these fuels. Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes total surface-disturbance acreages and compares alternatives.

Implementing Alternative D is projected to result in the same acreage as Alternative A of short- and long-term surface disturbance on BLM-administered land from prescribed fire.

Restrictions from Resources and Special Designations

Restrictions that limit or prohibit prescribed fire for the protection of resource values would result in similar impacts as those described under Alternative A, though to a greater degree. Under Alternative D, restrictions on surface-disturbing activities for the protection of resources that would limit

or prohibit prescribed fire would be greater than under alternatives A and C, but less than under Alternative B.

Seasonal stipulations on fuels treatments under Alternative D would result in similar adverse impacts to fire and fuels management as those under Alternative B in the Absaroka Front Management Area, but to a lesser degree overall as it designates fewer ACECs with seasonal stipulations.

Restrictions on heavy equipment and fire suppression activities identified for wildland fire in Section 4.3.1 *Wildfires (Unplanned Ignitions)* would also apply to prescribed fires. These restrictions would require other techniques for the control of prescribed fires, if the BLM implemented prescribed fires in these areas.

Alternative D also prohibits surface-disturbing activities within 500 feet of perennial surface water and riparian/wetland areas and avoids surface-disturbing activities within ¼ mile of sensitive habitat, of perennial surface water, and riparian/wetland areas, which would result in impacts similar to those described for Alternative B, but to a lesser degree. This would result in a greater impact than Alternative A, which limits surface-disturbing activity within 500 feet of riparian/wetland areas.

Management of special designations under Alternative D would result in similar impacts to those under Alternative B, but to a lesser degree because there is less acreage within special designations. Overall, the restrictions on prescribed fire under Alternative D would result in similar adverse impacts to private lands as under Alternative B, but to a lesser degree because Alternative D stipulates fuels treatments in less area and performs mechanical fuels treatments and prescribed burns on more acreage (Appendix T).

Resource Uses

Minerals development under Alternative D would result in similar beneficial impacts to prescribed fire as those under Alternative A, but to a lesser degree because less acreage is available for oil and gas development. Utility corridors designated under Alternative D would result in beneficial impacts similar to those described under Alternative A, but to a greater degree than Alternative B. Alternative D manages the second-largest area as ROW avoidance or exclusion areas, which would result in proportional adverse impacts to prescribed fire.

Proactive Management

The BLM would use prescribed fire under Alternative D to a similar extent as under Alternative A, but with a greater emphasis placed on using prescribed fire to accomplish resource management objectives.

Management identified in the Northern Zone FMP for prescribed fire monitoring may be carried forward under Alternative D, consistent with management under this alternative. Impacts would be the same as those described for Alternative A.

Alternative E

Surface Disturbance

Surface disturbance may result in the establishment of invasive species, which increases the potential for fire occurrence and spread. In areas where invasive species become established or spread after surface disturbance, the BLM may use prescribed fire as a management tool to reduce these fuels. Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes total surface-disturbance acreages and compares alternatives.

Implementing Alternative E is projected to result in 18,000 acres of short-term surface disturbance on BLM-administered land from prescribed fires (Appendix T). Short-term surface disturbance from prescribed fire under Alternative E is projected to be the least of all the alternatives; no long-term disturbance is projected.

Restrictions from Resources and Special Designations

Restrictions that limit or prohibit prescribed fire for the protection of resource values would result in similar impacts to those described under Alternative A, though to a greater degree. In general, management under Alternative E focuses on the protection and conservation of resources and resource values. Under Alternative E, restrictions on surface-disturbing activities for the protection of resources that limit or prohibit prescribed fire would be the greatest among the alternatives.

Alternative E includes the largest acreage of special designations where management is prescribed for the protection of resource values; as a result, prescribed fire and other fuels treatments are decreased in these areas more than under the other alternatives. Seasonal fuels treatment stipulations in ACECs under Alternative E are similar to Alternative B except in the Greater Sage-Grouse Key Habitat Areas ACEC, which includes seasonal restrictions on fuels treatments. Alternative E also prohibits the use of fire to treat sagebrush in portions of greater sage-grouse Key Habitat Areas located in less than 12-inch precipitation zones. For ACECs and other special designations outside the Greater Sage-Grouse Key Habitat Areas ACEC, management of and impacts to prescribed fire use would be the same as Alternative B.

Overall, management of special designations under Alternative E would result in similar impacts to private lands to those described under Alternative B, but to a greater extent due to a larger area of special designations with restrictions on fuels treatments and a correspondingly increased likelihood of fire spreading from public lands with high fuel loads to adjacent private lands.

Resource Uses

Under Alternative E, impacts to prescribed fire from management for ROWs and minerals development would result in similar impacts as those described under Alternative A, though to a lesser degree due to additional restrictions on these activities in the Greater Sage-Grouse Key Habitat Areas ACEC. Outside the Greater Sage-Grouse Key Habitat Areas ACEC, ROW and minerals management under Alternative E are the same as Alternative B, and impacts to prescribed fire management would be the same as Alternative B.

Proactive Management

Alternative E uses wildland fires (wildfires managed for resource benefit and prescribed fires) and other vegetative treatments to restore fire-adapted ecosystems for natural resource systems and to reduce hazardous fuels in a similar manner to Alternative B. Therefore, impacts to prescribed fire management would be the same as Alternative B except within the Greater Sage-Grouse Key Habitat Areas ACEC.

In the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), Alternative E places additional restrictions on the use of prescribed fire including prohibiting fuels treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and restrict the use of fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other sagebrush species). However, if as a last resort and after all other treatment opportunities have been explored and site specific variables allow, the use of prescribed fire for fuel breaks that would disrupt the fuel continuity across the landscape could be considered in stands where cheatgrass is a very minor component in the understory (Brown 1982). Based on prescribed measures,

Alternative E would monitor and control invasive vegetation post-treatment and require use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success.

Alternative F

Surface Disturbance

Surface disturbance may result in the establishment of invasive species, which increases the potential for fire occurrence and spread. In areas where invasive species become established or spread after surface disturbance, the BLM may use prescribed fire as a management tool to reduce these fuels. Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes total surface-disturbance acreages and compares alternatives.

Alternative F is projected to result in the same acreage of short- and long-term surface disturbance on BLM-administered land from prescribed fire as alternatives A and D (Appendix T).

Restrictions from Resources and Special Designations

Under Alternative F, restrictions on surface-disturbing activities for the protection of resources that limit or prohibit prescribed fire are greater than under alternatives A, C, and D, but less than under alternatives B and E. Impacts resulting from restrictions that limit or prohibit prescribed fire would be similar to Alternative D, but to a greater degree due to the additional acreage with special designations under Alternative F.

Seasonal stipulations on fuel treatments under Alternative F would result in similar impacts to fire and fuels management as those under Alternative D, but to a greater degree overall because seasonal stipulations are placed on an additional 1,116,698 acres in the Greater Sage-Grouse PHMAs ACEC.

In areas outside of the Greater Sage-Grouse PHMAs ACEC, management for the use of prescribed fire is the same as Alternative D, and impacts to fire and fuels management would be the same as Alternative D.

Resource Uses

Minerals development under Alternative F would result in similar beneficial impacts to prescribed fire as alternatives A and D, though to a lesser degree due to additional restrictions on these activities in the Greater Sage-Grouse PHMAs ACEC. Utility corridors designated under Alternative F would result in beneficial impacts similar to those described under alternatives A and D, and to a greater degree than alternatives B and E. Under Alternative F, lands managed as ROW avoidance and exclusion areas are similar to Alternative D (ROW avoidance areas are based on greater sage-grouse Key Habitat Areas under Alternative D and PHMAs under Alternative F), and impacts would be similar to those listed under Alternative D.

Proactive Management

Under Alternative F, the BLM uses prescribed fire to a similar extent as under Alternative D, but with greater emphasis on using prescribed fire to accomplish resource management objectives. Impacts to prescribed fire management would be similar to those described under alternatives A and D except within the Greater Sage-Grouse PHMAs ACEC.

In the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres), Alternative F would place additional restrictions on the use of prescribed fire including prohibiting fuels treatments in known greater sage-grouse winter range unless the treatments are designed to strategically reduce wildfire risk around or in

the winter range. Within greater sage-grouse PHMAs, Alternative F also limits the use of fire to treat sagebrush in areas receiving less than 12 inches of annual precipitation, and designs post-fuels management projects to ensure long-term persistence of seeded or pre-treatment native plants.

In areas outside the Greater Sage-Grouse PHMAs ACEC, prescribed fire management would be the same as Alternative D, and impacts to fire and fuels management would be the same as Alternative D.

4.3.3 Stabilization and Rehabilitation

The BLM undertakes stabilization and long-term rehabilitation actions to repair lands damaged by wildfire that are unlikely to recover naturally. Emergency stabilization and burned area rehabilitation are part of a holistic approach to address post-wildfire issues, including soil impacts, vegetation restoration, invasive species establishment and spread, and damage that can occur resulting from suppression activity and long-term (more than 3 years) restoration. Rehabilitation includes, but is not limited to, contour felling, mulching, seeding, and control of invasive plants.

Emergency stabilization refers to planned actions performed by a Burned Area Emergency Response team within 1 year of containment of a wildfire to stabilize and prevent unacceptable degradation to natural and cultural resources. Burned area rehabilitation refers to efforts undertaken within 3 years of containment of a wildfire to repair or improve fire-damaged land unlikely to recover naturally to desired management conditions, or to repair or replace minor facilities damaged by fire. The spread of cheatgrass, in particular, is possible in areas burned or disturbed due to fire suppression activities. Widespread presence of cheatgrass can alter the local fire regime and fire-recurrence interval.

This analysis describes the impacts to stabilization and rehabilitation in relation to fire and fuels management. Impacts to stabilization and rehabilitation directly affect the management of fire and fuels and the potential for future fire occurrence and spread. Beneficial impacts to fire and fuels management results from management actions that encourage appropriate stabilization and rehabilitation following a wildfire. Adverse impacts to fire and fuels management result from management that limits stabilization and rehabilitation activities.

Direct impacts to stabilization and rehabilitation include restrictions that prohibit or limit stabilization and rehabilitation actions or techniques.

4.3.3.1 Methods and Assumptions

Section 4.3.1 *Wildfires (Unplanned Ignitions)* describes methods and assumptions used in the analysis of impacts to fire and fuels management (including stabilization and rehabilitation).

4.3.3.2 Summary of Impacts by Alternative

The principal impacts to stabilization and rehabilitation in relation to fire and fuels management result from management that affects the occurrence and spread of wildfire, and management that limits or restricts rehabilitation and stabilization tactics or activity. Under all alternatives, the BLM would conduct stabilization and rehabilitation consistent with BLM policy and guidance and in accordance with the FMP. An increase in fire suppression restrictions associated with wildfire management (as described in Section 4.3.1 *Wildfires (Unplanned Ignitions)* that increases the potential for wildfire occurrence and spread in the short term may increase the need for stabilization and rehabilitation as more wildfires occur. However, intensive fire suppression that reduces the natural role of fire in the ecosystem may result in large catastrophic wildfires in the long term that require more intensive stabilization and

rehabilitation activities. Restrictions on wildfire suppression are greatest under alternatives B and E. There are no restrictions or limitations on stabilization and rehabilitation in specific areas under any of the alternatives.

4.3.3.3 Detailed Analysis of Alternatives

Stabilization and rehabilitation efforts relate directly to the occurrence of wildfires. Funding for stabilization and rehabilitation activities comes from fire funds for the suppression of wildfire. As a result, impacts to stabilization and rehabilitation reflect impacts to management of fire and fuels described in Section 4.3.1 *Wildfires (Unplanned Ignitions)*. Management that increases the occurrence and spread of wildfire (or decreases fire suppression) would impact stabilization and rehabilitation.

Impacts Common to All Alternatives

Implementing the BLM Emergency Stabilization and Rehabilitation standards in *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a) would result in beneficial impacts to fire and fuels management in the Planning Area by prescribing activities that would successfully rehabilitate areas following a wildfire and reduce the potential for future fires in burned areas.

Achieving a balance between treating areas that have departed from the historic fire regime (FRCC 3) and areas that are functioning within an appropriate fire regime (FRCC 1) would result in beneficial impacts on fire and fuels management. Treatment in FRCC 3 areas to return the fire ecology to the appropriate historic fire regime would help decrease fuel loading in these areas and require additional rehabilitation and stabilization to ensure that these areas recover. Without appropriate stabilization and rehabilitation in FRCC 2 and 3 areas, the potential for the occurrence and spread of wildfire in these areas would increase.

Using certified noxious weed seed-free vegetation products on all BLM-administered land (including during rehabilitation and stabilization activities) would result in beneficial impacts on fire and fuels management by decreasing the potential for the establishment of noxious weeds following seeding of rehabilitated areas.

Alternative A

Under Alternative A, the Northern Zone FMP would continue to guide stabilization and rehabilitation. Impacts to the fire and fuels program would result from increased workload associated with writing and implementing an Emergency Stabilization and Response plan for rehabilitation activities, in coordination with other appropriate agencies, landowners, and affected livestock operators. Consistent with the Northern Zone FMP, treatment in and around a disturbed area affected by wildfire would continue until resource specialists determine there is no longer a threat of noxious weeds. If necessary, this treatment would continue beyond the timeframe for Emergency Stabilization and Response funding.

As described in the Northern Zone FMP, the BLM would perform baseline and post-rehabilitation monitoring under Alternative A. Post treatment monitoring is required to determine the accomplishment of direct treatment objectives and resource management objectives. Monitoring rehabilitation efforts would follow the same general protocol as described for prescribed fire, to the extent practical. Monitoring stabilization and rehabilitation would provide appropriate evaluation and documentation of rehabilitation activities, which may increase the efficiency and effectiveness of future rehabilitation activities to meet resource objectives, reduce fuel loading, and reduce the potential for additional fires in the area. This would result in beneficial impacts to fire and fuels management.

Alternative B

There is no separate management under Alternative B for stabilization and rehabilitation activities following a fire. Similar to Alternative A, the BLM would perform stabilization and rehabilitation consistent with the *BLM Emergency Stabilization and Rehabilitation* standards in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a).

In addition, the BLM may carry forward under Alternative B stabilization and rehabilitation activities and monitoring identified in the Northern Zone FMP, with impacts similar to those described for Alternative A.

Alternative C

There is no separate management under Alternative C for stabilization and rehabilitation activities following a fire. Similar to alternatives A and B, the BLM would perform stabilization and rehabilitation consistent with the *BLM Emergency Stabilization and Rehabilitation* standards in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a).

In addition, the BLM may carry forward under Alternative C stabilization and rehabilitation activities and monitoring identified in the Northern Zone FMP, with impacts similar to those described for Alternative A.

Alternative D

There is no separate management under Alternative D for stabilization and rehabilitation activities following a fire. Similar to alternatives A, B, and C, the BLM would perform stabilization and rehabilitation consistent with the *BLM Emergency Stabilization and Rehabilitation* standards in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a).

In addition, the BLM may carry forward under Alternative D stabilization and rehabilitation activities and monitoring identified in the Northern Zone FMP, with impacts similar to those described for Alternative A.

Alternative E

Under Alternative E, the BLM would perform stabilization and rehabilitation consistent with the *BLM Emergency Stabilization and Rehabilitation* standards in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a).

Alternative E also provides separate management for stabilization and rehabilitation activities in the Greater Sage-Grouse Key Habitat Areas ACEC. In greater sage-grouse Key Habitat Areas, Alternative E would design post-fuels management projects (including emergency stabilization and rehabilitation management) to ensure long-term persistence of seeded or pre-treatment native plants. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project. Alternative E would also provide management to consider potential changes in climate when proposing post-fire seedings and consider seed collections from the warmer component within a species' current range for selection of native seed.

In addition, under Alternative E, the BLM may carry forward stabilization and rehabilitation activities and monitoring identified in the Northern Zone FMP, with impacts similar to Alternative A.

Alternative F

Under Alternative F, the BLM would perform stabilization and rehabilitation consistent with the *BLM Emergency Stabilization and Rehabilitation* standards in the *BLM Burned Area Emergency Stabilization and Rehabilitation Handbook* (BLM 2007a).

Alternative F also provides separate management for stabilization and rehabilitation activities in the Greater Sage-Grouse PHMAs ACEC. In the ACEC, Alternative F would design post-fuels management projects to ensure long-term persistence of seeded or pre-treatment native plants to reestablish disturbed areas with healthy native or desired plant communities based on pre-disturbance conditions or desired species composition. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project. Similar to Alternative E, Alternative F would provide management to consider potential changes in climate when proposing post-fire seedings using native plants. Seed collections from the warmer component within a species' current range would be considered under Alternative F.

Under Alternative F, post-fire stabilization and rehabilitation activities in the Greater Sage-Grouse PHMAs ACEC would also include the establishment of exclosures (free of livestock grazing) that would be used to assess recovery. Livestock grazing would be excluded from burned areas until woody and herbaceous plants achieve sage-grouse habitat objectives. Lastly, where burned sage-grouse habitat cannot be fenced from other unburned habitat, the entire area (e.g., allotment/pasture) should be close to grazing until recovered.

Under Alternative F, the BLM may carry forward stabilization and rehabilitation activities and monitoring identified in the Northern Zone FMP, with impacts similar to Alternative A.

4.4 Biological Resources

Vegetation Resources

Impacts Common to All Alternatives

This section describes potential impacts to all vegetation types (Map 36) under all alternatives. The sections that follow describe potential impacts to individual vegetation resources (i.e., forests and woodlands, grasslands and shrublands, or riparian/wetland resources).

There would be surface disturbance under all alternatives, and all alternatives apply BMPs for surface-disturbing activities. For each individual vegetation resources section, projected short- and long-term surface disturbance are assumed to be evenly distributed throughout the Planning Area. Impacts to specific vegetation types would therefore be proportional to the acreage of these vegetation types in the Planning Area, subject to any restrictions on surface disturbance that apply specifically to that vegetation type (e.g., prohibiting surface disturbance in riparian/wetland areas). Impact acreage for vegetation types are not absolute, but serve as a relative comparison among alternatives.

Surface disturbance directly affects plant communities through vegetation removal and mechanical damage to plants. Indirect impacts to vegetation from surface disturbance on vegetation include soil compaction, alteration of soil horizons, erosion, changes in hydrology, and invasive species encroachment. These indirect impacts would limit recovery or rehabilitation of vegetation communities following disturbance. Conversely, vegetation treatments (e.g., mechanical treatments, fire), while involving short-term disturbance, would result in long-term beneficial impacts to vegetation communities. Vegetation treatments would pursue objectives to increase species and structural diversity, control invasive species, improve the quality and quantity of vegetation for wildlife and livestock, restore habitat connectivity, and create or maintain the desired vegetation structure.

Depending on the air quality conditions in the area at the time of proposed treatments, the BLM may implement restrictions on prescribed burns and vegetation treatments in forests and woodlands to maintain air quality. Planning and timing restrictions on vegetation treatments to minimize emissions associated with fugitive dust or smoke would result in short-term adverse impacts to forests, woodlands, and forest products.

Development of facilities and infrastructure associated with transportation networks, minerals, and recreation would increase habitat fragmentation in the Planning Area, could remove vegetation, and contribute to the introduction and the spread of invasive species. ROWs concentrated in a corridor tend to localize or confine disturbance to a smaller area and reduce disturbance in areas identified as sensitive.

Renewable energy development, especially in the form of wind turbines, could result in adverse impacts by fragmenting vegetation communities and requiring mechanized maintenance that has the potential to make these communities more vulnerable to invasive species establishment and wildfire. However, there are no current or pending ROW authorizations for wind facilities in the Planning Area. The limited projected surface disturbance from these activities would have a minimal impact on vegetation.

Recreation use in vegetation communities could result in indirect short-term adverse impacts from unplanned ignitions and unauthorized woodcutting in forestlands in and adjacent to campgrounds, and degradation of vegetation along trails and roads. Unless properly designed and managed, the development of recreation trails, both motorized and nonmotorized, could erode soils, which would

cause adverse impacts to vegetation communities. Increased development of nonmotorized and motorized trails and trailheads can increase recreational use and associated impacts to vegetation communities (e.g., the potential spread and establishment of invasive species and risk of unplanned ignitions) over time. Adverse impacts would generally be more intense from roads and trails that allow motorized vehicle use.

Using the *Wyoming Standards for Healthy Rangelands* (Appendix N) to determine the minimum acceptable conditions for public rangelands would improve the health and diversity of vegetation communities. Impacts to vegetation from livestock grazing management on BLM-administered lands include the removal of forage by livestock, which may alter the amount, condition, composition, and vigor of vegetation. Grazing during the growing season or summer months may reduce the vigor of desired species and change in species composition. Livestock concentration around supplemental minerals or water would disturb soil, remove vegetation, and alter plant community composition.

Livestock, wild horses, and wildlife could contribute to the introduction and spread of invasive species, including noxious weeds. Livestock, wild horses, and wildlife may transport seeds of invasive species into the Planning Area (Bartuszevige and Endress 2008). Areas where animals concentrate and disturb the soil would be particularly vulnerable to infestations of invasive species. Range improvements that disturb the soil surface would provide locations for invasive species to become established. Heavy grazing of native vegetation may increase the susceptibility of an area to invasive species infestation. However, livestock grazing management that promotes healthy ecosystem function would create conditions more resistant to the spread of invasive species.

Managing for greater sage-grouse seasonal habitat objectives (see Chapter 2, Table 2-5) would have mixed impacts depending on cover types and desired condition goals. Sagebrush and grass communities would directly benefit from greater sage-grouse habitat objectives, especially in localized situations such as nesting habitat to maintain residual cover. Cover types containing tree species may be adversely impacted in these same areas to manage for a desired condition on shrub/grassland sites.

The BLM anticipates that potential impacts from VRM classifications, soil and water resources, air quality, invasive species, NHTs and other historic trails, transportation, wildlife, and special status species would influence the location, size, and shape of vegetation treatments and restrict the location and construction of access roads for activities such as forest and woodland treatments.

Summary of Impacts by Alternative

Certain types of management that restrict surface-disturbing activities and other resource uses would generally protect vegetation communities. Table 4-21 provides an overview of select protective management actions by alternative for each plant community in the Planning Area. The purpose of this table is to provide a broad overview comparison of the alternatives. The proceeding sections further discuss the effects of these and other management actions for each plant community.

Table 4-21. Comparison of Acres of Protective Management by Alternative Encompassing Different Plant Communities

Protective Management	Alternative	Plant Community					
		Forests and Woodlands	Sagebrush Shrubland	Nonnative Annual Brome	Riparian	Salt Desert Shrub	Settlement/ Agriculture
Locatable Minerals – Closed	A	15,032	24,475	0	1,543	14,771	451
	B	44,867	135,977	0	2,250	65,588	1,459
	C	4,383	9,495	0	1,324	8,222	441
	D	10,733	25,700	0	1,541	14,926	310
	E	112,217	889,830	23,950	11,702	327,569	10,259
	F	10,733	25,700	0	1,541	14,926	390
Oil and Gas Constraints – Closed	A	27,403	97,301	30	4,926	111,894	7,094
	B	298,521	1,379,992	33,142	34,954	631,360	32,771
	C	14,900	47,194	30	588	77,372	113
	D	59,003	146,654	30	1,508	77,799	1,063
	E	298,521	1,379,992	33,142	34,955	631,360	32,771
	F	63,794	154,129	30	1,732	92,883	332
Oil and Gas Constraints – Major	A	133,090	574,631	20,304	30,028	111,982	11,294
	B	105,054	450,444	9,993	0	317,032	42,943
	C	9,964	25,262	0	4,911	39,585	7,851
	D	157,848	773,060	31,306	33,223	189,769	19,422
	E	118,138	472,286	9,993	0	318,020	43,441
	F	141,909	771,565	31,404	33,223	183,959	19,189
Oil and Gas Constraints – Moderate	A	200,235	954,930	20,512	0	413,778	27,408
	B	24,097	104,394	1,678	0	186,878	13,418
	C	120,943	879,686	21,962	29,456	240,569	27,083
	D	157,848	878,405	14,665	0	189,769	48,471
	E	17,359	96,582	1,678	0	186,403	13,234
	F	190,330	873,920	14,567	0	183,959	49,443
ROW – Exclusion	A	4,650	18,326	653	23,957	11,920	1,130
	B	26,810	142,372	5,754	2,386	38,956	1,447
	C	19	252	0	1,310	5,054	377
	D	1,046	4,621	0	2,151	25,207	647
	E	90,693	855,639	26,200	12,449	294,447	10,305
	F	1,046	4,147	0	2,151	23,883	647
Lands with Wilderness Characteristics[1]	A	0	0	0	0	0	0
	B	38,705	148,570	940	5,969	257,734	4,750
	C	0	0	0	0	0	0
	D	0	0	0	0	0	0
	E	38,705	148,570	940	5,969	257,734	4,750
	F	16,947	27,537	0	121	1,563	54

Table 4-21. Comparison of Acres of Protective Management by Alternative Encompassing Different Plant Communities (Continued)

Protective Management	Alternative	Plant Community					
		Forests and Woodlands	Sagebrush Shrubland	Nonnative Annual Brome	Riparian	Salt Desert Shrub	Settlement/ Agriculture
Livestock Grazing – Closed	A	369	622	9	1,226	1,827	382
	B	209,434	1,168,708	33,802	19,429	504,322	16,833
	C	369	622	9	1,226	1,825	382
	D	369	622	9	1,226	1,827	382
	E	209,434	1,168,708	33,802	19,429	504,322	16,853
	F	369	622	9	1,226	1,827	382
ACEC	A	18,900	39,334	0	281	6,777	73
	B	69,262	157,458	0	1,056	65,920	1,306
	C	3,087	8,651	0	0	0	61
	D	27,451	57,283	0	357	14,030	93
	E	129,888	900,827	23,950	11,040	329,465	10,112
	F	107,354	809,728	33,714	8,497	200,131	11,830
WSR[2]	A	9,647	16,159	0	1,380	0	127
	B	9,647	16,159	0	1,380	0	127
	C	N/A	N/A	0	N/A	N/A	N/A
	D	N/A	N/A	0	N/A	N/A	N/A
	E	9,647	16,159	0	1,380	0	127
	F	N/A	N/A	0	0	0	N/A
WSAs	A	10,872	45,090	30	572	78,478	41
	B	10,872	45,090	30	572	78,478	41
	C	10,872	45,090	30	572	78,478	41
	D	10,872	45,090	30	572	78,478	41
	E	10,872	45,090	30	572	78,478	41
	F	10,872	45,090	30	572	78,478	41

Sources: BLM 2008b; BLM 2009a; BLM 2013a

[1]Includes only lands with wilderness characteristics managed to maintain their wilderness characteristics.
[2]Includes only WSRs managed as eligible (Alternative A) or recommended as suitable (alternatives B and E) for inclusion in the National Wild and Scenic River System.

Note: For the purposes of this analysis, grassland and shrubland communities include 'Sagebrush Shrubland' and 'Salt Desert Shrub' cover types, with intermixed grassland components as described in Chapter 3, *Vegetation – Grassland and Shrubland Communities*.

Note: Table does not include 'Badland/Rock Outcrop' and 'Open Water' cover types.

ACEC Area of Critical Environmental Concern
N/A Not Applicable
ROW rights-of-way
WSA Wilderness Study Area
WSR Wild and Scenic River

4.4.1 Vegetation – Forests, Woodlands, and Forest Products

Actions that restrict forest management practices or contribute to the decline in abundance, distribution, or health of forests or woodlands, and availability, quality, and quantity of forest products would result in adverse impacts. Conversely, actions that enhance management, improve health, and protect and restore forests and woodlands in the Planning Area provide beneficial impacts.

Direct impacts to forests, woodlands, and forest products result from management actions that affect forest structure, species composition/diversity, vigor, health, vegetative community type, or other forest/woodland characteristics. Management actions that limit timber availability and restrict timber extraction methods directly affect forest products. Indirect impacts to forests, woodlands, and forest products include any change in forest and woodland characteristics due to natural forces (e.g., insect and disease, fire and drought conditions), management actions from other resources, or failure to implement management actions.

In addition to human activities, natural processes could produce beneficial or adverse impacts to forest and woodland communities. In an old growth forest, natural regeneration restores genetic diversity, sustained yield, and uneven-aged stands that provide economic benefits such as continuous production, insect and disease control, soil and water conservation, and the elimination of planting costs. Alternatively, natural regeneration can introduce conifers into aspen stands, thereby reducing the size of, or out-competing the aspen stands. Aspen stands create natural fuel breaks and provide other benefits such as scenic qualities and habitat for wildlife. Refer to Map 36 for forest and woodland resources.

4.4.1.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- No current forest or woodland inventory or age and species classifications are available for the Planning Area.
- The condition, species content, and vitality of the forest and woodland ecosystem rest on the foundation of the soils, topography, slope/aspect, and microclimate and climatic forces specific to the region.
- Distributing and managing vegetative treatments will vary in forest and woodland areas depending on the desirable goals (e.g., fuel reduction in a Wildland Urban Interface [WUI] area).
- Livestock grazing in forests and woodlands generally remains compatible with forest management under all alternatives. Many forests and woodland areas are inaccessible to livestock due to steep slopes, physical barriers, or proximity to other portions of grazing allotments.
- Old growth stands, or those the BLM would manage for old growth, will follow the Healthy Forests Restoration Act (2003) Section 102 for maintaining and managing these stands.
- Public demand sales for firewood, Christmas trees, posts and poles, and other forest products would continue.
- Forest health, forest restoration, and hazardous fuels reduction objectives will be the major determining factors in forest management.
- Forests and woodlands are important for the watershed, visual resources, and wildlife habitats. Some of these values are natural and some are sociological. For example, wildlife needs habitat,

not visual quality. Human, sociological, economic, and cultural influences relate to managing forestlands and must be considered.

- Management of the forest could increase the water yield from the forest.
- Water quality could be adversely impacted in the short term due to mechanical forest treatments (soil erosion, etc.), but overall, the consequences of these treatments, as related to water quality, are anticipated to be negligible.
- Aspens generally are declining due to succession and other factors that lead to encroachment of evergreen species into aspen stands; for example, shade-tolerant conifers invade and eventually shade out aspen stands, contributing to their decline.

4.4.1.2 Summary of Impacts by Alternative

Impacts to forests, woodlands, and forest products would result from surface-disturbing activities or actions that increase the chance of catastrophic wildfire or degrade forest health through increased erosion and disease. Surface disturbance would adversely affect forests and woodlands under all alternatives, but would have the greatest impact under Alternative C, followed by alternatives D, F, A, B, and E. Alternative C would also place the fewest restrictions on motorized vehicle use and new road construction, which, in addition to increasing erosion, would increase the risk of unplanned ignitions and unauthorized woodcutting that would degrade forest health. Beneficial impacts to forests and woodlands would result from more intense forest management practices and silvicultural treatments that would improve forest health and reduce the risk of catastrophic wildfires, which pose the greatest threat to forests and woodlands. Forest products would also benefit from similar treatments that increase the availability of commercially viable stands. Alternative C, followed by alternatives D and F, A, and B and E, implements the largest number of silvicultural practices and other treatments to actively manage forests and woodlands. Beneficial impacts would also result from management actions that restrict surface-disturbing activities within certain specially managed areas, such as ACECs, where forests and woodlands are present. However, such actions may also limit silvicultural treatments in certain areas. Alternative E manages the most acres of forests and woodlands within ACECs, followed by alternatives F, B, D, A, and C. Therefore, while Alternative E would result in the least surface-disturbing activities that may affect forests and woodlands, it would also place the most restrictions on proactive management that would improve forest health and reduce the risk of catastrophic fire.

4.4.1.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

In addition to the impacts described above, the following paragraphs provide a general description of potential impacts to forests, woodlands, and forest products that would not differ among alternatives.

Forest management, including timber harvest, would contribute to improving overall forest health throughout the Planning Area. These types of actions would reduce the potential for catastrophic fires, reduce the number of diseased trees, enhance age and species diversity, and reduce the spread of invasive species. Specific proactive management actions common to all alternatives would restore the historic processes, composition, and structures of forests and woodlands, thereby maintaining the desired harvest level. Under all alternatives, the BLM manages to maintain sustainable populations of forest and woodland tree species within the context of other intermingled resources and resources

uses. This management approach would generally have beneficial impacts on forest and woodland communities, but in some cases may require compromise with competing uses.

There would be direct long-term adverse impacts to forest management in localized areas of new important cultural resources discoveries, because these sites would require protection. Such cultural sites could restrict the location of vegetative treatments and access roads, thereby decreasing the accessibility and the forest acreage available for treatments.

Consolidation of land ownership would have a long-term beneficial impact on forest resources through facilitation of management actions in blocks of forestland. If implemented, forest management activities would not be constrained by ownership boundaries. Easement acquisition and land tenure adjustments would help enhance access and aid in implementing forest management actions. Objectives for acquiring or maintaining access to forested areas would keep these areas open to active forest management. Conversely, land transactions could fragment ownership and impact management of forests, woodlands, and forest products if management objectives are inconsistent; however, the low level of land designated for possible disposal would have negligible impacts on forests, woodlands, and forest products in the Planning Area as a whole.

Short-term impacts regarding the timing or location of vegetative treatments and the availability of forest products could result from temporary CSU restrictions, seasonal NSO restrictions, or no surface development restrictions within buffers for specials status species and raptor nest sites in forests and woodlands. Seasonal restrictions for forest management may apply to existing or newly designated ACECs, WSAs, or lands with wilderness characteristics managed to preserve their wilderness characteristics.

Alternative A

Surface Disturbance

Alternative A would result in approximately 15,646 acres of long-term surface disturbance that may contribute to the decline in abundance, distribution, or health of forests and woodlands (Table 4-1); approximately 1,465 acres of long-term disturbance is projected to occur in forest and woodland communities, based on the percent cover of these vegetation types in the Planning Area. The BLM projects 30,000 acres of short-term surface disturbance from silvicultural treatments (Appendix T). Short-term surface disturbance would increase the potential for short-term adverse impacts to forests and woodlands through soil erosion and potential spread of invasive species. The use of BMPs would minimize these impacts. The long-term benefits from silvicultural treatments would reduce the likelihood of catastrophic fire through fuel removal, increase opportunities for natural regeneration, and control insects and disease. The use of silvicultural treatments may also create beneficial impacts by altering forests and woodlands toward DPC. The degree to which these treatments would alter forests and woodlands toward DPC would depend on the location, timing, and other factors of the treatments.

Resource Uses

Under Alternative A, oil, gas, and other minerals development would involve 25,552 acres of short-term surface disturbance, a portion of which could adversely impact forests and woodlands by contributing to a decline in abundance, distribution, or health (Appendix T). Under Alternative A, most of the Planning Area remains open to mineral extraction, and the extent of RFD of minerals facilities is second greatest under this alternative compared to the other alternatives. Most of the impacts would be temporary during the life of the operation, with most areas of disturbance reclaimed following closure of

operations; however, short-term adverse impacts from minerals development would include forest health degradation and habitat fragmentation.

Alternative A permits motorized vehicle use on existing roads and trails in most of the Planning Area. The level of public access granted from motorized travel may increase the potential for unplanned ignitions, unauthorized woodcutting, and the spread of invasive species. This would result in adverse impacts to forests, woodlands, and forest products. Permitting off-road motorized vehicle use in areas with limited travel designations to access dispersed campsites would result in road and trail proliferation that would increase erosion, degrade vegetation, and increase the potential for unplanned ignitions, adversely affecting forests, woodlands, and forest products.

Special Designations

Special designations could beneficially impact forests and woodlands if they place additional restrictions on activities that contribute to forest decline or degrade forest health (e.g., long-term surface disturbance). Special designations also could adversely impact forests and woodlands and forest products when they restrict vegetation treatments to achieve DPC or limit timber extraction availability or methods. Under Alternative A, the forests and woodlands in ACECs (see Table 4-21) would experience limited beneficial impacts due to restrictions on surface-disturbing activities and motorized travel. However, when restrictions limit certain silvicultural treatments they would adversely affect forests, woodlands, and forest products. Alternative A restricts motorized vehicle use in WSAs, which would reduce the likelihood of unplanned ignitions and could result in beneficial impacts.

Resources

Under Alternative A, wildland fire is used to restore fire-adapted ecosystems and to reduce hazardous fuels. Wildland fire at the appropriate intensity would provide beneficial impacts to forests and woodlands in the short term by reducing hazardous fuels to decrease the chance of stand-replacing fires, and in the long term, by diversifying stand age and improving forest health.

Management actions specific to wildlife and special status species could beneficially impact forests and woodlands if they restrict activities that degrade forest health. Conversely, they could adversely impact forests, woodlands, and forest products if they restrict forest management practices (e.g., vegetation treatments) or extraction activities. Under Alternative A, a seasonal TLS to prohibit all activity within a ¾-mile radius of active special status raptor species nests would restrict forest management practices, which may adversely impact forests, woodlands, and forest products. The BLM restores and maintains 25 to 200 acres of aspen stands per year for wildlife values until the number of managed acres reaches 2,000 to 4,000. This increases woodland abundance. Wildlife grazing and browsing could adversely impact the regeneration of aspen and other trees and shrubs.

Proactive Management

Alternative A allows harvesting in commercial forestland in a manner that protects and benefits watershed, wildlife, and riparian/wetland habitat values and emphasizes areas where forest health is a primary concern. This management would create long-term beneficial impacts, both to forests and forest products, by maintaining or improving forest health and improving the quality of forest products over the life of the plan. Under Alternative A, the BLM generally closes timber access and haul roads after completion of timber management, which limits vehicle access and the associated risk of unplanned ignitions and the spread of invasive species. This could beneficially impact forests.

Alternative A allows precommercial thinning in overstocked areas and regenerated timber sale areas when trees reach the 20- to 30-year age class, which would reduce stand density and allow the

healthiest trees to grow faster to harvest. This would create long-term beneficial impacts to forest products. In addition, reducing stand density makes forests more resistant to bark beetle infestation (Leatherman et al. 2007), and salvaging infested stands can slow the spread of bark beetles while preventing other safety hazards associated with dead stands (USFS 2007). Forest management actions under Alternative A slow the spread of bark beetles and result in beneficial impacts to forests.

Precommercial thinning also can benefit forests and woodlands in the long term, if performed at the appropriate intensity, by reducing the fuel load and the chance of catastrophic wildfire. Under this alternative, the BLM manages wildland fire and logging or timbering whenever possible to revitalize decadent stands, improve stand density, and increase canopy cover. This management action would benefit forest health but would not benefit forest products. Alternative A permits clear-cuts of no more than 900 feet in any direction, unless a long-term benefit to habitat results, which would create beneficial impacts to forest products by maintaining timber availability. However, clear-cuts could adversely affect forest health if they are large enough to substantially alter the microclimate or regeneration time of the forest or substantially increase soil erosion.

Planting conifer areas exposed by wildfire or harvesting if they do not regenerate naturally within 15 years of the disturbance would beneficially impact forest products by accelerating regeneration and therefore reducing the rotation time between harvests. Proactive management actions, such as performing woodland treatments in all woodland types and managing conifer encroachment to improve forest health conditions, would create beneficial impacts to forests and woodlands by improving forest health or increasing the abundance, distribution, and stand diversity of forests and woodlands. Alternative A employs a variety of silvicultural practices (e.g., clear cutting, shelterwood, tree and group selection) to accomplish forest health goals, which, if effects remain consistent with forest health objectives, would beneficially impact forests, woodlands, and forest products.

Alternative B

Surface Disturbance

Alternative B would result in 31 percent less acreage of long-term surface disturbance that may contribute to the decline in abundance, distribution, or health of forests and woodlands than Alternative A (Table 4-1). Alternative B would involve approximately 20,000 acres of short-term surface disturbance from silvicultural treatments, which would have fewer short-term adverse impacts on forests and woodlands than Alternative A. However, because fewer acres would be subject to treatment, Alternative B would have fewer long-term beneficial impacts on forests and woodlands (Appendix T). Under Alternative B, the potential for catastrophic fire would be greater and the ability to reduce insects and disease would be less than under Alternative A. The use of silvicultural treatments would create beneficial impacts of altering forests and woodlands toward DPC as identified similar to Alternative A, although to a lesser degree because of the smaller treatment area.

Resource Uses

Under Alternative B, oil, gas, and other minerals development would involve 17,306 acres of short-term surface disturbance (Appendix T), a portion of which may adversely impact forests and woodlands by contributing to a decline in abundance, distribution, or health of these areas. Although most of the Planning Area remains open to mineral extraction, compared to Alternative A, Alternative B has less RFD of minerals facilities. Most of the impacts would be temporary during the life of the operation with most areas of disturbance reclaimed following closure of operations. However, there may be short-term adverse impacts from minerals development, including forest health degradation and habitat

fragmentation. Alternative B would result in less adverse impact to forests and woodlands from minerals development than Alternative A.

Alternative B limits motorized vehicle use to designated roads and trails in most of the Planning Area, which would result in impacts similar to those under Alternative A, but to a lesser degree. Restricting motorized vehicle use to fewer travel routes also may adversely impact forest products by limiting access for commercial timber harvest. Prohibiting off-road motorized vehicle use for dispersed campsite establishment in areas with limited travel designations would eliminate the potential for new road and trail proliferation and reduce the impacts from this management action described under Alternative A.

Special Designations

Under Alternative B, the BLM manages a greater portion of forests and woodlands in the Planning Area within special designation areas (see Table 4-21). The BLM designates the Sheep Mountain and Rattlesnake Mountain ACECs, which contain aspen and conifer stands, under Alternative B. These ACECs implement restrictions on surface-disturbing activities and motorized vehicle use, and the BLM manages them as renewable energy and ROW avoidance areas. The BLM allows, where feasible, and stipulates vegetation and silvicultural treatments and fuels management in these ACECs. Alternative B closes WSAs to motorized vehicle use. Under Alternative B, the BLM restricts minerals development, road construction, and motorized vehicle use, while allowing vegetation treatments and prescribed fire, in lands with wilderness characteristics (all of which are managed to preserve their wilderness characteristics under this alternative). These management actions would beneficially impact forests and woodlands in these areas by maintaining their abundance and reducing the chance for wildfire. However, Alternative B also closes lands with wilderness characteristics to commercial or personal-use woodcutting, adversely affecting forest products by reducing their availability and eliminating the ability to performing commercial aspen and bark beetle treatments that would improve forest health. Special designations under Alternative B would involve more stipulations and restrictions applied to vegetative and silvicultural treatments and motorized vehicle use than Alternative A, which may result in limited adverse impacts to forest health and the availability of forest products. Overall, special designations under Alternative B would create more beneficial impacts to forests, woodlands, and forest products than under Alternative A by increasing restrictions on activities and resource uses that can degrade forest health or increase the chance of wildfire.

Resources

Under Alternative B, the BLM utilizes wildland fires to restore fire-adapted ecosystems for natural resource systems and to reduce hazardous fuels, resulting in similar beneficial impacts to those described under Alternative A. Most of the Planning Area is in FRCC Classes 2 and 3, which have the highest risk of catastrophic fire and of having lost or losing key ecosystem components (see Section 4.3 *Fire and Fuels Management*). Alternative B emphasizes natural processes that would take longer to achieve forest health objectives compared to Alternative A. This type of vegetation management would increase the risk, versus Alternative A, that Alternative B would be inadequate to diversify fuel conditions enough to substantially reduce the risk of catastrophic fire.

Under Alternative B, a TLS to prohibit activity within a 1-mile radius of active special status raptor species nests would have a greater adverse impact on forests, woodlands, and forest products than under Alternative A. Under Alternative B, the Absaroka Front Management Area, which is not managed under Alternative A, restricts some resource uses (e.g., mineral leasing and motorized vehicle use) that would reduce the abundance, distribution, or health of the 48,794 acres of forests and woodlands in its boundaries. Management of this area would allow silvicultural/vegetation and fuels treatments that

would benefit forest and woodland health and forest products. Alternative B restores 100 acres of aspen stands per year with similar beneficial impacts as identified under Alternative A.

Proactive Management

Under Alternative B, the BLM manages forests and woodlands for watershed stability, wildlife habitat, and forest health with an emphasis on natural processes to manage towards achieving forest health objectives. Alternative B permits timber harvesting and other silvicultural practices only where natural processes are unable to accomplish forest health goals, which would result in adverse impacts to forest products by reducing their availability. The BLM closes timber access and haul roads no longer required, which would create beneficial impacts similar to those under Alternative A by limiting motorized vehicle access. Alternative B only allows precommercial thinning for fuels treatment, which would create beneficial impacts to forests and woodlands by reducing fuel loads and the chance of catastrophic fire, and to forest products by improving future harvest quality. However, forest management actions under Alternative B may result in denser, more mature stands with less diverse age structure. Compared to Alternative A, Alternative B could result in greater adverse impacts by increasing the risk of spreading bark beetles. Overall, management of precommercial thinning under Alternative B is more restrictive than Alternative A and would result in less benefit to forest products and forest health.

Alternative B prohibits clear-cuts, which would beneficially affect forest health by preventing potential soil erosion. Conversely, prohibiting clear-cuts would adversely affect forest products by decreasing timber availability and restricting extraction methods, and would eliminate a management tool useful in the regeneration of early successional species (e.g., aspen and lodgepole pine) and treatment of insects and diseases. Additionally, restrictions on timber harvesting on BLM-administered lands may increase harvesting on private or other federal and state lands to make up for decreased availability on BLM-administered lands.

The BLM plants conifer areas exposed by wildfire and harvesting if they do not regenerate naturally within 20 years, resulting in less benefits to forest products than Alternative A, due to the longer rotation time. The BLM limits vegetative treatments and forest management only to areas where natural processes do not achieve forest health goals. The use of primarily natural processes to improve forest health would reduce the potential for erosion and the spread of invasive species, which would be short-term beneficial impacts. However, this practice could slow the rate of fuels production, thereby increasing the risk of catastrophic fire. This would result in long-term adverse impacts to forest health.

Under Alternative B, long-term beneficial impacts to old growth forests would result from managing for no net loss of this forest stand type over a 30-year period and in an appropriate proportion to other timber classes in a hydrologic unit code (HUC) Level 4 sub-basin. Such management would be more beneficial for old growth forest stands than Alternative A, where no specific management exists, but would lead to greater adverse impacts to forest products availability and slower production of new timber in areas managed for old growth than under Alternative A.

Alternative C

Surface Disturbance

Alternative C would result in approximately 165 percent more acreage of long-term surface disturbance that may contribute to the decline in abundance, distribution, or health of forests and woodlands than Alternative A (Table 4-1). Alternative C would result in 40,000 acres of short-term surface disturbance from silvicultural treatments (Appendix T). Potential short-term adverse impacts to forests and woodlands from surface disturbance would be greatest under Alternative C. However, compared to the

other alternatives, under Alternative C potential long-term beneficial impacts from these treatments are greatest. Long-term beneficial impacts include reducing the risk of catastrophic fire, increasing opportunities for natural regeneration, and reducing the spread of insects and disease. The use of silvicultural treatments would create the benefits of altering forests and woodlands toward DPC similar to Alternative A, although to a greater degree because the treatment area would be larger.

Resource Uses

Under Alternative C, oil, gas, and other minerals development would involve 25,912 acres of short-term surface disturbance, a small portion of which could adversely impact forests and woodlands by contributing to a decline in abundance, distribution, or health (Appendix T). Most of the Planning Area remains open to mineral extraction, and the RFD of minerals facilities is the greatest under Alternative C. Most of the impacts would be temporary during the life of the operation, with most areas of disturbance reclaimed following closure of operations. However, short-term adverse impacts from minerals development include forest health degradation and habitat fragmentation. Alternative C would result in the greatest adverse impacts to forests and woodlands from minerals development.

Alternative C would result in impacts from motorized vehicle use similar to those under Alternative A, but to a greater degree. The BLM limits motorized vehicle use to designated roads and trails in a larger area, but also opens a larger area to unrestricted off-road use, with impacts comparable those under Alternative A. Permitting off-road motorized vehicle use to access dispersed campsites would case impacts similar to those under Alternative A.

Special Designations

Under Alternative C, the BLM manages the smallest acreage of forests and woodlands in the Planning Area within special designations (see Table 4-21). Only two ACECs are designated under this alternative. Although these designations would provide the least beneficial impact to forests and woodlands by limiting long-term surface disturbance, this alternative would result in the least adverse impact from restricting silvicultural treatments that improve forest and woodland health and generate forest products. Motorized vehicle use is less restricted in WSAs, which could create less beneficial impact in these areas by reducing the risk of unplanned ignitions.

Resources

Under Alternative C, the BLM utilizes wildland fires to restore fire-adapted ecosystems for natural resource systems, to reduce hazardous fuels, and to enhance forage for commodity production. This utilization of wildland fire under Alternative C would create beneficial impacts to forests and woodlands similar to Alternative A, and could benefit forest products more if the BLM used prescribed burns to affect forests similarly to precommercial thinning. Under Alternative C, the BLM would use mechanical, chemical, and biological treatments across the landscape as needed to restore vegetative diversity and reduce the risk of larger, more intense fires. This would benefit forests, woodlands, and forest products. Alternative C would present the least risk that vegetation management acreage is inadequate to diversify fuel conditions enough to substantially reduce the risk of catastrophic fire.

Under Alternative C, restrictions around special status raptor nests that potentially limit extraction and management practices are the least stringent, which would result in the least adverse impact to forests, woodlands, and forest products. Limiting motorized vehicle use to designated roads and trails subject to seasonal limitations in the Absaroka Front Management Area would create greater beneficial impacts than Alternative A by reducing the risk of unplanned ignitions in the 48,794 acres of forests and woodlands in the area. However, Alternative C allows more oil and gas development in this area that may adversely impact forests and woodlands. The BLM promotes aspen regeneration under all

alternatives and focuses woodland treatments on aspen stands under Alternative C. The BLM does not restore aspen woodlands for wildlife habitat or set a targeted annual acreage of aspen stand regeneration (such as under alternatives A and B) under this alternative; therefore, beneficial impacts from aspen regeneration may be less than under alternatives A and B.

Proactive Management

Under Alternative C, the BLM manages forests and woodlands to achieve a sustained supply of forest products. Alternative C allows timber harvesting in areas classified as commercial timberland, which would create the greatest beneficial impact to forest products by maximizing their availability. The BLM allows timber access and haul roads to remain open to meet other resource goals or for new recreational purposes, which may result in adverse impacts to forests and woodlands by increasing the potential for unplanned ignitions and the spread of invasive species. Alternative C allows precommercial thinning when trees reach the 10- to 20-year age class or are at least 5- to 15-feet tall. This would benefit forest products more than under the other alternatives by releasing the healthiest trees from competition at the earliest age so that they grow faster to harvest. Forest management actions under Alternative C may also result in less dense stands with a more diverse age structure than other alternatives. This would create the most beneficial impacts to forests and woodlands by potentially slowing the spread of bark beetles. Precommercial thinning also could benefit forests and woodlands, if performed at the appropriate intensity to reduce fuels and the chance of catastrophic fire. Alternative C allows clear cuts up to 100 acres, which would provide greater forest product availability than alternatives A and B and similar availability to Alternative D. Allowing larger clear cuts than under Alternative A may result in more adverse impacts to forests and woodlands, depending on the stand composition and slope of the site, from increasing regeneration time and soil erosion.

Under Alternative C, efforts to retain old growth forest areas at appropriate locations and distribution levels in an HUC Level 4 sub-basin as evaluations occur would result in similar beneficial impacts to those under Alternative B, but to a lesser extent. The less restrictive management under Alternative C may be less beneficial to the retention of this forest type than under Alternative B, but also would result in less adverse impacts to forest products production.

Planting conifer areas exposed by wildfire and harvesting if they do not regenerate naturally within 10 years would create the greatest benefit to forest products compared to the other alternatives. Logging or timbering before wildland fire and other natural processes to improve stand density would benefit forest products by increasing the availability and health of timber. Alternative C employs a variety of silvicultural practices (e.g., clear cutting, shelterwood, tree and group selection) to accomplish forest health goals, which, if effects remain consistent with forest health objectives, would benefit forests and forest products. In general, Alternative C would create the greatest benefit to forest products and more beneficial impacts to forests and woodlands than Alternative A, as long as managing forests for commodity production can reduce fuel levels without degrading forest health.

Alternative D

Surface Disturbance

Alternative D would result in approximately 17 percent more acreage of long-term surface disturbance that may contribute to the decline in abundance, distribution, or health of forests and woodlands than Alternative A (Table 4-1). Silvicultural treatments would result in impacts to forests and woodlands similar to those under Alternative A. Under Alternative D, the potential for catastrophic fire would be similar to Alternative A and the ability to reduce insects and disease would be similar to that under

Alternative C. The use of silvicultural treatments to manage forests and woodlands toward DPC would result in impacts similar to those under Alternative A.

Resource Uses

Minerals development under Alternative D would result in impacts to forests and woodlands similar to those under Alternative A. Motorized vehicle use would result in adverse impacts to forests and woodlands similar to Alternative A, although to a lesser degree because the BLM limits motorized vehicle use to designated roads and trails in more areas and limits off-road travel for big game retrieval to within 300 feet of established roads. More limitations on motorized vehicle use would benefit forest products less than Alternative A.

Special Designations

Under Alternative D, the BLM manages more forests and woodlands in special designations than alternatives A and C, but less than Alternative B. The BLM designates the Sheep Mountain ACEC, which would result in impacts similar to those under Alternative B, although to a lesser extent because Alternative D applies fewer restrictions on surface-disturbing activities. Restricting motorized vehicle use in WSAs would limit the potential for unplanned ignitions. This would create more beneficial impacts than Alternative C, but fewer than alternatives A and B.

Resources

Fire and fuels management under Alternative D would result in impacts to forests and woodlands similar to those under Alternative A. Management actions specific to protecting wildlife and special status species and their habitat would result in more adverse impacts to forests, woodlands, and forest products than alternatives A and C, but fewer than Alternative B. Actions to restore aspen woodlands would be similar to those under Alternative C and would result in similar impacts.

Proactive Management

Under Alternative D, proactive management actions for forests, woodlands, and forest products would be similar to those under Alternative A, with more beneficial impacts to forest products from allowing clear cuts up to 100 acres, more precommercial thinning, and managing endemic insects and disease with the full range of silvicultural techniques and treatment methods. Management actions to preserve old-growth stands would benefit forests and woodlands more than under Alternative A, which includes no such actions.

Alternative E

Surface Disturbance

Alternative E would result in 48 percent less acreage of long-term surface disturbance that may contribute to the decline in abundance, distribution, or health of forests and woodlands than Alternative A (Table 4-1), and a similar but slightly smaller acreage of surface disturbance than Alternative B. Under Alternative E, surface-disturbing activities that may contribute to the decline in abundance, distribution, or health of forests and woodlands would be the same as Alternative B, except for areas within the Greater Sage-Grouse Key Habitat Areas ACEC. In this ACEC, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) to not exceed one disturbance per 640 acres and cover less than 3 percent of the total priority sage-grouse habitat, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B; this additional surface disturbance restriction would result in greater beneficial effects than under Alternative B, as the Greater Sage-

Grouse Key Habitat Areas ACEC encompasses areas of forests and woodlands in addition to sagebrush steppe (shrubland) vegetation. Alternative E would involve the same acreage (20,000 acres) of short-term surface disturbance from silvicultural treatments as Alternative B.

Resource Uses

Under Alternative E, oil, gas, and other minerals development would result in 17,297 acres of short-term surface disturbance (Appendix T), a portion of which may adversely impact forests and woodlands by contributing to a decline in abundance, distribution, or health of these areas. Impacts from mineral development under Alternative E would be similar to Alternative B, but the location of development may vary due to greater limitations on surface disturbance within the Greater Sage-Grouse Key Habitat Areas ACEC under Alternative E. As with Alternative B, the majority of the impacts would be temporary during the life of the operation with most areas of disturbance reclaimed following closure of operations.

Management of motorized vehicle use and livestock grazing are similar to Alternative B, and impacts to forests and woodlands under Alternative E would therefore be similar to those described under Alternative B. Compared to Alternative A, limitations and closures to motorized vehicle use for resource protection, including seasonal motorized vehicle closures in greater sage-grouse Key Habitat Areas and for the protection of big game species, would result in beneficial impacts to forests and woodlands under Alternative E.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land in the Greater Sage-Grouse Key Habitat Areas ACEC. As a result, the BLM would manage a greater portion of forests and woodlands in the Planning Area with special designation areas under Alternative E (see Table 4-21). Overall, the relative size and additional restrictions on surface-disturbing activities in special designation areas under Alternative E would create more short-term beneficial impacts to forests, woodlands, and forest products than the other alternatives.

Resources

Under Alternative E, fire and fuels management practices and impacts are the same as Alternative B, with the exception of lands within the Greater Sage-Grouse Key Habitat Areas ACEC, which would be managed with an emphasis on protecting existing sagebrush ecosystems. In general, fuels treatments would be minimized in greater sage-grouse Key Habitat Areas and focused instead on interfaces with human habitation or significant existing disturbances. The build-up of fuels from limitations on fire management activities under Alternative E, which restricts the use of fire to treat sagebrush in less than 12-inch precipitation zones, may increase the potential for catastrophic fires in forest and woodland vegetation in the short term, but may decrease the risk of catastrophic fire in the long term through a return to more natural fire regimes. However, effects from the additional restrictions in this ACEC may be limited since its management also requires strategically and effectively designed fuels treatments to reduce wildfire to the greatest extent possible, potentially resulting in attempts to address areas of inadequate fuels treatments before catastrophic wildfires begin.

Vegetation management would be the same as Alternative B, with exception of lands within the Greater Sage-Grouse Key Habitat Areas ACEC, where management would emphasize the restoration and preservation of native sagebrush ecosystems to create a landscape pattern that most benefits sage-grouse. Activities in this ACEC that control juniper encroachment or stimulate herbaceous growth at interfaces with sagebrush habitats may also adversely impact forests and woodlands under

Alternative E. As a whole, vegetation and fire management practices under Alternative E may result in short-term adverse impacts to forests and woodlands by restricting activities that could improve forest health (e.g., fuels reduction) and allow the collection of forest products.

Proactive Management

Forest and woodland management under Alternative E is the same as Alternative B, and impacts to forests and woodlands would be the same as Alternative B.

Alternative F

Surface Disturbance

Impacts to forests and woodlands from surface disturbances under Alternative F are projected to be greater than alternatives A, B, and E, but less than alternatives C and D. Alternative F would result in approximately 12 percent more acreage of long-term surface disturbance that may contribute to the decline in abundance, distribution, or health of forests and woodlands than Alternative A. Management practices relating to surface disturbance would be the same as Alternative D, except within areas of the proposed Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). In this ACEC, the density of disturbance would not exceed an average of one disruptive activity location per 640 acres and cover less than 3 percent of the greater sage-grouse PHMAs, compared to a larger allowable disturbance of 5 percent under Alternative D. This additional restrictive management over that large ACEC (35 percent of BLM-administered surface land) would generally provide a short-term benefit to forest and woodland resources by limiting the size and extent of disturbances, but may reduce the ability to control insects and disease and may increase the potential for catastrophic fire in the area compared to alternatives A and D. However, in general the BLM anticipates Alternative F would result in the same acreage (30,000 acres) of short-term surface disturbance from silvicultural treatments as Alternative D, though the location of those treatments under Alternative F may vary due to the additional restrictions on anthropogenic disturbances.

Resource Uses

Alternative F manages mineral resource exploration, development, and extraction similar to Alternative D, and impacts to forests and woodlands would be similar to Alternative D. However, Alternative F places additional restrictions on mineral development, including limiting disturbances to one per 640 acres and 3 percent or less of the greater sage-grouse PHMAs. This additional restrictive management would reduce impacts from surface disturbance compared to alternatives A, C, and D, but not compared to alternatives B or E.

Management of motorized vehicle use under Alternative F would provide greater protections for forests and woodlands than under alternatives A, C, and D, but fewer protections than under alternatives B and E. Alternative F manages motorized vehicle use the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC, where such travel is limited to designated roads and trails, reducing potential adverse impacts compared to Alternative D. Under Alternative F, disturbances associated with the creation of new roads and trails is projected to be less than alternatives A, C, and D, but higher than under alternatives B and E. Additional limitations on motorized vehicle use would have greater adverse impacts on forest products than alternatives A, C, and D, but less than alternatives B and E. As stated under Alternative A, authorized or permitted uses that specify allowable access are not affected by travel management designations.

Special Designations

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. Overall, the relative size and additional restrictions on surface-disturbing activities in special designation areas under Alternative F would result in greater short-term beneficial impacts to forests and woodlands than Alternative D.

Resources

Fire and fuels management would result in impacts to forests and woodlands similar to those under alternatives A and D, except in the Greater Sage-Grouse PHMAs ACEC. Additional restrictions on fuels treatment and prescribed fire in this ACEC would prioritize the conservation and restoration of native sagebrush habitats over other priorities, and would design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. Additional restrictions on where and how fuels treatments are implemented may increase the build-up of fuels under Alternative F and increase the potential for catastrophic fire in the short term; however, the extent of this build-up may be limited due to management under this alternative that designs treatments to reduce wildfire to the greatest extent possible. Overall, specific management actions to protect wildlife, special status species, and their habitats under Alternative F would result in more adverse impacts to forests, woodlands, and forest products than alternatives A, C, and D, but fewer than alternatives B and E.

Proactive Management

Under Alternative F, management of forests and woodlands is the same as Alternative D, and the impacts would be the same as Alternative D.

4.4.2 Vegetation – Grassland and Shrubland Communities

Adverse impacts to grassland and shrubland communities include actions that contribute to the decline in abundance or distribution of these communities. Conversely, beneficial impacts to grassland and shrubland communities include actions that protect or restore the communities in the Planning Area.

Direct impacts to grassland and shrubland communities result from surface disturbance and other activities that remove vegetation and cause mechanical damage to plants. Surface-disturbing activities generally result in an adverse direct impact. Activities such as livestock grazing, wildlife use, wildland fire, and vegetative treatments (e.g., planned ignitions, chemical, or biological) also result in direct adverse or beneficial impacts to these communities.

Indirect impacts to grassland and shrubland communities result from activities that alter the quality and health of these communities. For example, activities that compact soil, cause erosion, cause changes in hydrology, and cause invasive species encroachment would cause indirect impacts. Beneficial impacts to grassland and shrubland communities include vegetative treatments to improve these communities and activities that minimize, reduce, or prevent the spread of invasive species into these communities.

4.4.2.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Current trends in plant succession and vegetation health would continue.
- Some existing plant communities likely would not be reestablished to pre-disturbance structure and density for more than 20 years. Actual reclamation success and timeframes are subject to high variability based on the characteristics of the affected plant community, climatic factors, and other site-specific conditions. For example, the reestablishment of Wyoming big sagebrush communities following disturbance from prescribed fire or wildfire has been known to take over 100 years (Cooper et al. 2007).
- Short-term vegetation impacts depend on the length of time it takes for a disturbed area to become revegetated, generally a 1- to 5-year timeframe.
- For the purposes of this analysis, grassland and shrubland communities include the 'Sagebrush Shrubland' and 'Salt Desert Shrub' cover types listed in Table 4-21, with intermixed grassland components as described in Chapter 3, Section 3.4.2 *Vegetation – Grassland and Shrubland Communities*.
- Grassland and shrubland communities would be maintained with a mix of species composition, cover, and age classes.
- Based on the definition of surface-disturbing activity (mechanized actions), an increased source of surface disturbance in the Planning Area will be from bentonite and gypsum development.
- Surface disturbances increase the likelihood of the spread of invasive species in an area.
- The placement of supplements can affect the distribution of livestock grazing in grassland and shrubland communities.
- The primary conduit for the initial establishment of the spread of invasive species is through the road network.
- Herbivory use in the form of grazing and browsing is important for maintaining the health of grassland and shrubland communities. Improper or unmanaged herbivory can decrease plant vigor and ground cover, lead to increased erosion, degrade soil nutrients and water retention, and impact rangeland health.
- Grazing practices can maintain, improve, or degrade rangeland health. *The Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N) are designed to maintain or improve rangeland health and are applied under all alternatives.
- Fire plays an intricate role in these communities, particularly shrubland communities.
- Prescribed fire is a tool used to manage vegetative communities and can result in short-term adverse impacts with long-term beneficial impacts to wildlife, certain desirable wildlife habitats, and in some cases forage availability and productivity.

4.4.2.2 Summary of Impacts by Alternative

Adverse impacts to grassland and shrubland communities would result from surface-disturbing activities and other actions that alter the distribution and abundance of grassland and shrubland communities and change the community structure and diversity. Therefore, management actions that result in more surface disturbance would result in more adverse impacts to these communities. Alternative C would involve the most surface disturbance to grassland and shrubland communities, followed by

alternatives D, F, A, B, and E. Other adverse impacts may result from concentrated livestock grazing that compacts soil and degrades the health of vegetation communities. However, proper grazing practices would reduce the potential for these impacts and may improve resource conditions in certain areas. Under alternatives B and E, allotment monitoring practices, Allotment Management Plan (AMP) development, livestock flushing practices, and rangeland improvements would cause the fewest adverse impacts to grassland and shrubland communities, but would also restrict grazing from certain areas where it could be used as a management tool to improve resource conditions.

Reclamation practices under Alternative E would facilitate the restoration of disturbed areas the most, followed by alternatives B, F, D, A, and C. Special designations and other resource programs under alternatives B and E protect the most grasslands and shrublands from surface disturbance and degradation due to off-road motorized vehicle use, followed by alternatives F, D, A, and C. However, Alternative E would involve the least amount of treatment to prevent wildfires and eradicate invasive species. Alternatives A, D, F, and C allow for more treatment of grassland and shrubland communities, but overall, adverse impacts due to surface disturbance under these alternatives are likely to be greater than under Alternative E. Alternative C would result in the greatest adverse impact to grassland and shrubland communities, followed by alternatives A, D, F, B, and E.

4.4.2.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Impacts to grassland and shrubland communities under the various alternatives would be similar; however, the extent and intensity of impacts would vary by alternative. Therefore, discussions for individual alternatives describe impacts to grassland and shrubland communities from surface-disturbing activities, motorized vehicle use, livestock grazing management, special designations, fire management, wildlife management/use, and proactive management actions under the individual alternatives. The following paragraphs generally describe impacts to grassland and shrubland communities regardless of the alternative selected.

Minerals development impacts to grassland and shrubland communities would include long- and short-term impacts, small and localized removal of vegetative surface cover, and larger disturbances covering many acres. There would be surface disturbance from bentonite and gypsum mining under all alternatives, increasing with the area available for locatable mineral entry. Mineral development would alter the distribution and abundance of grassland and shrubland communities and change community structure and diversity. Long-term impacts would mostly be associated with permanent structures and road construction, but some grassland and shrubland communities would not reestablish to pre-disturbance structure and density for more than 20 years. The severity of impacts would depend on the precipitation zone, amount of activity, and the success of reclamation efforts for disturbed areas. The *Impacts Common to All Alternatives* section under *Vegetation Resources* describes impacts from other surface-disturbing activities, including ROW development that would affect grasslands and shrublands.

Motorized vehicle use on public lands may result in adverse short-term and long-term impacts to vegetation in grassland and shrubland communities. A one-time disturbance from off-road motorized vehicle use causes physical damage to vegetation by breaking stems and branches and may disturb the soil surface, depending on soil conditions, slope, and ground cover. With a one-time disturbance, plants and disturbed areas usually recover. However, with repeated use, new trails become established. This results in the long-term reduction of vegetation cover and density, and changes species composition. In

areas with significant biological soil crusts, a one-time off-road disturbance can remain visible for many months and is prone to repeated use.

Livestock grazing can cause both adverse and beneficial impacts to vegetation communities. Historically, overgrazing of native perennial grasses has contributed to the spread of nonnative annual grasses (DiTomaso 2000). However, proper grazing in grassland and shrubland communities does not adversely impact rangeland health, and may improve it in certain instances. Manier and Hobbs (2007) found that livestock grazing in sagebrush communities can increase plant species richness and diversity, and Muscha and Hild (2006) found no substantial difference in biological crust cover between areas grazed and areas with light to moderate grazing throughout Wyoming. Improving plant vigor, increasing vegetative cover, and reducing invasive species infestations can occur through removing old growth and decadent vegetation that inhibits new growth. Healthier plant communities are more resistant to the spread of invasive species and other undesirable plant species. Livestock grazing of noxious weeds at crucial points in their life-cycles can decrease the spread of invasive species. Proper livestock grazing management also increases a plant community's resistance to cheatgrass invasion after a disturbance such as wildland fire (Davies et al. 2009).

Under all of the alternatives, wild horse grazing—if concentrated or localized year-round—within HMAs may result in adverse impacts to grassland and shrubland communities by compacting soils and removing vegetation. Expanding the McCullough Peaks HMA under alternatives B and D may increase the extent of adverse impacts to grasslands and shrublands from concentrated wild horse grazing.

Wildland fire and prescribed fire have both adverse and beneficial impacts to grassland and shrubland communities. In the short term, wildland fires remove vegetation and create an opportunity for the establishment or spread of invasive and noxious weeds. Many invasive species respond rapidly after fire, and can out-compete native species. In areas where invasive species are present, wildland fire increases the likelihood of invasive species expansion. Firefighters and their equipment may also introduce or spread invasive species. Some mechanical control activities disturb the soil surface and remove vegetation, creating an opportunity for invasive species to become established or spread.

In the long term, because of the role fire historically played in these communities, fire would increase vegetative diversity across the landscape, rejuvenate decadent plants, and improve the overall health of these communities. In shrubland communities, impacts from fire usually are long-term and depend on the scale and severity of the disturbance. The potential for sagebrush shrublands to return after fire depends on the acreage burned, the distance to seed sources, and the spread of invasive species, such as cheatgrass, which can increase fire frequency. Limiting or protecting acreage from fire may, in some cases, lessen direct loss of grassland and shrubland communities and reduce the potential spread of invasive species in the short term. However, considering the historic role of fire in maintaining vegetative composition and structure, the lack of fire may decrease the overall health of these communities. Wildlife impacts to vegetation depend on population levels, the distribution of animals, and the ability of animals to move. Crucial winter ranges for mule deer and pronghorn, where shrubs are heavily used, may exhibit vegetation shifts from sagebrush, bitterbrush, and mountain mahogany to conifers, grasses, forbs, and annuals, and in some cases, bare ground. Management actions that prohibit surface-disturbing activities to protect special status species, such as the greater sage-grouse, in grassland and shrubland communities also would benefit vegetation in these areas.

Specific proactive management actions common to all alternatives would benefit grasslands and shrublands to ensure that the selected alternative will meet the goals and objectives for these resource programs. Proactive management actions common to all alternatives include managing vegetative communities in accordance with the *Wyoming Standards for Healthy Rangelands* (Appendix N) and continuing to use ecological site descriptions (ESDs), resource objectives, specific management

practices, or other reasonable or practical options to maintain or achieve the standards; continuing to regularly monitor and evaluate climatic and vegetative data to analyze shifts in rangeland production to implement actions, if necessary, to ensure the long-term productivity of rangeland; using certified noxious-weed-free vegetation products on all BLM-administered lands; and maintaining 10 to 30 percent sagebrush canopy cover on suitable lands in greater sage-grouse PHMAs. Refer to Chapter 2 for goals, objectives and a complete list of management actions common to all alternatives for grassland and shrubland communities.

Alternative A

Surface Disturbance

Under Alternative A, approximately 116,578 acres of short-term and 13,387 acres of long-term surface disturbance is projected to occur in grassland and shrubland communities, based on the percent cover of these vegetation types in the Planning Area. Under Alternative A, impacts to grassland and shrubland communities associated with surface-disturbing activities would be primarily adverse. Short-term adverse impacts include soil erosion, loss of species diversity, and invasive species spread; however, the relatively small size of individual disturbed areas and the implementing BMPs would minimize these short-term impacts. Long-term impacts from development last longer than 5 years and primarily include a decrease in abundance and distribution of grasslands and shrublands. Table 4-21 lists the acreages of grasslands and shrublands protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under Alternative A.

Routinely seeding, or requiring permittees and operators to seed, disturbed areas with native plant species would encourage native vegetation cover, maintain biological integrity, help shift vegetative communities toward DPC, and reduce the potential for the spread of invasive species. These would be beneficial impacts to grassland and shrubland communities. Conversely, seeding with only native species may reduce reclamation success compared to using the species most likely to restore vegetative cover, whether native or nonnative. Alternative A does not require a reclamation plan, the purpose of which is to incorporate measures to support the return of as much of the disturbed acreage to its predisturbed state as quickly as feasible upon conclusion of operations from a given surface pad. Not requiring comprehensive measures and monitoring to ensure the reclamation of areas following surface disturbance would result in a greater short-term adverse impact. However, reestablishing vegetation cover over disturbed soils within 5 years of initial seeding would encourage native vegetative structure and reduce long-term impacts associated with exposed soils (e.g., establishment and spread of invasive species). These would be beneficial impacts to grassland and shrubland communities.

Resource Uses

Under Alternative A, oil, gas, and other minerals development is project to result in 25,552 acres of short-term surface disturbance and 1,184 new oil and gas wells, a portion of which would adversely impact grassland and shrubland communities by contributing to a decline in their abundance, distribution, or health (Appendix T). Most of the Planning Area would remain open to mineral extraction. Alternative A makes available 4,130,352 acres for locatable mineral entry, which would involve long-term surface disturbance in the portion of that acreage where development occurs. Alternative A would result in impacts to grassland and shrubland communities from bentonite and gypsum development. Some of the impacts would be temporary during the life of the operation, with areas of disturbance reclaimed following closure of operations, but some areas may not reestablish pre-disturbance structure and density for more than 20 years.

Invasive species would adversely affect grassland and shrubland communities under Alternative A. The spread of invasive species reduces diversity in grasslands and shrublands and, in the case of cheatgrass spread, alters the fire regime so that fires burn frequently and rapidly. Under Alternative A, the BLM would perform vegetation treatments to control or eradicate invasive species on 2,000 acres. The projected surface disturbance from vegetative treatments under Alternative A would result in short-term adverse impacts, but would benefit grassland and shrubland communities over the long term.

Alternative A would involve the second-most acreage of surface disturbance from pipeline and road development. Pipeline disturbance would be short-term, because reclamation would return herbaceous cover to the disturbance areas following construction. However, grassland and shrublands in low precipitation zones may not return to pre-disturbance cover for more than 20 years. The amount of new road construction in grassland and shrubland communities would impact these areas proportionately through the loss of vegetation and potential spread of invasive species. New roads also would fragment grassland and shrubland communities, which may reduce species diversity.

Motorized vehicle use is limited to existing roads and trails in most of the Planning Area under Alternative A. Even when confined to roads, motorized vehicles increase the potential for invasive species spread and poorly designed or maintained roads may increase erosion and affect adjacent vegetation. Areas with grasslands and shrublands that allow OHV activities, but are further restricted by limiting use to designated roads and trails, include the Absaroka Mountain Foothills SRMA and Bighorn River SRMA. Alternative A allows OHV use in areas with limited travel designations for big game retrieval and dispersed campsite access, which could result in road and trail proliferation that would damage vegetation and impact grasslands and shrublands. Areas where damage from off-road use is most likely include stream crossings, areas with highly erosive soils, steep slopes, areas with important biological soil crusts, and vegetative communities with plants, such as Wyoming big sagebrush, susceptible to physical damage. Motorized vehicle use under Alternative A would result in adverse impacts to grassland and shrubland communities.

Livestock grazing management under Alternative A would have both adverse and beneficial impacts to grassland and shrubland communities (see Table 4-21). Under Alternative A, the BLM emphasizes monitoring on category "I" allotments, treats monitoring on category "M" and "C" allotments as a low priority, and develops and implements AMPs as needed to meet multiple use objectives. By emphasizing monitoring only on higher priority allotments, undesirable conditions in lower priority allotments may not be identified and deterioration or improvement in grassland and shrubland communities may not be realized in a timely manner. However, concentrating monitoring on category "I" allotments would beneficially affect these allotments because undesirable conditions would be identified more quickly. When appropriately managed according to the *Wyoming Guidelines for Livestock Grazing Management* and other appropriate BMPs, livestock grazing would benefit grasslands and shrublands as described under *Impacts Common to All Alternatives*.

The BLM requires livestock flushing on a case-by-case basis, allowing for the potential spread of invasive species via livestock to grazed grassland and shrubland communities. However, identifying and flushing potential vector livestock would reduce the threat of invasive species spread in some instances. Rangeland improvements such as reservoirs, pits, pipelines, and wells would involve removing vegetation and may concentrate livestock and increase the potential spread of invasive species. Due to allotment monitoring practices, AMP development, livestock flushing practices, and projected rangeland improvements, livestock grazing under Alternative A would, overall, benefit grasslands and shrublands by continuing to improve these vegetation types in the Planning Area.

Special Designations

Special designations would benefit grasslands and shrublands where the designations protect areas from resource uses or activities that may damage or destroy vegetation or increase the potential for wildfire or invasive species spread. The primary purpose of the Carter Mountain ACEC designated under Alternative A is to protect grassland and shrubland communities. The setting consideration zone (SCZ) around the Nez Perce (Neeme-poo) NHT and other trails may protect areas of grasslands and shrublands from disturbance. Table 4-21 lists the acreages of grassland and shrubland communities in special designation areas; the designations would limit adverse impacts to these vegetation communities.

Resources

The vegetation treatments applied according to the fire and fuels management actions under Alternative A may be inadequate to reduce fuel conditions enough to substantially diminish the risk of catastrophic fire. Most of the Planning Area is in FRCC Classes 2 and 3, which have the highest risk of catastrophic fire or of having lost or losing key ecosystem components (see Section 4.3 *Fire and Fuels Management*). Intense fires in areas where fuels exceed historical levels may destroy the seeds of perennial grasses and shrubs and alter soils to increase the risk of invasive species establishment. The BLM would apply most of the total projected prescribed fire and fuels treatment acreage under Alternative A (70,000 acres) to grassland and shrubland communities not meeting DPC objectives (Appendix T).

Under Alternative A, the BLM utilizes wildland fires to restore fire-adapted ecosystems and to reduce hazardous fuels. Alternative A would involve the second highest level of surface disturbance from prescribed fire and fuels treatments. Prescribed fire would cause a short-term adverse impact to grasslands and shrublands by destroying vegetation, increasing soil erosion, and increasing the potential spread of invasive species. However, the relatively small size of individual treatment areas and the use of BMPs would minimize these short-term impacts. Prescribed fire and fuels treatments would benefit grassland and shrubland communities in the long term by reducing fuels and preventing catastrophic fires. Overall, fire and fuels management under Alternative A would result in long-term beneficial impacts to shrubland and grassland communities.

Wildlife management actions under Alternative A would indirectly benefit grassland and shrubland communities. Alternative A prohibits domestic sheep grazing on pronghorn crucial winter range, unless adverse impacts can be avoided or mitigated, reducing the potential for increased herbivory that may shift shrubland communities to conifers, grasses, forbs, and annuals. Limiting surface-disturbing activities around greater sage-grouse leks and in winter, nesting, and early brood-rearing habitats would create short-term beneficial impacts to grassland and shrubland communities in these areas. However, if these restrictions prevent vegetation treatments that would improve grassland and shrubland health in the long term, they may adversely impact communities in these areas. The short-term beneficial impacts of preventing vegetation loss from surface disturbance may outweigh potential loss of long-term benefits from vegetation treatments.

Proactive Management

Alternative A would result in beneficial long-term impacts to grassland and shrubland health by managing grassland and shrubland communities on 600,000 acres of BLM-administered land toward DPC objectives for watershed protection and livestock grazing. Managing toward DPC objectives improves overall community health, improves plant vigor, reduces the potential for erosion, and improves forage for livestock and wildlife. Because the BLM implements these management actions on

a portion of grassland and shrubland communities, Alternative A would create limited long-term beneficial impacts to grasslands and shrublands.

Alternative B

Surface Disturbance

Under Alternative B, approximately 63,263 acres of short-term and 9,320 acres of long-term surface disturbance is projected in grassland and shrubland communities, based on the percent cover of these vegetation types in the Planning Area. Impacts to grassland and shrubland communities associated with surface-disturbing activities would be less than Alternative A under this alternative. Table 4-21 lists the acreages of grasslands and shrublands protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

Under Alternative B, the BLM analyzes surface-disturbing activities by mapping soils, collecting soil samples for physical and chemical analysis, and evaluating current erosion conditions. Alternative B requires that disturbed areas be reestablished with 50 percent of native vegetative cover within three growing seasons, and 80 percent cover within five growing seasons of initial seeding, based on preexisting conditions. Alternative B also manages disturbed areas to reestablish healthy native plant communities based on preexisting composition or other species, as identified in an approved management plan. Approving reclamation plans before all surface-disturbing activities under this alternative would minimize short-term adverse impacts by requiring project proponents to propose comprehensive measures and monitoring to ensure reclamation of areas following surface disturbance. Reclamation practices under Alternative B increase the chance of successful reestablishment of grasslands and shrublands in disturbed areas. Based on management of reclamation and the amount of long-term disturbance acreage projected under Alternative B, this alternative would result in less short- and long-term adverse (and more beneficial) impacts to grassland and shrubland communities than Alternative A.

Resource Uses

Under Alternative B, oil, gas, and other minerals development would result in 17,306 acres of short-term surface disturbance and 502 new oil and gas wells, resulting in impacts similar to those under Alternative A, but to a lesser degree (Appendix T). Alternative B leaves less area available for locatable mineral entry (3,888,990 acres) than Alternative A, which would result in less long-term surface disturbance. Some of the impacts would be temporary during the life of the operation, with areas of disturbance reclaimed following closure of operations.

Adverse impacts from invasive species would be similar to those under Alternative A, but to a lesser degree. Alternative B would involve fewer acres of surface disturbance to control or eradicate invasive species. However, due to the projected overall surface disturbance, reclamation practices, and motorized vehicle use restrictions, Alternative B also would leave less area vulnerable to invasive species establishment. Therefore, Alternative B would result in less adverse impacts to grassland and shrubland communities from invasive species than Alternative A.

Alternative B would involve fewer acres of disturbance from pipeline and road development, and increase the chance of successful reestablishment of grasses and shrubs following construction, compared to Alternative A. Alternative B also would result in less new road construction. Compared to Alternative A, projected new roads under Alternative B and management designed to manage for large contiguous blocks of important plant communities along with managing more acreage as ROW

avoidance and exclusion areas would present less potential for fragmentation of grasslands and shrublands and associated loss of diversity.

Motorized vehicle use under Alternative B would cause impacts to grasslands and shrublands similar to those under Alternative A, but to a lesser degree. Most of the Planning Area is limited to designated roads and trails, including areas in the West Slope and Badlands areas, limiting impacts to grasslands and shrublands from motorized vehicle use. Alternative B prohibits off-road motorized vehicle use for big game retrieval and dispersed campsites, which would reduce adverse impacts to grasslands and shrublands by preventing road and trail proliferation and vegetation damage. Alternative B would involve more long-term surface disturbance associated with the creation of new roads and trails for recreational purposes than Alternative A, with proportional impacts to grasslands and shrublands from vegetation removal. Compared to Alternative A, Alternative B would result in less adverse impacts to grassland and shrubland communities from motorized vehicle use.

Alternative B would result in extensive monitoring and grazing management to identify and improve grassland and shrubland conditions in a timely manner. Under Alternative B, the BLM monitors all allotments and develops or revises AMPs for all "I" allotments or allotments not meeting the *Wyoming Standards for Healthy Rangelands* (Appendix N). The authorized officer can require livestock flushing for up to 72 hours to reduce the threat of invasive species spread via livestock to grassland and shrubland communities. Alternative B would result in fewer disturbed acres from rangeland improvements such as reservoirs, pits, pipelines, and wells (Appendix T) than Alternative A, posing less threat to grasslands and shrublands from invasive species spread and livestock concentration. Conversely, decreasing surface-disturbing rangeland improvement activities may adversely affect some grassland and shrubland communities where problems with livestock distribution cannot be addressed without these projects. Due to allotment monitoring practices, AMP development, livestock flushing practices, and projected rangeland improvements, livestock grazing management under Alternative B would result in less adverse and more beneficial impacts to grasslands and shrublands than Alternative A.

Under Alternative B, the BLM closes greater sage-grouse Key Habitat Areas and elk and bighorn sheep crucial winter range to livestock grazing (Table 4-21). This management would have a beneficial impact on some grasslands and shrublands by increasing vegetation cover and reducing the chance of soil compaction and invasive species spread. However, a recent land management modeling effort over large areas in eastern Nevada concluded that the proposed removal of livestock grazing alone had little impact on vegetation resiliency, rather, active restoration (e.g., prescribed fire, mechanical and chemical treatments) was required to improve degraded habitats (Provencher et al. 2007). Other research indicates removing grazing will increase woody plant cover and may reduce species richness and diversity (Manier and Hobbs 2007). Any beneficial impacts to grasslands and shrublands in greater sage-grouse Key Habitat Areas and bighorn sheep crucial winter range from the removal of livestock grazing may, therefore, be limited. The removal of livestock grazing would also mean that any beneficial impacts to these areas that would result from properly managed livestock grazing under Alternative A, such as increased resilience to disturbance and removal of decadent vegetation, would not be realized under Alternative B.

Special Designations

Proposed special designations to protect grassland and shrubland communities under Alternative B include the Carter Mountain (existing and expansion areas), Little Mountain (expansion area), Clarks Fork Canyon, Chapman Bench, Rattlesnake Mountain, and Sheep Mountain ACECs. Under Alternative B, the BLM manages all lands with wilderness characteristics specifically to preserve their wilderness characteristics, and restrict resource uses and activities in these areas that may damage grassland and

shrubland vegetation. Alternative B applies a buffer around the Heart Mountain Relocation Center National Historic Landmark and the Nez Perce (Neeme-poo) NHT to restrict surface-disturbing activities and motorized vehicle use, which would benefit grassland and shrubland communities in these areas to a greater extent than Alternative A. Table 4-21 lists the acreages of grassland and shrubland communities in special designation areas under Alternative B.

Resources

Under Alternative B, the BLM utilizes wildland fires and other vegetation treatments to restore fire-adapted ecosystems and to reduce hazardous fuels. However, Alternative B would result in fewer acres of prescribed fire and fuels treatments (25,000 acres) than Alternative A, which would increase the risk of catastrophic fire due to inadequate fuel reductions (Appendix T). This alternative would result in less long-term beneficial impacts from preventing fire that may destroy and permanently alter grassland and shrubland communities, compared to Alternative A.

Wildlife management actions under Alternative B would indirectly benefit grassland and shrubland communities to a greater extent than Alternative A. Alternative B prohibits all new domestic sheep grazing on pronghorn crucial winter range, reducing the potential for overgrazing due to dietary overlap of the two species more than Alternative A. Under Alternative B, the Absaroka Front Management Area, to which the BLM does not apply specific management actions under Alternative A, restricts some resource uses (e.g., mineral leasing and motorized vehicle use) that would remove vegetation or damage grassland and shrubland health. Compared to Alternative A, Alternative B places greater limitations on surface disturbance around greater sage-grouse leks and in winter, nesting, and early brood-rearing habitats, which would result in a greater beneficial impact. However, Alternative B may also reduce long-term beneficial impact in these areas in comparison to Alternative A by restricting vegetation treatments in areas where the plant community is extremely degraded, especially by the occurrence of noxious weeds, or by the increase in certain conifer species (e.g., juniper). The short-term beneficial impacts of preventing vegetation loss from surface disturbance may outweigh potential loss of long-term benefits from vegetation treatments where they are necessary to restore degraded vegetation communities.

Proactive Management

Under Alternative B, the BLM must achieve or make progress towards the reference state plant community based on the ESD for the site in all grasslands and shrublands, benefitting these communities by making progress toward improving vegetation conditions. The BLM would also manage to maintain large contiguous blocks of native plant communities, which would result in beneficial impacts to grassland and shrubland communities; however, Alternative B includes fewer acres of vegetation treatments to improve vegetation conditions than Alternative A (Appendix T).

Alternative C

Surface Disturbance

Under Alternative C, approximately 210,171 acres of short-term and 35,495 acres of long-term surface disturbance is projected in grassland and shrubland communities, based on the percent cover of these vegetation types in the Planning Area. Under Alternative C, the impacts to grassland and shrubland communities associated with surface-disturbing activity is more than any other alternative. Table 4-21 lists the acreages of grasslands and shrublands protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

Under Alternative C, the BLM analyzes surface-disturbing activities by mapping soils, collecting soil samples for physical and chemical analysis, and evaluating current erosion conditions on a case-by-case basis. Alternative C requires that disturbed areas are reestablished with 30 percent of desired vegetative cover within three growing seasons (with no long-term cover requirement) and requires reclamation plans on a case-by-case basis, which would result in a greater beneficial impact from stabilizing soil than Alternative A, but less than alternatives B and D. Allowing the use of approved nonnative seed and reestablishing plant communities to increase commodity production in disturbed areas may result in more immediate soil stabilization in the short term (depending on the species used) than Alternative A, but would also adversely impact disturbed areas by reducing the potential for reestablishing native plant communities in the long term. Based on the reclamation actions under Alternative C and the amount of long-term disturbance acreage projected, this alternative would result in the greatest adverse (and least beneficial) short- and long-term impacts to grassland and shrubland communities.

Resource Uses

Under Alternative C, oil and gas and other minerals development would result in 25,912 acres of short-term surface disturbance and 1,304 new oil and gas wells, resulting in impacts similar to those under Alternative A, but to a greater degree (Appendix T). Locatable minerals development under Alternative C would result in similar long-term surface disturbance and associated impacts as those under Alternative A. Overall, minerals development under Alternative C would result in the greatest adverse impacts to grassland and shrubland communities.

Adverse impacts from invasive species would be similar to those under Alternative A, but to a greater degree. Alternative C would result in the most acres of invasive species control or eradication activities. However, Alternative C would also leave the largest area vulnerable to new invasive species establishment due to new surface disturbance (245,642 acres), less rigorous reclamation requirements, and the least restrictive management of motorized vehicle use. Based on these factors, Alternative C would result in the greatest adverse impacts to grassland and shrubland communities from invasive species, relative to the other alternatives.

Alternative C would result in the greatest acreage of disturbance from pipeline and road development and the smallest chance of successful reestablishment of grasses and shrubs following construction. Alternative C also would result in the most new road construction. The projected new roads under Alternative C would result in the greatest potential for fragmentation of grasslands and shrublands and the associated loss of species diversity relative to the other alternatives, particularly since this alternative does not, like Alternative B, manage for large contiguous blocks of important plant communities and manages less acreage as ROW avoidance and exclusion areas.

Motorized vehicle use under Alternative C would result in impacts to grasslands and shrublands similar to those under Alternative A, but to a greater degree. Alternative C limits motorized vehicle use to designated roads and trails in more area than Alternative A, but closes less area. Under Alternative C, the BLM also limits motorized vehicle use to designated roads and trails with seasonal closures in the Absaroka Front Management Area, which encompasses grassland and shrubland communities. Under Alternative C, BLM actions would result in the most long-term surface disturbance from motorized vehicle use, of which a portion would directly impact grasslands and shrublands by removing vegetation. Allowing off-road motorized vehicle use for big game retrieval and dispersed campsites as long as there is no resource damage would put grassland and shrubland communities at greater risk of adverse impacts than Alternative B in this regard. Overall, Alternative C would result in the greatest adverse

impacts to grassland and shrubland communities from motorized vehicle use, compared to the other alternatives.

Under Alternative C, the BLM varies the intensity of allotment monitoring, giving priority to category "I" allotments and those not meeting the *Wyoming Standards for Healthy Rangelands* (Appendix N). By emphasizing monitoring only on higher priority allotments, undesirable conditions in lower priority allotments may not be identified and deterioration or improvement in grassland and shrubland communities may not be realized in a timely manner. Not requiring livestock flushing would result in the greatest risk of invasive species spread to grasslands and shrublands via livestock. Alternative C would result in the most disturbance acreage from rangeland improvements such as reservoirs, pits, pipelines, and wells (Appendix T), posing the greatest threat from invasive species spread—exacerbated due to the lack of livestock flushing—and livestock concentration. Conversely, this alternative has the greatest potential to address some improper livestock distribution-related concentrated herbivory issues that require rangeland improvement projects and, therefore, the beneficial impacts from properly managed livestock grazing, described under *Impacts Common to All Alternatives*, would also be greatest under this alternative. Under this alternative, the BLM does not manage livestock grazing to enhance other resource values; the BLM would manage grasslands and shrublands at a lower seral stage to increase herbaceous forage production. Potential adverse impacts to grasslands and shrublands from allotment monitoring and grazing management practices, livestock flushing practices, and surface disturbance from projected rangeland improvements would outweigh the potential beneficial impacts from livestock grazing management. Overall, livestock grazing management would result in the greatest adverse impacts to grassland and shrubland communities under Alternative C.

Special Designations

No ACECs, specific to Alternative C, would protect substantial amounts of grasslands and shrublands. Protective SCZ around the Nez Perce (Neeme-poo) NHT and Other Historic Trails, of similar size to Alternative A, may protect areas of grasslands and shrublands from disturbance. The BLM also applies a protective buffer around the Heart Mountain Relocation Center National Historic Landmark under this alternative. Table 4-21 lists the acreages of grassland and shrubland communities in special designation areas under Alternative C.

Resources

Under Alternative C, the BLM utilizes wildland fires and other vegetation treatments to restore fire-adapted ecosystems, reduce hazardous fuels, and enhance forage for commodity production. Alternative C would administer prescribed fire and fuels treatments on 40,000 more acres than Alternative A and would therefore reduce the risk of catastrophic fire through fuel reduction to a greater extent (Appendix T). This alternative would result in the most long-term beneficial impact from preventing fire that may destroy and permanently alter grassland and shrubland communities, compared to the other alternatives.

Wildlife management actions under Alternative C would indirectly benefit grassland and shrubland communities the least. Alternative C allows domestic sheep grazing on pronghorn crucial winter range, increasing the potential for overgrazing. Alternative C would allow more resource uses (e.g., oil, gas, and other mineral leasing) in the Absaroka Front Management Area that may result in more adverse impacts to grassland and shrubland communities in its boundaries than under Alternative B. Compared to the other alternatives, Alternative C applies the least surface-disturbance restrictions around greater sage-grouse leks and in nesting and early brood-rearing habitats, does not apply restrictions in winter concentration areas, and exempts Oil and Gas Management Areas from discretionary wildlife seasonal stipulations. These management actions would result in the least short-term beneficial impacts by

preventing vegetation removal or degradation in these areas, compared to the other alternatives. However, Alternative C allows vegetation treatments over a greater area than the other alternatives, providing a long-term benefit by reducing fuel loads. The short-term adverse impacts of vegetation loss from surface disturbance may outweigh potential long-term benefits from vegetation treatments.

Proactive Management

Under Alternative C, the BLM manages to achieve or make progress toward the appropriate community phase for all grasslands and shrubland sites. Alternative C would result in the most acreage of vegetation treatments to improve vegetation conditions (Appendix T); however, no grasslands and shrublands are managed toward DPC. Alternative C would result in the fewest beneficial impacts from proactive management toward achieving historical community structure and composition. However, the projected area of prescribed burns and vegetation treatments under Alternative C would result in beneficial impacts across the greatest area to achieve rangeland health standards, relative to the other alternatives, in areas needing active restoration due to substantial habitat degradation.

Alternative D

Surface Disturbance

Under Alternative D, approximately 119,933 acres of short-term and 15,663 acres of long-term surface disturbance is projected in grassland and shrubland communities, based on the percent cover of these vegetation types in the Planning Area. Although the BLM projects that Alternative D would result in slightly more surface disturbance than Alternative A, more stringent reclamation and restoration practices may result in fewer long-term adverse impacts from surface disturbance. Table 4-21 lists the acreages of grasslands and shrublands protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

The reclamation and restoration practices under Alternative D would result in similar beneficial impacts to those under Alternative A, but to a greater degree. Incorporating erosion rates and soil stability into soil survey efforts, developing specific objectives and timeframes for reclamation plans in coordination with stakeholders, and beginning interim and final reclamation at the earliest feasible time would result in greater beneficial impacts than alternatives A and C, but less than Alternative B.

Resource Uses

Under Alternative D, oil, gas, and other minerals development would result in 25,229 acres of short-term surface disturbance and 1,143 new oil and gas wells, affecting grassland and shrubland communities similar to Alternative A. Locatable minerals development under Alternative D would result in long-term impacts to grasslands and shrublands similar to those under Alternative A. Alternative D closes the second least area in grasslands and shrublands to locatable minerals development and may result in more adverse impacts from long-term surface disturbance than Alternative A. However, the demand for locatable minerals entry, and therefore the level of development and impact, would be similar under all alternatives.

Adverse impacts from invasive species would be similar to those under Alternative A, but to a lesser degree. Alternative D controls or eradicates invasive species on the same amount of land as Alternative A and surface disturbance under Alternative D would leave a similar amount of land vulnerable to invasive species spread. However, the more rigorous reclamation requirements and restrictive management of motorized vehicle use would limit the establishment and spread of invasive species more than Alternative A.

ROW development under Alternative D, including roads and pipelines, would result in impacts similar to those under Alternative A, but to a lesser degree because managing more acreage as ROW avoidance or exclusion areas would limit habitat fragmentation more than ROW management under alternatives A and C.

Motorized vehicle use under Alternative D would result in adverse impacts similar to those under Alternative A, but to a lesser degree. Alternative D closes slightly more area to motorized vehicle use than Alternative A, limits motorized vehicle use to designated roads and trails in more area and restricts off-road motorized vehicle use for big game retrieval to within 300 feet of established roads, resulting in less adverse impacts to grasslands and shrublands than alternatives A and C, but more than Alternative B.

Livestock grazing management under Alternative D would result in adverse impacts to grasslands and shrublands similar to Alternative A. However, allowing livestock grazing in areas closed to grazing as a tool to maintain or improve resource conditions may result in more beneficial impacts.

Special Designations

Proposed special designations that would protect grassland and shrubland communities under Alternative D include the Carter Mountain, Little Mountain, Clarks Fork Canyon, and Sheep Mountain ACECs. In addition, the designation of the Craig Thomas Little Mountain SMA and the Chapman Bench Management Area would limit resource uses and activities that can adversely affect grassland and shrubland communities. Special designations under Alternative D would result in more beneficial impacts to grasslands and shrublands than alternatives A and C, but less than Alternative B.

Resources

Fire and fuels management practices and the area treated to reduce fuels under Alternative D would result in impacts similar to those under Alternative A.

Wildlife management actions under Alternative D would result in similar beneficial impacts as those under Alternative A, but to a greater degree. Alternative D prohibits sheep grazing on pronghorn crucial winter range, restricts resource uses in the Absaroka Front Management area, and restricts surface-disturbing activities around greater sage-grouse leks and in winter, nesting, and early brood-rearing habitats more than Alternative A. Restricting surface-disturbing activities may limit vegetation treatments in areas needing restoration where the plant community is extremely degraded; however, the short-term beneficial impacts of preventing vegetation loss from surface disturbance may outweigh potential loss of long-term benefits from vegetation treatments. Overall, wildlife management would result in more indirect beneficial impacts than alternatives A and C, but less than Alternative B.

Proactive Management

Proactive management under Alternative D would result in similar beneficial impacts as those under Alternative B, but to a lesser degree. Under Alternative D, the BLM would manage to maintain large contiguous blocks of native plant communities, similar to Alternative B. However, Alternative D would manage to achieve or make progress toward the appropriate community phase for grassland and shrubland sites. Some areas under Alternative D would be managed for a higher plant community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable.

Alternative E

Surface Disturbance

Under Alternative E, surface-disturbing activities that would affect grassland and shrubland communities are the same as Alternative B, except within areas of the Greater Sage-Grouse Key Habitat Areas ACEC. In this ACEC, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) to not exceed one disturbance per 640 acres and cover less than 3 percent of the total sage-grouse habitat, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. Alternative E also requires beneficial reclamation and rehabilitation activities in the Greater Sage-Grouse Key Habitat Areas ACEC that would prioritize the reestablishment of native vegetation communities in sagebrush steppe communities to a greater extent than under the other alternatives. Under Alternative E, approximately 61,457 acres of short-term and 9,242 acres of long-term surface disturbance is projected in grassland and shrubland communities, based on the percent cover of these vegetation types in the Planning Area, which is the least amount of any alternative (see Table 4-21).

Resource Uses

Under Alternative E, oil, gas, and other minerals development would involve 17,297 acres of short-term surface disturbance (Appendix T), a portion of which may adversely impact grassland and shrubland communities. Impacts from mineral development under Alternative E would be similar to Alternative B, but the location of development may vary due to greater limitations on locatable and mineral materials development in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). As with Alternative B, the majority of the impacts would be temporary during the life of the operation with most areas of disturbance reclaimed following closure of operations.

Adverse impacts from invasive species would be similar to Alternative B, but to a lesser degree due to additional management practices within the Greater Sage-Grouse Key Habitat Areas ACEC. Although Alternative E places additional limitation on the use of herbicides to control the spread of invasive species in that ACEC, it would result in the smallest area vulnerable to invasive species establishment due to reduced surface disturbance and more stringent reclamation practices. Overall, Alternative E would result in the fewest adverse impacts to grassland and shrubland communities from invasive species of any alternative.

Disturbance from pipeline and road construction would be the same as Alternative B. However, additional restrictions on ROW applications and more stringent vegetation management and habitat restoration requirements under Alternative E in the Greater Sage-Grouse Key Habitat Areas ACEC would decrease potential adverse impacts to grasslands and shrublands from ROWs compared to the other alternatives. Management of the Greater Sage-Grouse Key Habitat Areas ACEC designed to preserve large contiguous blocks of important plant communities by managing the area as ROW exclusion areas and limiting new ROWs to access valid existing rights would provide the greatest protection from fragmentation of grassland and shrubland communities and associated loss of diversity of any alternative.

Management of motorized vehicle use and livestock grazing are similar to Alternative B, and impacts to grassland and shrubland communities under Alternative E would therefore be similar to that alternative. Travel management and livestock grazing under Alternative E, includes the most limitations and closures for resource protection of any alternative.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land in the Greater Sage-Grouse Key Habitat Areas ACEC. As a result, the BLM would manage a greater portion of grasslands and scrublands in the Planning Area as special designation areas under Alternative E (see Table 4-21). Requirements to include a full reclamation bond to insure restoration of disturbed areas to their original condition and other habitat restoration and vegetation management requirements associated with the Greater Sage-Grouse Key Habitat Areas ACEC would reduce adverse impacts from surface-disturbing activities in greater sage-grouse Key Habitat Areas. Overall, the relative size and additional restrictions on surface-disturbing activities in special designation areas under Alternative E would create more beneficial impacts to grassland and shrubland communities than the other alternatives.

Resources

Alternative E would result in fewest acres of prescribed fire and fuels treatments (18,000 acres) among the alternatives, which would result in the greatest risk of catastrophic fire due to inadequate fuel reductions (Appendix T). This alternative would also result in the fewest long-term beneficial impacts from preventing fire that may destroy and permanently alter grassland and shrubland communities among the alternatives. Management emphasizing the protection of existing sagebrush ecosystems in the Greater Sage-Grouse Key Habitat Areas ACEC may restrict potential fuels treatments, increasing the short-term risk of catastrophic fire in these areas when compared to the other alternatives. However, Alternative E also includes management that requires strategically and effectively designed fuels treatments and sets canopy cover and invasive species thresholds for areas to be treated; this focus on the overall health of the primarily sagebrush steppe communities in the Greater Sage-Grouse Key Habitat Areas ACEC may result in long-term beneficial impacts and healthier grassland and shrubland communities in these areas.

With exception of lands within the Greater Sage-Grouse Key Habitat Areas ACEC, vegetation management under Alternative E is the same as Alternative B. Vegetation management in the Greater Sage-Grouse Key Habitat Areas ACEC emphasizes the restoration and preservation of native sagebrush ecosystems to create a landscape pattern that most benefits sage-grouse habitat. However, Alternative E may result in fewer long-term beneficial impacts in these areas by restricting vegetation treatments in plant community that are degraded, especially by the occurrence of noxious weeds, or by the increase in certain conifer species (e.g., juniper). The short-term beneficial impacts of preventing vegetation loss from surface disturbance may outweigh the potential loss of long-term benefits from vegetation treatments where they are necessary to restore degraded vegetation communities. Overall, the management of resources under Alternative E would result in the most short- and long-term beneficial impacts to grassland and shrubland communities when compared to the other alternatives.

Proactive Management

Grassland and shrubland management under Alternative E is generally the same as Alternative B, and the beneficial and adverse impacts would be the same as Alternative B. However, under Alternative E, the Greater Sage-Grouse Key Habitat Areas ACEC includes additional limitations on surface-disturbing activities and manages vegetation communities consistent with the reference state of the appropriate ESD, resulting in additional beneficial impacts to grasslands and shrublands in the ACEC compared to Alternative B.

Alternative F

Surface Disturbance

Alternative F would result in approximately 117,273 acres of short-term and 15,113 acres of long-term surface disturbance in grassland and shrubland communities based on the percent cover of these vegetation types in the Planning Area, which is less than alternatives A, D, and C but greater than alternatives B and E. The management of surface-disturbing activities and reclamation is the same as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). In this ACEC, the BLM applies the density of disturbance management requirements proposed under Alternative F for the Greater Sage-Grouse PHMAs ACEC, which would result in similar beneficial impacts from reduced disturbance across a large portion of the Planning Area and from increased reclamation of disturbances. However, unlike Alternative E, Alternative F still allows ROW, renewable energy, and mineral development in the Greater Sage-Grouse PHMAs ACEC, resulting in greater adverse impacts from disturbance and fragmentation from resource uses under Alternative F compared to Alternative E.

Resource Uses

Alternative F manages resource exploration, development, and extraction the same as Alternative D, and impacts to grasslands and shrublands would be similar to Alternative D. However, Alternative F places additional restrictions on mineral development, including limiting disturbances to one per 640 acres and 3 percent or less of the greater sage-grouse PHMAs. Oil, gas, and other minerals development would result in 25,223 acres of short-term surface disturbance, affecting a smaller area of grassland and shrubland communities than alternatives A, C, or D.

Adverse impacts from invasive species would be the same as alternatives A and D, but to a lesser degree due to additional restrictions on resource uses and management to prevent and treat invasive species in the Greater Sage-Grouse PHMAs ACEC. Alternative F controls or eradicates invasive species on the same amount of land as alternatives A and D; however, a decrease in surface disturbance under Alternative F would leave a smaller amount of land vulnerable to spread of invasive species.

ROW development under Alternative F would result in impacts similar to Alternative A, but to a lesser degree because more acreage is managed as ROW avoidance or exclusion areas under Alternative F. Compared to alternatives A, C, and D, this additional restrictive ROW management would decrease adverse effects from road and pipeline disturbance and habitat fragmentation in grassland and shrubland communities.

Motorized vehicle use under Alternative D would result in adverse impacts similar to those under alternatives A and D, but to a lesser degree. Travel management under Alternative F would be the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC, where motorized vehicle use would be limited to designated roads and trails. This additional management would result in fewer adverse impacts to grasslands and shrublands from motorized vehicle use than under alternatives A, C, and D.

Impacts resulting from livestock grazing under Alternative F would be the same as Alternative D, with the exception of areas in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). Livestock grazing management in this ACEC includes multiple management actions that would benefit grasslands and shrublands, including requirements for land health assessments to determine whether rangeland health standards are being met, reviews against greater sage-grouse habitat objectives during grazing permit renewal, location and timing restrictions on grazing (e.g., following drought or fires), restrictions on vegetation treatments that reduce sagebrush cover, and greater restrictions on range improvement

projects. The ACEC-related restrictions would provide additional tools to ensure livestock grazing management would not adversely affect vegetation communities.

Special Designations

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. Overall, the size and additional restrictions on surface-disturbing activities in special designation areas under Alternative F would result in greater beneficial impacts to grassland and shrubland communities than alternatives A and C, but less than alternatives B and E.

Resources

Disturbance from fuels treatments and prescribed fire under Alternative F would be the same as Alternative D and would result in impacts similar to those under Alternative A. However, in the Greater Sage-Grouse PHMAs ACEC, additional restrictions on fuels treatment and a management priority of protecting sagebrush communities would result in impacts similar to those under Alternative E in the Greater Sage-Grouse Key Habitat Areas ACEC.

Wildlife management actions under Alternative F would be the same as Alternative D and would provide the same benefits to grassland and shrubland communities as under that alternative. However, with the exception of areas within the Greater Sage-Grouse PHMAs ACEC, additional protections for greater-sage-grouse and sagebrush habitats would provide benefits to grassland and shrubland communities similar to those under Alternative E. These benefits would come from restricting resource uses across the ACEC that would remove vegetation or degrade grassland and shrubland health, as well as a management focus on maintaining or restoring sagebrush habitat. However, similar to under Alternative E, these additional restrictions may also result in adverse impacts to grasslands and shrublands where they restrict the use of certain vegetation treatments that may improve the health of degraded areas. Overall, wildlife management under Alternative F would result in more beneficial impacts to grassland and shrubland communities than alternatives A, C, and D, but fewer than alternatives B and E.

Proactive Management

Under Alternative F, management of grassland and shrubland communities would be the same as Alternative D, and the beneficial and adverse impacts would be the same as Alternative D. However, in the Greater Sage-Grouse PHMAs ACEC, Alternative F would manage some areas for a higher plant community state or phase (based on state and transition models in ESDs) on a case-by-case basis where site-specific management objectives determine that a higher plant community state or phase is desirable.

4.4.3 Vegetation – Riparian/Wetland Resources

An impact to riparian/wetland resources alters the physical, chemical or biological components of the ecosystem. Actions that contribute to the decline in abundance, distribution, or functionality of riparian/wetland resources would be adverse impacts. Conversely, beneficial impacts result from management actions that protect or restore riparian/wetland resources in the Planning Area.

Direct impacts to riparian/wetland resources result from disturbing vegetation or ground surface in these communities. Indirect impacts to riparian/wetland communities result from actions in a watershed that cause a change in riparian/wetland functionality (e.g., increased rates of sediment loading or changes in hydrology), a change in water chemistry, or spread of invasive species. Short-term

impacts occur in the 5 years following the disturbance and include increased sediment loading into streams and the potential spread of invasive species. Long-term impacts last longer than 5 years and primarily include loss of habitat due to development or other activities that degrade riparian/wetland resources (e.g., permanently altering stream morphology and associated vegetation).

4.4.3.1 Methods and Assumptions

Evaluating potential impacts to riparian/wetland areas caused by changes in functionality or invasive species establishment focuses on resource management actions that (1) cause surface disturbances or limit the impacts for surface disturbances, and (2) are substantially different among the proposed alternatives. Estimates of projected surface disturbances are used as the primary metric for determining the relative level of potential indirect impact to riparian/wetland areas. The determination as to the jurisdiction of a wetland, in addition to determining the extent and of and the delineation of the wetland area, will be routinely conducted for all undertakings with potential to impact wetlands or waters of the U.S. on a case-by-case basis and therefore, will not be discussed within this document.

Methods and assumptions used in this impact analysis include the following:

- Surface disturbances generally increase the potential for accelerated sediment loading to streams.
- Surface disturbances generally increase surface runoff to streams due to an increase in impervious surface, changes in water routing, and loss of vegetation.
- Surface disturbance, transportation networks, ungulate use, and recreation increase the likelihood of invasive species introduction and spread in an area.
- The greater the amount of surface disturbance in a watershed, the greater the probability that excess surface runoff and sediment will enter the stream and contribute to the loss of riparian/wetland functionality.
- Placing salt and mineral supplements outside of riparian/wetland communities is one tool that can reduce wildlife and livestock use of riparian/wetland areas.
- Surface runoff to streams generally increases as livestock stocking rates increase. This is not a linear relationship. For example, low stocking rates typically have no measurable impact on surface runoff, moderate stocking rates typically have a negligible impact on surface runoff, high stocking rates have a measurable impact on surface runoff, and consecutive years of high stocking rates have the highest potential for increasing surface runoff to streams.
- Herbivory use is typically disproportionately higher in riparian/wetland communities than in upland communities. Improper or unmanaged herbivory can adversely impact these areas throughout the year, but surface impacts (due to hoof action) are generally greater in the spring and early summer, when soils are wet and, therefore, more vulnerable to compaction and stream banks are more vulnerable to sloughing. Livestock, especially cattle, tend to congregate in these communities during the hot season (mid to late summer). While stocking rates for an allotment or pasture may be low to moderate, the utilization levels in riparian/wetland areas can be high.
- Riparian areas are evaluated during application of the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N).
- Grazing practices can maintain, improve, or degrade rangeland health. *The Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands*

Administered by the BLM in the State of Wyoming (Appendix N) are designed to maintain or improve rangeland health. Approximately 10 percent of the public land in the Planning Area is evaluated annually for rangeland health.

- Riparian/wetland areas, except for laterally unstable cobble substrate-based streams, possess the ability to recharge and rebound faster than other vegetative areas in the Planning Area.
- All riparian/wetland areas are evaluated per the *Wyoming Standards for Healthy Rangelands* (Appendix N) and managed toward proper functioning condition (PFC). Management toward DPC is assumed to exceed the requirements of managing toward desired future condition (DFC), which is assumed to exceed the requirements of managing toward PFC.

4.4.3.2 Summary of Impacts by Alternative

Adverse impacts to riparian/wetland resources arise from surface-disturbing and other activities that increase erosion and sediment loading into surface waterbodies and degrade vegetation health. Major sources of these impacts include mineral resources development, motorized vehicle use, road construction, and wild horse and improper livestock grazing management. Alternative C would result in the greatest projected total surface disturbance, followed by alternatives D, F, A, B, and E. Surface disturbance is anticipated to result in proportional levels of erosion and sedimentation, and as such, impacts to riparian/wetland resources are expected to be greatest under Alternative C, the least under alternatives B and E, and similar under alternatives A, D, and F. Alternative E would result in the greatest direct beneficial impact to riparian/wetland resources by imposing greater restrictions on surface-disturbing activities in proximity to riparian/wetland resources and by instituting more beneficial proactive management actions such as watershed improvement projects, followed by alternatives B, F, D, A, and C. Alternatives B and E prohibit livestock forage supplements within 0.5 mile of riparian/wetland resources to prevent vegetation degradation and soil compaction in these areas. Alternatives A, D, and F prohibit livestock forage supplements within 0.25 mile of riparian/wetland resources. Alternative C does not provide similar protections from livestock forage supplements. Overall, Alternative E would result in the fewest adverse impacts to riparian/wetland resources, followed by alternatives B, F, D, A, and C.

4.4.3.3 Detailed Analysis of Alternatives

Allowable uses and management actions that may impact riparian/wetland resources include surface-disturbing activities, motorized vehicle use, recreation, livestock grazing, and proactive management actions. Impacts to soil and water, which may impact riparian/wetland resources, are discussed in Section 4.1.3 *Soil* and Section 4.1.4 *Water*.

Impacts Common to All Alternatives

The types of potential impacts to riparian/wetland resources are similar under all alternatives. However, the intensity of impacts would vary by alternative, as described for each.

Implementing any of the alternatives may cause direct and indirect impacts to riparian/wetland resources. Because riparian/wetland areas are limited and often the most productive lands, they are disproportionately affected by humans, livestock, wild horses, and wildlife, compared with the same types or extent of actions in upland areas. The BLM generally avoids, whenever possible, direct impacts to riparian/wetland areas under all alternatives and minimizes impacts from projects or resource uses

that involve riparian areas through applying BMPs. In addition, the BLM manages lotic and lentic riparian/wetland areas to meet PFC and the *Wyoming Standards for Healthy Rangelands* (Appendix N).

Riparian vegetation is more susceptible to grazing impacts during the spring, when soils are wet and more vulnerable to compaction, and during the hot season (July and early August), as livestock is naturally attracted to areas with water and thermal cover. Many grazing management strategies, such as rotation, deferment, rest from use, and the manipulation of season of use and grazing intensity would be implemented to manage vegetation composition, cover, and vigor to maintain or achieve PFC in riparian areas. As the BLM does not practice wild horse relocation in HMAs, year-round wild horse grazing may adversely impact, unless fenced, riparian areas in HMAs and impair the ability to maintain or achieve PFC in these areas.

Changes in water chemistry can affect riparian/wetland areas primarily through changes in plant species composition, which may affect utilization of the area by wildlife and livestock. Indirect impacts caused by changes in water chemistry have not been a major factor in the Planning Area historically and are not expected to be in the future. Impacts caused by wildlife are generally less than those caused by livestock, particularly cattle and wild horses in operational HMAs. As is the case with livestock, wildlife also is attracted to and often congregates in wetland areas; however, the size and foraging habitat of wildlife limits adverse impacts. In localized areas, elk have affected riparian habitats through trampling, wallowing, and grazing. Likewise, the impacts associated with wild horse management activities would be similar to those described for livestock grazing, except localized to the 4,570 acres of riparian/wetlands in existing HMAs.

The management of special status species generally involves restricting activities in the vicinity of special status plants or wildlife either year-round or during specific times of the year. As a result, riparian/ wetland areas in the vicinity of buffer zones of special status species can benefit from the lower level of public use. In addition, efforts at conserving species, such the Ute ladies'-tresses (a wetland species), can directly benefit riparian condition.

Alternative A

Surface Disturbance

Prohibiting surface-disturbing activities within 500 feet of surface water and riparian/wetland areas unless impacts can be mitigated would reduce the acreage of surface disturbance in these areas. Therefore, the principal impacts to riparian/wetland resources associated with surface-disturbing activities would be indirect impacts. Indirect adverse impacts to riparian/wetland resources would be associated with surface-disturbing activities in the watershed. Short-term impacts include increased sediment loading into streams and the potential spread of invasive species. Long-term impacts include loss of habitat due to development. As a summary, Table 4-21 lists the acreages of riparian/wetland areas protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

While most surface-disturbing activity will not be near riparian/wetland areas, these areas may be indirectly impacted due to soil erosion in the uplands, which may increase sediment released into streams. Alternative A would result in short-term and long-term soil erosion rates of approximately 567,492 and 25,065 tons per year, respectively that may adversely affect riparian/wetland resources (see Section 4.1.3 *Soil*). Higher sediment loading to a stream may dramatically alter its form and, consequently, the integrity of the riparian/wetland resources adjacent to it. The impact of increased sediment loading depends on the stream's ability to pass the sediment through the system and largely depends on the size (i.e., discharge volume) of the stream and the channel slope gradient. In segments

of a stream that have lower gradients, deposition occurs and the stream channel aggrades (builds), possibly becoming braided and shallow. In some instances, the aggradations of the streambed may cause the stream to down cut or degrade (become more incised) as the stream seeks to restore its equilibrium. The additional material eroded from the upstream channel is transported down to a depositional area and the cycle continues. In such cases, the functionality of the riparian/wetland areas in both the aggraded stream reach, and the incised stream reach, change.

Resource Uses

Most of the Planning Area remains open to mineral extraction under Alternative A; the associated surface disturbance would be the second highest of the alternatives. While the BLM prohibits surface-disturbing activity associated with mineral development within 500 feet of riparian/wetlands, this type of activity in the uplands, including well pad construction, pipeline development, and road construction, may increase sediment loading in streams. Under Alternative A, the BLM allows the surface discharge of produced water if it meets state of Wyoming water quality standards. Water production from oil and gas development represents a new water source in a watershed that augments existing water flows. In the event that produced water from CBNG or traditional gas development is disposed of on the surface, riparian/wetland vegetation may be affected. Impacts may be both beneficial (e.g., increased water quantity that may benefit riparian/wetland vegetation or create new riparian/wetland areas) and detrimental (e.g., increased dissolved compounds that may adversely impact riparian/wetland vegetation), as discussed in more detail in Section 4.1.4 *Water*. The short- and long-term nature of these impacts would vary considerably based on the duration, quality, and quantity of produced water discharges.

Invasive species are particularly undesirable in riparian/wetland areas because they do not have the same high level of soil-binding properties that many native riparian/wetland species (e.g., willows and sedges) have. The proximity of surface disturbances to riparian/wetland areas is one of the primary ways in which invasive species would spread to these areas. Prohibiting surface disturbance within 500 feet of riparian/wetland areas would help reduce the opportunity to spread invasive species to these areas. Invasive species and pest management under Alternative A includes allowing aerial application of pesticides and requiring livestock flushing on a case-by-case basis. Application of chemicals near water may reduce water quality, adversely affecting the health of riparian/wetland resources. Requiring livestock flushing would reduce the opportunity of spreading ingested invasive species seeds or material to riparian/wetland areas.

One of the most prevalent increases in surface runoff caused by human activity is due to an increase in impervious cover (e.g., roads, parking lots, and rooftops). Roads are not only impervious, they also route water. While small increases in surface runoff may have a beneficial impact on riparian/wetland areas because more water may be available for plant growth, they may also cause an increase in channel incision. Channel incision could disconnect the stream from its flood plain (i.e., gully formation) and, if the stream becomes incised enough, alter conditions in associated riparian/wetland areas. For this reason, it is undesirable to have a road close to a stream or crossings where runoff from the road is more likely to reach the stream.

Alternative A permits motorized vehicle use on existing roads and trails across the largest area but would result in the least acres of surface disturbance associated with new road and trail creation, compared to the other alternatives. However, Alternative A allows the use of off-road motorized vehicles to retrieve big game and to access dispersed campsites, which may cause undue environmental degradation and accelerated soil erosion in riparian/wetland areas. Motorized vehicle use and the associated greater access that it grants to recreationists, may adversely impact riparian/wetland

resources by introducing invasive species near streams or wetlands and increasing erosion and sediment loading in streams. Recreational activities, such as camping, often occur near riparian/wetland areas and may result in adverse impacts through soil compaction and trash accumulation in or near these areas. More developed recreation areas would increase this potential, although most impacts are expected to be mitigated by managing recreational use to maintain or improve riparian/wetland resource conditions along intensively used streams and reservoirs. Recreation management areas such as SRMAs that restrict surface disturbance in these areas would have a beneficial impact on riparian/wetland resources.

Most of the Planning Area remains open to livestock grazing under this alternative. Concentrated livestock, wild horse, or wildlife grazing would increase runoff in a watershed due to soil compaction and loss of vegetative cover, with the amount of bare ground being the primary factor. Consistent with guidance provided by the University of Wyoming Cooperative Extension Service (Horn 2005), Alternative A prohibits the placement of salt, mineral, or forage supplements within ¼ mile of water, wetlands, and riparian areas, which limits the direct impacts from livestock grazing on these areas. Livestock range improvement projects would distribute livestock over a large landscape, but would also create concentrated use in local areas. Over the long term, these improvements would potentially improve the stability and resiliency of riparian/wetland resources.

Special Designations

Special designations would result in beneficial impacts to riparian/wetland areas when they place additional restrictions on activities that degrade watershed health (e.g., surface-disturbing activities and motorized vehicle use). These restrictions have an indirect beneficial impact on riparian/wetland areas because these areas are not subject to large-scale surface-disturbing activities. Table 4-21 lists the acreage of wetlands in each type of special designation under Alternative A and Section 4.1.4 *Water* lists the miles of streams within special designations.

Resources

Implementing watershed improvement practices in Wyoming's Bighorn Basin water quality plans to reduce sediment loadings in streams and river segments and, when approved, including them in various BLM activity plans and use authorizations would benefit riparian/wetland resources.

Under Alternative A, the BLM utilizes wildland fires to restore fire-adapted ecosystems and to reduce hazardous fuels. The loss of vegetative cover from both wildland fires and prescribed fires would increase runoff and sediment to streams and other waterbodies in the short term. A rainstorm following a fire may overwhelm downstream waterbodies by contributing excessive amounts of sediment, large woody debris, and water to the system in a short period. Fires that burn more intensely would cause more adverse impacts to the watershed. Fires of the appropriate intensity generate a vegetation response that may have beneficial impacts on a watershed by helping to recharge water tables and increasing the amount of herbaceous cover, thereby improving livestock, wild horse, and wildlife distribution and lessening erosion.

Management actions under Alternative A designed to protect wildlife and special status species habitat from the impacts of surface-disturbing and disruptive activities will also protect riparian/wetland resources from these activities. For example, applying NSO and CSU restrictions in crucial wildlife habitat would reduce the chance of sediment loading into streams in these areas. Other beneficial impacts include performing restoration of streams and fisheries habitat on a case-by-case basis, which would have direct beneficial impacts on riparian/wetlands areas.

Proactive Management

Proactive management under Alternative A primarily consists of managing riparian/wetland areas to meet PFC and prohibiting surface-disturbing activities within 500 feet of surface water and riparian/wetland areas. This 500-foot buffer would prohibit surface-disturbing activities on 70,715 acres of BLM-administered land within and around riparian/wetland areas. Management actions that strive to improve streams and conserve riparian/wetland areas generally result in long-term beneficial impacts to riparian/wetland resources. Watershed improvement projects, while potentially causing short-term impacts from surface disturbance, would result in long-term benefits to these areas by reducing sediment loading, improving stream conditions, and facilitating PFC, DFC, or DPC management objectives.

Alternative B

Surface Disturbance

The impacts to riparian/wetland resources under Alternative B from surface-disturbing activities would be similar to those under Alternative A, but to a lesser degree. Alternative B prohibits surface-disturbing activities within ¼ mile of all riparian/wetland areas; therefore, the principle impacts from surface disturbance would be indirect. Alternative B also includes more restrictions on surface-disturbing activities for the protection of other resources such as for special designations, crucial winter range, and recreation management areas than Alternative A. Across the Planning Area, the BLM projects that this alternative would involve less surface disturbance than Alternative A (Table 4-1), which would reduce impacts to riparian/wetland resources. Alternative B is also projected to result in less short-term and long-term erosion (approximately 30 percent less than Alternative A), which would reduce potential adverse impacts to riparian/wetland resources (see Section 4.1.3 *Soil*). As a summary, Table 4-21 lists the acreages of riparian/wetland areas protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

Resource Uses

The projected amount of surface disturbance associated with mineral development under Alternative B is less than Alternative A. Most of the impacts would be temporary during the life of the operation, with most areas of disturbance reclaimed following closure of operations; however, in the short term, mineral extraction activities would increase the potential for riparian/wetland health degradation. Activities such as well pad and road construction would increase runoff and sediment loading in streams. Alternative B prohibits the surface discharge of produced water on BLM-administered surface, negating the impacts (both beneficial and adverse) present under Alternative A.

The smaller amount of surface disturbance under Alternative B, compared to the other alternatives, will result in the least impact associated with invasive species in riparian/wetlands due to surface-disturbing activities. Alternative B prohibits aerial application of pesticides within ½ mile of riparian/wetland resources but allows exceptions to manage riparian weed species, a beneficial impact. Alternative B allows the authorized officer to require livestock flushing before allowing livestock to move onto or within BLM-administered land. Similar to Alternative A, discretionary livestock flushing will limit the risk of spreading invasive species to riparian/wetland areas from ingested seeds or material.

Alternative B would result in fewer acres of short- and long-term surface disturbance from new road creation associated with ROW development in the Planning Area than Alternative A, and would therefore result in similar but less adverse impacts than described under Alternative A.

Alternative B permits motorized vehicle use on existing roads and trails over less area than Alternative A, but would result in more acres of surface disturbance associated with the creation of new roads and trails for recreational purposes than Alternative A. Limiting motorized vehicle use to designated roads and trails would limit public access and reduce the associated potential impacts to riparian/wetland areas, as described under Alternative A. Off-road motorized vehicle use to retrieve big game and access dispersed campsites is prohibited in areas with limited travel designations and would limit erosion and sediment loading from trail proliferation near riparian/wetland areas. Alternative B places less emphasis on developing camping or recreation sites, reducing the potential for adverse impacts associated with concentrated recreational activities compared to Alternative A.

Livestock grazing management is more restrictive under Alternative B and more area is closed to grazing compared to Alternative A. A ½-mile buffer prohibiting the placement of salt, mineral, or forage supplements near water, wetlands, and riparian areas, would provide greater protection for these resources from livestock and native ungulate grazing. Alternative B would also result in fewer livestock improvement projects than Alternative A. While this would limit disturbance associated with these activities in the short term, riparian/wetland areas would not receive the long-term benefits of these improvement projects. For example, fewer water development projects may increase herbivory in riparian/wetland areas because livestock, wild horses, and wildlife concentrate near natural water sources.

Special Designations

Compared to Alternative A, Alternative B proposes more special designations containing riparian/wetland habitat (see Table 4-21 and Section 4.1.4 *Water*) and places more restrictions on surface-disturbing activities in these special designation areas. Prohibitions on surface-disturbing activities would limit adverse impacts to riparian/wetland resources in these areas.

Resources

Developing watershed improvement practices in cooperation with local governments to reduce sediment loading in stream and river systems and, once developed, including them in all activity plans and permitted activities would beneficially impact riparian/wetland resources.

Under Alternative B, the BLM utilizes wildland fires to restore fire-adapted ecosystems for natural resource systems and to reduce hazardous fuels. This utilization of wildland fire under Alternative B would result in impacts similar to those under Alternative A, but over less area. Therefore, under Alternative B, long-term beneficial impacts from prescribed fire would be less extensive than under Alternative A.

Management actions designed to protect wildlife and special status species habitat apply greater restrictions on surface-disturbing activities than Alternative A and therefore have a greater beneficial impact on riparian/wetland resources. Riparian/wetland areas in the Absaroka Front Management Area (444 acres), not identified under Alternative A, would benefit from the restrictions on some resource uses (e.g., mineral leasing and motorized vehicle use). Management actions designed to improve fisheries would also have a greater beneficial impact under Alternative B. The BLM would restore or reclaim important fisheries habitat through upland management and hydrologic function enhancement actions on at least 3 miles of lotic stream system. These restoration activities would result in beneficial impacts to riparian/wetland resources.

Proactive Management

Proactive management under Alternative B results in greater benefits to riparian/wetland resources than Alternative A. Alternative B manages riparian/wetland areas to meet DPC and prioritizes those riparian/wetland areas not meeting PFC. Management toward DPC is assumed to exceed the requirements of managing toward PFC and would therefore result in improved functioning and healthier riparian/wetland areas. As noted above, Alternative B prohibits surface-disturbing activities within ¼ mile of all riparian/wetland areas. This buffer would prohibit surface-disturbing activities on 162,887 acres of BLM-administered land adjoining riparian/wetland areas. Applying an NSO restriction on wetland areas greater than 40 acres would limit erosion and other detrimental impacts associated with oil and gas activity. In addition, Alternative B allows sediment reduction structures on a case-by-case basis, which would further protect riparian/wetland health. Watershed improvement projects under Alternative B are anticipated to disturb more acres than Alternative A. While these treatments may result in short-term impacts from surface disturbance, they would have greater long-term benefits on riparian/wetland areas than Alternative A.

Alternative C

Surface Disturbance

Unlike alternatives A and B, Alternative C allows surface-disturbing activities in flood plains or riparian/wetland areas and this alternative may therefore result in direct adverse impacts. By allowing surface-disturbing activities on a case-by-case basis, Alternative C is more likely to risk the impairment of riparian/wetland health through the introduction of invasive species and the removal of vegetation. Based on the percent cover of this vegetation type and the total projected surface disturbance (Table 4-1), there may be 1,846 acres of the short-term and 312 acres of the long-term surface disturbance in riparian/wetland areas on BLM-administered surface under this alternative. In addition, Alternative C has the largest projected total acreage of surface disturbance (Table 4-1) and would result in the greatest indirect adverse impacts to riparian/wetland resources from increased erosion and sediment loading. By allowing direct disturbance of riparian/wetland areas, Alternative C could result in the greatest adverse impact to riparian/wetland resources compared to the other alternatives. As a summary, Table 4-21 lists the acreages of riparian/wetland areas protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

Resource Uses

The projected amount of surface disturbance associated with mineral development under Alternative C is the highest of the alternatives. Most of the Planning Area remains open to mineral extraction and the RFD of minerals facilities is the greatest under Alternative C, compared to the other alternatives. Most of the impacts would be temporary during the life of the operation, with most areas of disturbance reclaimed following closure of operations; however, in the short term, surface disturbance associated with minerals development may impair riparian/wetland areas. Under Alternative C, the BLM allows the proper disposal of water produced through mineral production activities. When surface discharge occurs in waterways on BLM-administered land, Alternative C requires the discharge of produced water be done in such a manner as to cause minimal environmental harm, while still contributing to designated uses. Impacts to riparian/wetland resources from the discharge of produced water would be similar to those under Alternative A, but to a greater degree due to more projected oil and gas activity.

Fewer restrictions on surface-disturbing activities in proximity to riparian/wetland areas under Alternative C would result in greater adverse impacts associated with invasive species than the other

alternatives. An increase in invasive species would alter the vegetative communities, introducing species that use more water and lack the same high level of soil-binding properties as native riparian/wetland species. Invasive species and pest management under Alternative C prohibits aerial application of pesticides within 100 feet of riparian/wetlands but allows exceptions to manage riparian weed species. This management practice would result in impacts similar to those described under Alternative B. Alternative C does not require livestock flushing, which increases the chance of spreading ingested invasive species in riparian/wetland areas used by livestock.

Alternative C would result in the most short- and long-term surface disturbance from road and trail creation associated with recreational use and ROW development in the Planning Area. More roads in the Planning Area would increase associated erosion and surface runoff, which, in turn, would route water and sediment into nearby streams. As a result, road development under Alternative C would result in the greatest adverse impacts to riparian/wetland resources in the Planning Area.

Motorized vehicle use under Alternative C would result in impacts similar to those under Alternative A, but to a greater degree. Alternative C limits motorized vehicle use to existing roads and trails in most of the Planning Area and closes the least area to motorized vehicle use compared to the other alternatives, resulting in more adverse impacts to wetlands and riparian resources. Alternative C also allows the use of off-road motorized vehicles to retrieve big game and access dispersed campsites, which may cause vegetation damage and erosion in some riparian/wetland areas. If demand warrants, the BLM would develop or upgrade recreation sites and associated amenities, resulting in impacts similar to Alternative A.

Most of the Planning Area would remain open to livestock grazing under Alternative C. The BLM manages livestock grazing to optimize commodity production while meeting rangeland health standards but not specifically to enhance other resource values; therefore, Alternative C would have the fewest beneficial impacts to riparian/wetland resources. In contrast to the other alternatives, Alternative C does not prohibit the placement of salt, mineral, or forage supplements near riparian/wetland areas, resulting in the greatest potential adverse impact to riparian/wetland areas. Concentrated livestock grazing or substantial increases in wild horse use may increase runoff in a watershed due to soil compaction and loss of vegetative cover. In addition, uncontrolled livestock grazing in these areas has a greater potential to introduce invasive species. Alternative C would result in the most livestock improvement projects. In the short term, these projects would result in increased surface disturbance; in the long term, however, these projects would result in the most beneficial impacts to riparian/wetland resources compared to the other alternatives.

Special Designations

Alternative C places the least restriction on surface-disturbing activities in special designations and designates the fewest number of these areas. As shown in Table 4-21 and Section 4.1.4 *Water*, Alternative C protects the fewest acres of wetlands and miles of streams within special designations. As a result of the limited additional protections provided by special designations, Alternative C would result in the fewest beneficial impacts to riparian/wetland areas.

Resources

Alternative C utilizes wildland fires and other vegetation treatment to restore fire-adapted ecosystems and enhance forage for commodity production and to reduce hazardous fuels. This management could result in an increase in wildland fires in the Planning Area, which would result in vegetative cover loss and sediment loading in streams.

Alternative C applies fewer management restrictions on surface-disturbing and disruptive activity designed to protect wildlife and special status species. Riparian/wetland areas in the Absaroka Front Management Area (444 acres) would receive fewer beneficial impacts than under Alternative B since some resource uses (e.g., oil and gas and other mineral leasing) that would be restricted under Alternative B would be allowed under this alternative. Management actions designed to improve fisheries are similar to Alternative A and would therefore result in similar beneficial impacts. Native ungulate grazing is anticipated to cause impacts to riparian/wetland areas similar to Alternative A.

Proactive Management

Alternative C manages riparian/wetland areas to meet PFC, giving priority to those areas functioning at-risk with a downward trend or in nonfunctioning condition. Prioritizing areas that do not meet the standard allows the BLM to efficiently allocate management resources to those areas most in need. Alternative C allows surface-disturbing activities in flood plains and riparian/wetland areas on a case-by-case basis. By not prohibiting surface-disturbing activities, Alternative C results in the fewest beneficial impacts compared to the other alternatives. Watershed improvement projects under Alternative C are anticipated to disturb the fewest number of acres. While fewer treatments would result in less short-term impacts in terms of surface disturbance, they would provide fewer long-term benefits to these areas.

Alternative D

Surface Disturbance

Prohibiting surface-disturbing activities within 500 feet of surface water and riparian/wetland areas unless impacts can be mitigated would reduce the direct adverse impacts from surface disturbance in these areas similar to Alternative A. Alternative D is projected to result in 3 percent more short- and 17 percent more long-term erosion than Alternative A, with proportional indirect impacts to riparian/wetland resources—though the more stringent reclamation practices under Alternative D, relative to Alternative A, may limit erosion impacts to riparian/wetland areas to a greater degree. As a summary, Table 4-21 lists the acreages of riparian/wetland areas protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative. Although Alternative D is projected to result in more surface disturbance than Alternative A, with proportional indirect impacts to riparian/wetland areas, Alternative D includes more measures, described below, to limit direct adverse impacts to riparian/wetland areas from surface-disturbing activities.

Resource Uses

The BLM projects that Alternative D would result in a similar amount of surface disturbance from mineral development as Alternative A, resulting in a similar degree of adverse impacts. Most of the impacts would be temporary during the life of the operation, with most areas of disturbance reclaimed following closure of operations; however, in the short term, surface disturbance associated with minerals development may impair riparian/wetland areas. Impacts from produced water would be similar to those under Alternative C, although to a lesser degree because the BLM projects fewer new oil and gas wells under this alternative.

Adverse impacts from invasive species spread in riparian/wetland areas would be similar to those under Alternative A, but to a lesser degree. Management practices regarding pesticide application and livestock flushing would be similar to those under Alternative A, but applying a NSO on wetlands greater than 20 acres and on designated 100-year flood plains under Alternative D would limit the potential for invasive species spread to a greater extent.

Road development under Alternative D would result in impacts similar to Alternative A.

Under Alternative D, motorized vehicle use would result in impacts similar to Alternative A, but to a lesser degree. Alternative D limits motorized vehicle use to designated roads and trails in more areas and closes more areas to motorized vehicle use compared to Alternative A. Localized impacts from opening areas to motorized vehicle use would result in surface disturbance and potential indirect adverse impacts to riparian/wetland areas. Restricting off-road motorized vehicle use to within 300 feet of established roads would limit the extent of the adverse impacts described under Alternative A. Developing recreation sites would result in similar potential adverse impacts to those under Alternative A; however, Alternative D recognizes more SRMAs that contain riparian/wetland habitat, such as the Bighorn River, The Rivers, Canyon Creek, Middle Fork of the Powder River, and Beck Lake SRMAs, which would limit surface disturbance and the associated impacts in these areas.

Livestock grazing management would result in impacts to riparian/wetland areas similar to Alternative A.

Special Designations

Special designations under Alternative D would result in similar beneficial impacts to riparian/wetland areas as under Alternative A, but to a greater degree. Alternative D proposes more special designations containing riparian habitat (see Table 4-21 and Section 4.1.4 *Water*) and places more restrictions on surface-disturbing activities in these special designations than alternatives A and C, but less than Alternative B.

Resources

Watershed improvement practices under Alternative D would result in similar beneficial impacts to riparian/wetland resources as under Alternative B.

Fire and fuels management under Alternative D would result in impacts similar to Alternative A.

Management actions to protect wildlife and special status species under Alternative D would result in similar beneficial impacts to those under Alternative A, but to a greater degree. Restrictions on mineral development in the Absaroka Front Management Area, which contains 887 acres of riparian/wetland area, would result in more beneficial impacts than under Alternative C, but less than Alternative B. Restoring streams and fisheries habitat would result in similar beneficial impacts as those under Alternative A.

Proactive Management

Proactive management under Alternative D would result in similar beneficial impacts to those under Alternative C, but to a greater degree. The BLM manages certain riparian/wetland areas containing streams with unique recreational or fishery values to obtain DFC. Management toward DFC is assumed to exceed the requirements of managing toward PFC and would therefore result in improved functioning and healthier riparian/wetland areas, although not to the degree afforded by management toward DPC (as under Alternative B). Alternative D prohibits surface disturbing activities within 500 feet and avoids surface-disturbing activities within ¼ mile of perennial surface water and riparian/wetland areas, which would provide a similar beneficial impact to riparian/wetland areas as Alternative A, but with additional protections outside of the 500-foot buffer. Watershed improvement projects would result in impacts similar to Alternative A.

Alternative E

Surface Disturbance

The management of surface-disturbing activities and their impacts to riparian/wetland resources under Alternative E would be similar to Alternative B. Alternative E includes the same 0.25 mile riparian/wetland area protective buffer as Alternative B, and therefore impacts would be primarily indirect. Alternative E is projected to result in the least amount of short- and long-term erosion (approximately 2.9 percent less than Alternative A, and approximately 2.2 percent less than Alternative B), which would result in the least potential adverse impacts to riparian/wetland resources compared to the other alternatives (see Section 4.1.3 *Soil*). Table 4-21 details the acreages of riparian/wetland areas protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

Resource Uses

Under Alternative E, oil, gas, and other minerals development would involve 17,297 acres of short-term surface disturbance (Appendix T), a portion of which may adversely impact riparian/wetland resources. Impacts from mineral development under Alternative E would be similar to Alternative B, but the location of development may vary due to greater limitations on surface disturbance in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres) under Alternative E. Alternative E would also provide additional long-term benefits through full reclamation of disturbed sites within greater sage-grouse Key Habitat Areas. Impacts from increased runoff and sediment loading to streams, as well as the surface discharge of produced water, would similar to Alternative B, and less than all other alternatives.

Under Alternative E, adverse impacts from the spread of invasive species would be similar to Alternative B, but to a lesser extent due to the fewer projected acres of surface disturbance under Alternative E. In particular, Alternative E management of the Greater Sage-Grouse Key Habitat Areas ACEC exclude surface-disturbing mineral developments and ROWs to a greater extent than any other alternative, reducing the potential spread of invasive species in disturbed areas over a large portion of the Planning Area.

Overall, adverse impacts to riparian/wetland areas from projected new roads and management under Alternative E would be similar to Alternative B, and would result in fewer adverse impacts than the other alternatives. Disturbance from pipeline, road development, and new road construction would be the same as Alternative B; however, the location of these disturbances may vary under Alternative E as a result of the management of the Greater Sage-Grouse Key Habitat Area ACEC as a ROW exclusion area.

Management of motorized vehicle use and livestock grazing are the same as Alternative B, and impacts to riparian/wetland resources would therefore be the same as Alternative B. Compared to Alternative A, limitations and closures to motorized vehicle use for resource protection, including seasonal motorized vehicle closures in greater sage-grouse Key Habitat Areas and for the protection of big game species, would result in beneficial impacts to riparian/wetland areas under Alternative E.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land in the Greater Sage-Grouse Key Habitat Areas ACEC. As a result, the BLM would manage a greater portion of riparian/wetland areas in the Planning Area with special designations under Alternative E (see Table 4-21). Overall, the relative size and additional restrictions on surface-disturbing activities in special designation areas under Alternative E

would limit adverse impacts to riparian/wetland areas to a greater extent than under the other alternatives.

Resources

Watershed improvement practices under Alternative E are the same as Alternative B and would provide the same beneficial impacts to riparian/wetland areas as Alternative B. Under Alternative E, fire and fuels management practices and impacts are the same as Alternative B with the exception of lands within the Greater Sage-Grouse Key Habitat Areas ACEC, which would be managed with an emphasis on protecting existing sagebrush ecosystems. In general, fuels treatments are minimized in priority sage-grouse habitat and are focused instead on interfaces with human habitation or significant existing disturbances. Limiting areas subject to fuels treatments could reduce short-term impacts from prescribed fire compared to Alternative A, but could increase long-term adverse impacts compared to the other alternatives if additional fuel loading leads to an increase in high-intensity fires.

Impact from management designed to protect wildlife and special status species habitat would be the same as under Alternative B, except in the Greater Sage-Grouse Key Habitat Areas ACEC where restrictions on surface-disturbing activities would result in greater beneficial impacts than under the other alternatives.

Proactive Management

Under Alternative E, riparian/wetland management would be the same as Alternative B, and the impacts would be the same as Alternative B.

Alternative F

Surface Disturbance

Surface disturbance impacts to riparian/wetland areas under Alternative F are projected to be greater than alternatives A, B, and E, but less than alternatives C and D. Management practices relating to surface disturbance would be the same as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres) where additional restrictions on surface disturbance would apply. Prohibiting surface-disturbing activities within 500 feet of surface water and riparian/wetland areas would reduce the direct adverse impacts from surface disturbance in these areas similar to Alternative A. Alternative F is projected to result in more surface disturbance than Alternative A, with proportional indirect impacts to riparian/wetland areas. Table 4-21 details the acreages of riparian/wetland areas protected from some common surface-disturbing activities (e.g., ROWs and locatable mineral development) under this alternative.

Resource Uses

Under Alternative F, management practices for resource exploration, development, and extraction would be similar to Alternative D, and impacts to riparian/wetland areas would generally be the same as Alternative D. However, Alternative F would place additional restrictions on mineral development and include management that limits disturbances to one per 640 acres and 3 percent or less of the greater sage-grouse PHMAs, compared to 5 percent under Alternative D. When compared to alternatives A, C, and D, the restrictive management of Alternative F over the large area of the ACEC would generally provide greater benefit to riparian/wetland areas by limiting the size and extent of mineral development and other disturbances.

Impacts from motorized vehicle use under Alternative F would provide greater protections for riparian/wetland areas than under alternatives A, C, and D, but fewer protections than under alternatives B and E. CTTM management practices for Alternative F are the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC, where motorized vehicle use would be limited to designated roads. Under Alternative F, disturbances associated with the creation of new roads and trails is projected to be less than alternatives A, C, and D, but higher than alternatives B and E. Overall, the limitations placed on motorized vehicle use under Alternative F would result in fewer adverse impacts to riparian/wetland areas than alternatives A and D by reducing erosion and sedimentation while also limiting vehicle activity within riparian/wetland areas.

Impacts resulting from livestock grazing under Alternative F would be the same as Alternative D, with the exception of areas in the Greater Sage-Grouse PHMAs ACEC. The Greater Sage-Grouse PHMAs ACEC is managed to reduce hot season grazing on riparian and meadow complexes through fencing and herding techniques, as well as seasonal use restrictions or livestock distribution changes. This ACEC management would protect or enhance vegetation and water quality in riparian/wetland areas by managing livestock grazing in these areas during the period of the year when they are most susceptible to damage from herbivory. Overall, the additional livestock grazing restrictions under Alternative F would result in greater beneficial impacts to riparian/wetland areas than alternatives A or D.

Special Designations

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. As a result, the BLM would manage a greater portion of riparian/wetland areas and wetlands in the Planning Area with special designations under Alternative F (see Table 4-21). Overall, the relative size and additional restrictions on surface-disturbing activities in special designation areas under Alternative F would result in greater beneficial impacts to riparian/wetland areas in comparison to alternatives A and D.

Resources

Watershed improvement practices under Alternative F would result in the same beneficial impacts to riparian/wetland resources as alternatives B and D.

Fuels treatments and prescribed fire management under Alternative F is the same as Alternative D except in the Greater Sage-Grouse PHMAs ACEC. Restrictions on fuels treatment and prescribed fire under Alternative F in the Greater Sage-Grouse PHMAs ACEC are similar to management in the Greater Sage-Grouse Key Habitat Areas ACEC under Alternative E; impacts to riparian/wetland areas would be similar to those under Alternative E.

Impact from management designed to protect wildlife and special status species habitat would be the same as under Alternative D except in the Greater Sage-Grouse PHMAs ACEC, where restrictions on surface-disturbing activities and managing riparian/wetland areas to achieve proper functioning condition/attain ESD would result in greater beneficial impacts than under the Alternative D. Overall, management wildlife and special status species habitat under Alternative F would result in more beneficial impacts to riparian/wetland areas than alternatives A, C, and D, but less than alternatives B and E.

Proactive Management

Under Alternative F, the management of riparian/wetland areas would be the same as Alternative D, and the beneficial and adverse impacts would be same as Alternative D.

4.4.4 Invasive Species and Pest Management

The presence of invasive species in the Planning Area is considered an adverse impact. Actions that contribute to the introduction of invasive species, the spread of existing invasive species populations, or that avoid, reduce, or prohibit invasive species control activities in the Planning Area also would be adverse impacts. Beneficial impacts include management actions that reduce or contain the spread of, or eradicate, invasive species in the Planning Area.

Direct impacts to the management of invasive species typically result from actions that disturb soil or that otherwise create environments (i.e., seedbed) for the establishment of invasive plant species (Map 36). Indirect impacts result from activities that avoid, reduce, or prohibit invasive species control activities in the Planning Area. The transport of invasive species seed or other plant parts by wildlife, livestock, vehicles, wind, or water to other locations, thereby expanding the distribution or increasing the range of spread of weeds, is also considered an indirect impact.

4.4.4.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Roadways, trails, ROWs, and corridors are major routes that can spread invasive species through transport on motor vehicles and off-road motorized vehicle uses. Invasive species also can spread through watercourses, wind, and by wildlife and livestock movement.
- The amount of new surface disturbance associated with an alternative is a good index of potential impact by invasive species. The larger the acreage of surface disturbance, the greater the potential adverse impact by invasive species.
- Success of reclamation measures prescribed as a condition of development is unknown and could either overestimate or underestimate the potential impact from weeds.
- Enforcement of restrictions related to recreation and off-road motorized vehicle use and dispersed travel can be assumed only if adequate funding and personnel are available to do the job.
- Instruction Memorandum (IM) 2006-073 (BLM 2006c) establishes policy and guidance for use of certified weed-free seed and mulch to prevent the establishment of new invasive species population in restoration projects on public lands.
- *Partners Against Weeds – An Action Plan for the BLM* (BLM 1996), establishes a strategy to prevent weeds through cooperation with all partners. It outlines goals and specific actions to help prevent and control the spread of weeds. This action plan, along with any future updates and guidance, would be followed to control and prevent weed problems.
- Seeds from some weeds can remain dormant and viable in the soil for periods that exceed the 5-year division between short- and long-term impacts. Therefore, favorable site conditions may serve to reintroduce invasive species to reclaimed sites without additional surface disturbance.
- The area evaluated for potential impacts includes the Planning Area and Big Horn, Hot Springs, Park, and Washakie County weed-control districts.
- The acreage of long-term disturbance (Appendix T) includes facilities that cannot be reclaimed and that, in most cases, would not provide long-term habitats for invasive species. For example, well pads, communication sites, powerlines, roads, wind-energy facilities, and other infrastructure would replace existing native vegetation with pervious or impervious surfaces for a period exceeding 5 years.

- Integrated Pest Management includes chemical, mechanical, biological, and cultural techniques.
- The introduction of aquatic invasive invertebrates, vertebrates, microorganisms, and pathogens can threaten the stability of ecosystems, create serious human health consequences, and cause substantial economic burdens. Large majorities of native and nonnative species do not pose a threat to natural or human systems. However, if any of these species were to become a concern, the WFO and CYFO would cooperate and coordinate with appropriate government agencies, private industry, and other interested parties involved in public education efforts and control, management, and research of invasive species.

4.4.4.2 Summary of Impacts by Alternative

Invasive species are expected to spread under all alternatives. Surface disturbance can increase the spread of invasive species by either damaging native vegetation and creating a space for the establishment of invasive species, or introducing invasive species seed and plant matter from machinery and other equipment. Correspondingly, alternatives projected to involve the greatest amount of surface disturbance would have the greatest potential to increase the spread of invasive species. Reclamation requirements, especially the development of reclamation plans prior to initiating surface-disturbing activities, would decrease long-term disturbance and the likelihood of invasive species establishment. Based on projected surface disturbance, Alternative C would result in the greatest potential spread of invasive species, followed by alternatives A, D, F, B, and E. Alternatives D and F are projected to result in greater surface disturbances than Alternative A, but they contain additional reclamation requirements that would result in a reduced potential for the spread of invasive species.

Fire and fuels management, motorized vehicle use, and livestock grazing would have the greatest impact on the spread of invasive species. Though disturbance caused by fire can spread invasive species, when conditions are favorable and proactive management to reestablish native plants follows closely after, fire can be a tool to reestablish historic fire regimes that favor native plants over invasive species. Alternative C would result in the greatest short-term adverse impacts from disturbance due to fire and fuels management and the greatest potential long-term benefits from restoration of historic fire regimes, followed by alternatives A, D, F, B, and E. Closing areas to motorized vehicle use can help prevent the unintentional spread of invasive species; alternatives B and E restrict travel across the largest portion of the Planning Area, and would provide the greatest potential reduction in the spread of invasive species from motorized vehicles, followed by alternatives F, D, A, and C. The potential adverse impacts from livestock grazing related spread of invasive species would be greatest under Alternative C due to fewer management options to control their spread (e.g., the option to require livestock flushing); alternatives A, D, F, B, and E contain more management options to control livestock grazing related invasive species spread.

4.4.4.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

All alternatives could result in proliferation of noxious and invasive weeds into areas considered weed-free, and there may be an increase in noxious and invasive weeds where they already exist. In general, surface-disturbing activities (e.g., mineral development, road construction) would adversely impact invasive species and pest management under all alternatives. Reclamation of these areas reduces the chance of invasive species establishment. Vegetation treatments would beneficially impact the management of invasive species under all alternatives. Treatments may cause short-term impacts to

vegetation by decreasing vegetation production and increasing establishment of early successional species. Long-term impacts could include increased production and diversity of vegetation communities, thereby controlling the spread of invasive species.

ROW authorizations would contribute to the spread of invasive species under all alternatives. The road network is a major conduit for the initial spread of invasive species, although the availability to access areas also results in the opportunity to find and treat new infestations. ROWs concentrated in a corridor tend to localize or confine disturbance to a smaller area and reduce disturbance in areas identified as sensitive, which would minimize potential impacts from invasive species spread.

Indirect, adverse, short- and long-term impacts from transportation of materials, people, and vehicles occur throughout the Planning Area at recreation sites, trailheads, trails, and transportation routes. Invasive species are established in some of these areas and their seeds are spread to other areas by vehicles, people, livestock, and wildlife. Due to the permanent nature of most recreation sites, trails, and transportation routes, most associated adverse impacts under all alternatives are anticipated to be long-term.

Fire and fuels management is likely to impact invasive species and pest management. By destroying or damaging invasive plants and seeds, beneficial impacts can be realized based on the timing and location of fire. Conversely, adverse impacts from suppression activities that disturb soil and from fires that remove native vegetation and expose soil result in conditions that provide a seedbed for weed establishment, such as cheatgrass. Most weeds can out-compete native species and typically respond rapidly after fire. The likelihood of weed expansion after a wildland fire increases in areas where weeds occur or are nearby. Firefighters and their equipment may also introduce or spread weeds. Impacts of fire management are not just limited to terrestrial invasive species; the use of water for fire suppression and rehabilitation activities can also contribute to the spread of aquatic invasive species, which are anticipated to become a greater management challenge in the Planning Area. Under all alternatives, fire-fighting equipment must be cleaned in areas with high-risk aquatic invasive species to prevent the spread of these species. The adverse impacts from fire management may be direct or indirect because the impact(s) may or may not occur immediately.

Because all alternatives would be managed according to the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N), the types of adverse impacts from livestock grazing and wild horse use to vegetation and soil are expected to be similar among alternatives. The number and distribution of native ungulates and current allowable management levels of wild horses also are anticipated to be similar among alternatives, because the number of AUMs does not change by alternative. The impacts of livestock, wild horse, and native ungulate grazing on the management of invasive species from all alternatives are anticipated to result in a mix of beneficial and adverse impacts.

Livestock, wild horse grazing, and native ungulate grazing, depending on its timing and intensity, can cause variable impacts to invasive species. Short- and long-term adverse impacts associated with livestock, wild horse, and native ungulate grazing are anticipated primarily where these species concentrate (e.g., water sources, trails, favored forage) and include transport of weed seeds and disturbance of soil, creating environments for the spread of invasive species. As the vegetation of riparian/wetland areas is fragile and these areas are vulnerable to wildlife, wild horse, and livestock concentrations, so too are they vulnerable to the spread of invasive species. High densities of native ungulates can reduce or eliminate shrub seed production and impair recruitment of young shrubs (Kay 1995). In addition, as vegetation stubble height is reduced, there can be a shift in cattle preference and damage to vegetation (Hall and Bryant 1995). These impacts would be expected to result in adverse impacts by increasing the establishment of invasive species.

Livestock grazing management in accordance with guidelines associated with the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N) may result in beneficial impacts by improving rangeland health and decreasing the potential for the spread and establishment of invasive species. Studies have shown that proper livestock grazing management can increase a plant community's resistance to cheatgrass invasion after a disturbance such as wildland fire and effectively control other invasive species (Hall and Bryant 1995, Stohlgren et al. 1999, Davies et al. 2009). In addition, livestock grazing in sagebrush communities can increase plant species richness and diversity (Manier and Hobbs 2007), decreasing vulnerability to invasive species spread. The impacts described by these studies are expected to remain site-specific in the Planning Area under all alternatives.

Proactive management actions common to all alternatives that may control the spread of invasive species include watershed stabilization, the use of certified noxious weed-free vegetation products, developing and maintaining an invasive species and pest management plan, and subjecting surface-disturbing activities to the *Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix H) and the BLM Reclamation Policy (BLM 2012b). The BLM also continues to collaborate with cooperating agencies and interested stakeholders in educating public lands users about the control of invasive species, funding development and implementation of integrated pest management, and reducing and preventing the expansion of cheatgrass. Other management actions common to all alternatives can adversely impact the control of invasive species, such as restricting aerial pesticide application when its use conflicts with other resource management objectives.

Alternative A

Surface Disturbance

The surface disturbance projected for Alternative A would contribute to the spread of invasive species, in both the short and long term. Short-term impacts would occur during the 5 years following disturbance while the soil is bare of vegetation and reclamation activities strive to stabilize the soil and revegetate the area. Long-term impacts would last longer than 5 years due to reclamation efforts not completely effective in preventing weed establishment.

Surface-disturbing activities from all actions listed in Appendix T provide opportunities for the establishment and spread of invasive species. It is anticipated that BLM actions under Alternative A would impact 136,253 acres over the short term and 15,646 acres over the long term in the Planning Area (Table 4-1). The impacts from invasive species spread due to surface disturbance under Alternative A are anticipated to be proportional with the intensity of reasonable foreseeable actions shown in Appendix T.

Under Alternative A, the BLM determines the rate of erosion and the degree of soil stability during rangeland health evaluations. The BLM requires the reestablishment of vegetative cover in disturbed areas within 5 years of initial seeding and routine seeding on a priority basis in disturbed areas, but does not require reclamation plans. Based on reclamation measures, Alternative A would have the highest opportunity for the spread of invasive species in disturbed areas. Under Alternative A, activities to control invasive species would disturb the surface of approximately 2,000 acres (Appendix T) that would be reclaimed in the long term. Surface disturbance to control weeds is likely to occur in areas already infested, and therefore is not likely to contribute to the spread of invasive species.

Resource Uses

Under Alternative A, mineral development would result in 25,552 acres of short-term and 13,033 acres of long-term surface disturbance (Appendix T). Most of the Planning Area would remain open to mineral extraction. Most of the impacts would be temporary during the life of the operation with most areas of disturbance reclaimed following closure of operations. Typically, a large portion of a mineral material site is disturbed leaving the area prone to the spread of invasive species.

Forest and woodland treatments and forest products would result in 30,000 acres of short-term surface disturbance under Alternative A, but that same acreage would be reclaimed (Appendix T). Alternative A allows for clear-cutting, which may cause adverse impacts by generating changes to the microclimate and destabilizing soil, thus facilitating the spread of weeds where seed sources are present. Harvesting timber on commercial forestland in a manner to protect watershed and riparian/wetland habitat values would minimize potential impacts from invasive species, which are more likely to spread to degraded habitats. Alternative A allows salvage of dead stands on a case-by-case basis but does not use the full range of silviculture treatments to manage endemic insect and disease outbreaks.

Utility corridors and linear ROWs in the Planning Area, including pipelines and powerlines, would result in 5,691 acres of short-term disturbance; however, impacts associated with these activities would be reclaimed and mitigated to the extent practicable through standard operating procedures, resulting in minimal long-term disturbance (Appendix T). Motorized vehicle use to maintain these corridors has the potential to cause adverse impacts by contributing to the spread of weeds. The road network is a major conduit for the initial spread of invasive species, although the availability to access areas also results in the opportunity to find and treat new infestations. Alternative A results in 1,966 acres of short-term and 983 acres of long-term surface disturbance from road construction. The risk of adverse impacts due to the spread of invasive species is expected to increase proportionally with the long-term surface disturbance from new road construction.

Under Alternative A, the creation of new roads and trails for recreational purposes would result in 1,233 acres of short-term and 835 acres of long-term surface disturbance. Adverse impacts would result from the spread of invasive species into potentially undisturbed areas in the Planning Area, and may be correlated with the amount of surface disturbance (Appendix T). Alternative A closes 68,115 acres to motorized vehicle use, resulting in beneficial impacts by slowing the potential spread of invasive species transported by motor vehicles. Restricting motorized vehicle use (e.g., limiting motorized vehicle use to designated roads and trails in areas with fragile soils) would reduce the threat of invasive species establishment and spread.

The degree of recreational site development under Alternative A may result in adverse and beneficial impacts. The BLM projects recreational site development to result in approximately 350 acres of long-term surface disturbance, which may leave these areas more vulnerable to invasive species spread. However, when recreational developments confine dispersed recreation to areas with higher use (e.g., vehicle barriers), beneficial impacts may result by reducing surface disturbance and the potential for introduction of invasive species to undisturbed areas. In addition, detection and treatment of new noxious weed infestations are more likely at centrally developed locations than over larger areas with more dispersed recreational activity. At developed sites, educational and prevention materials can be displayed and interpreted to the public resulting in the potential for lower risk of new infestations over time. However, when developments are likely to generate more visitors (e.g., trail or access route improvements) then they are likely to cause adverse impacts, as recreationists spread the seeds and material of weeds. In general, recreation management actions under Alternative A call for more development, if demand warrants, of facilities to augment and enhance visitor use and enjoyment

including fire rings, comfort stations, parking areas, road improvements and vehicle barriers, the impacts of which are likely to be site specific.

Alternative A prohibits the placement of salt, mineral, or forage supplements within ¼ mile of water, wetlands, riparian, or other areas with sensitive vegetation, such as reclaimed or reforested areas. This restriction would provide beneficial impacts by preventing livestock and native ungulate concentration, therefore reducing the potential to spread invasive species in these areas.

Under Alternative A, the BLM evaluates "I" category livestock grazing allotments and AMPs to determine if they are meeting the *Wyoming Standards for Healthy Rangelands*, resulting in the least amount of monitoring among the alternatives. Based on the lack of a required 72-hour holding period for livestock (see 'Proactive Management' below) and less monitoring of grazing allotments, livestock grazing under Alternative A is anticipated to have short- and long-term adverse impacts.

Special Designations

In general, special designations under Alternative A (ACECs and WSAs) place restrictions on surface-disturbing activities (e.g., mineral development, ROW development, and fire suppression) that may facilitate the spread of weeds. These restrictions would result in beneficial impacts to the management of invasive species. Current management designates nine ACECs under Alternative A.

Resources

Resource management actions would result in adverse and beneficial impacts to invasive species and pest management. Managing to maintain or enhance native vegetation would result in indirect beneficial impacts by controlling the spread of weeds. Other resource programs may also result in adverse impacts to managing invasive species, primarily by limiting their control (e.g., restricting the application of pesticides) to avoid conflicts with other resource management objectives.

Management actions specific to Alternative A allow the aerial application of pesticides on a case-by-case basis, the most efficient means of controlling invasive species at the landscape scale, thereby beneficially affecting invasive species and pest management.

Alternative A utilizes fire to restore fire adapted ecosystems and reduce hazardous fuels. Vegetation response following planned ignitions and mechanical and chemical treatment varies depending on a set of factors such as fire conditions, timing, and pre- and post-treatment weather conditions. Impacts to the spread of invasive species from fire and fuels management under Alternative A are likely to be site and species specific. No specific management actions that address the use of fire to control weed species exist under Alternative A. Based on projected surface disturbance (Appendix T), fire and fuels management under Alternative A may result in adverse impacts in areas where fire facilitates the spread of invasive species, such as cheatgrass, and beneficial impacts where it restores native fire-adapted vegetation.

Under Alternative A, vegetation management involves implementing DPC objectives for watershed protection, forestland management, and livestock grazing on 600,000 acres. Widespread vegetation management may result in beneficial impacts by controlling and monitoring the spread of invasive species in these managed areas. Vegetation not meeting DPC has the highest risk of having lost or losing key ecosystem components that make these areas more vulnerable to invasive species establishment. Managing riparian/wetland areas toward achieving PFC would result in beneficial impacts by controlling the spread of invasive species in these areas.

Proactive Management

Proactive management actions specific to the invasive species and pest management program would focus on aerial pesticide restrictions and livestock flushing. Allowing the aerial application of pesticides on a case-by-case basis would result in the greatest beneficial impact to the management of invasive species by placing the fewest restrictions on aerial pesticide application.

The transport of invasive species seeds and material by livestock and native ungulates occurs when they attach to the animals' coats and feet or are ingested. One method to control the spread of invasive species ingested by livestock is to hold the animals in one area before they are allowed to move to other areas. A holding period of 72 hours allows the animals to flush the ingested weed material from their systems so they would not transport the ingested material to uninfested areas. Alternative A requires livestock flushing on a case-by-case basis, but does not require a holding period before moving livestock onto or within public lands. Proactive management actions under Alternative A are expected to help control the spread of invasive species.

Alternative B

Surface Disturbance

The projected long-term disturbance acreage for Alternative B is approximately 31 percent less than Alternative A. Compared to Alternative A, Alternative B has stricter requirements (e.g., 50 percent pre-disturbance of vegetative cover within three growing seasons, 80 percent cover within 5 years of initial seeding, topsoil salvage, and development of a reclamation plan before surface disturbance) regarding the reclamation of disturbed areas. These measures would result in beneficial impacts decreasing the likelihood of invasive species establishment and spread. Although the extent of treatments for invasive species and pests would be less under this alternative—indicated by the projected surface disturbance from invasive species and pest management (Appendix T)—the less overall surface disturbance and proactive reclamation requirements under Alternative B may result in less adverse impacts due to the lower potential for the spread of invasive species in comparison to Alternative A.

Resource Uses

Under Alternative B, mineral development would result in 17,306 acres of short-term surface disturbance and 6,206 acres of long-term surface disturbance, likely having the less adverse impacts to invasive species management than Alternative A (Appendix T). The types of impacts from mineral development under Alternative B would be similar to those under Alternative A.

Forest and woodland treatments and recovery of forest products are projected to result in 20,000 acres of short-term surface disturbance under Alternative B (Appendix T); however, all of this acreage would be reclaimed. Alternative B prohibits clear-cutting, which is likely to result in beneficial impacts by maintaining microclimatic and soil conditions so there is less opportunity for the establishment of invasive species. Timber harvest is only allowed in areas where natural processes are unable to accomplish forest health goals, likely resulting in less use of motorized machinery that can disturb soils and carry invasive species seeds. Under Alternative B, these practices would have a more beneficial impact by slowing the spread of invasive plant species, compared to Alternative A. However, managing endemic insect and disease outbreaks only as necessary for human health and safety and prohibiting precommercial thinning would adversely affect pest management by limiting bark beetle control efforts.

Utility corridors and linear ROWs in the Planning Area, including pipelines and powerlines, would involve 3,975 acres of short-term and 721 acres of long-term surface disturbance (Appendix T); Alternative B

would involve 1,229 acres of short-term and 615 acres of long-term surface disturbance due to road construction. These disturbances would result in impacts similar to Alternative A, but to a lesser degree. The risk of adverse impacts from the spread of invasive species is expected to increase proportionally with long-term surface disturbance from new road construction.

Under Alternative B, the creation of new roads and trails for recreational purposes would result in 2,776 acres of short-term and 1,068 acres of long-term surface disturbance, slightly more disturbance than Alternative A (Appendix T). The resulting impact would be the potential spread of invasive species into new areas where disturbance occurs. Alternative B closes more area to motorized vehicle use and limits motorized vehicle use to designated roads and trails in more area, compared to Alternative A. Restricting motorized vehicle access would reduce the area to which vehicles may spread invasive species; however, restricting vehicle access would also make detection and subsequent treatment of new or expanding weed areas more difficult. Prohibiting off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations would result in beneficial impacts by controlling the spread of invasive species from motorized travel. For known weed infestations selected for treatment, the BLM may authorize motorized vehicle use for performing treatment activities, where appropriate. Overall, adverse impacts from motorized vehicle use would be less than under Alternative A.

In areas developed for recreational use outside of SRMAs, further development to enhance recreation and visitor services would generally be less extensive under Alternative B than Alternative A. However, recreational development in SRMAs and RMZs would be greater under Alternative B. Developments would include new trails and trailheads, access route improvements, and new motorized touring loops that may increase public access and the potential for invasive species spread but may also consolidate recreational activity to facilitate potential detection and treatment. Due to more intensive management of SRMAs and RMZs to maintain the desired recreation setting and, therefore, the more active control of invasive species, recreational use under Alternative B would result in fewer adverse impacts to invasive species and pest management than under Alternative A.

Alternative B prohibits the placement of salt, mineral, or forage supplements within ½ mile of water, wetlands, riparian, or other areas with sensitive vegetation such as reclaimed or reforested areas. This alternative provides the largest buffer and would, therefore, provide greater beneficial impacts than Alternative A by controlling the spread of invasive species by livestock and native ungulates in these vulnerable areas.

Under Alternative B, the BLM closes large areas—including crucial winter range for elk and greater sage-grouse Key Habitat Areas—to livestock grazing, allowing existing uses pending site-specific analysis. Closing areas to livestock grazing would limit the transport of invasive species and reduce the overall consumption of native vegetation, improving plant vigor, and resulting in more effective native plant competition over possible invasive species introduction. However, prohibiting livestock grazing may preclude its use as a tool to control invasive species in certain areas (Stohlgren et al. 1999, DiTomaso 2000). The opportunity for risk of introduction of noxious weed seeds by wildlife or birds would still remain under this alternative.

The BLM monitors those allotments not meeting rangeland health standards due to livestock grazing under Alternative B. This management action may require an increase in rangeland monitoring, compared to Alternative A, which would provide beneficial impacts by monitoring the spread of invasive species to better serve control and treatment efforts.

Special Designations

In general, special designations (e.g., ACECs and WSAs) under Alternative B place more restrictions on surface-disturbing activities (e.g., mineral development, ROW development, and fire suppression) that facilitate the spread of invasive species, compared to Alternative A. In addition to the nine ACECs designated under Alternative A, four existing ACECs would be expanded, and eight new ACECs designated under Alternative B. Although seasonal stipulations on invasive, nonnative pest species control in the Chapman Bench, Clarks Fork Canyon, Rattlesnake Mountain, and Sheep Mountain ACECs may adversely impact invasive species management by restricting control methods or timing, ACEC designations under this alternative would place restrictions on actions most likely to contribute to the spread of invasive species, resulting in the more beneficial impacts to invasive species control, compared to Alternative A. Two back country byways would be designated and developed under Alternative B. If these designations and facility developments increase use from motorized vehicles, then adverse impacts may result from increased potential to spread invasive species along these byways.

Resources

Alternative B would utilize fire to restore fire adapted ecosystems and reduce hazardous fuels. Vegetation response following planned ignitions and mechanical and chemical treatment typically varies depending on a set of factors such as fire conditions, timing, and pre- and post-treatment weather conditions. Alternative B uses mechanical, chemical, or biological treatments in the wildland urban interface to protect structures and private property from fire. Mechanical treatments may cause adverse impacts by increasing the potential of invasive species spread, because the surface disturbance associated with these treatments would occur in habitat that may already be degraded. In other situations, such as in areas affected by cheatgrass, burning has a greater adverse effect on weed spread than some mechanical treatments may have (Keeley 2006). Although fire and fuels management under Alternative B may result in less short-term surface disturbance than Alternative A (Appendix T) and therefore less adverse impacts by spreading invasive species, it would also result in less long-term beneficial impacts from restoring native fire-adapted vegetation.

Under Alternative B, vegetation management would be less extensive than Alternative A. Though the BLM would manage to achieve or make progress towards the reference state plant community based on the ESD for the site and maintain native plant communities on contiguous blocks of BLM-administered land. This would result in beneficial impacts by limiting new areas susceptible to invasive species spread due to improved habitat integrity. The greater reliance on natural processes for vegetation treatment under this alternative would result in a smaller beneficial impact that vegetation management under Alternative A. Alternative B also prohibits the aerial application of pesticides within 1 mile of special status plant species populations, which may result in adverse impacts by limiting widespread pesticide use to control invasive species spread. As managing riparian/wetland areas toward DPC is assumed to exceed the requirements of managing toward PFC, Alternative B may result in greater beneficial impacts than Alternative A by controlling the spread of invasive species in these areas.

Proactive Management

The BLM prohibits the aerial application of pesticides within ½ mile of riparian/wetland areas and aquatic habitats under Alternative B. Although this restriction may adversely affect the control of invasive species, exceptions can be made to manage riparian weed species when the beneficial impacts of invasive species control are greater than the risks to aquatic habitat from pesticides applied in conformance to label requirements.

Allowing the authorized officer, on a case-by-case basis, to hold livestock that may have ingested invasive species material or seeds for a period of 72 hours would reduce the potential of livestock to transport invasive species material or seeds under Alternative B. This allows the animals to flush the ingested invasive species material from their systems before moving on to or within public lands. It is anticipated that this action, more than actions under other alternatives, may reduce the adverse, indirect impacts associated with the spread of invasive species from livestock.

Alternative C

Surface Disturbance

Alternative C is projected to result in the greatest acreage of short-term surface disturbance. The projected long-term disturbance acreage for Alternative C is approximately 165 percent more than Alternative A, 283 percent more than Alternative B, and 127 percent more than Alternative D. Alternative C has less stringent reclamation requirements (e.g., 30 percent desired vegetative cover within three growing seasons, and no subsequent requirement) than alternatives B and D, but potentially more stringent requirements than Alternative A by requiring reclamation plans on a case-by-case basis. Additionally, seeding of areas not meeting resource objectives using approved seed mixes containing both native and nonnative species may allow for the selection of species most capable of competing with invasive species and, therefore, reduce the chances of invasive species establishment in these areas relative to Alternative A. Alternative C is likely to result in the most short- and long-term adverse impacts by providing the most opportunity for invasive species spread in disturbed areas. Although the extent of treatments for invasive species and pests would be twice that of alternatives A and D and 40 times more than Alternative B—indicated by the projected surface disturbance from invasive species and pest management (Appendix T)—the greater overall surface disturbance and limited requirements for revegetation under Alternative C may have the greatest adverse impacts to invasive species and pest management.

Resource Uses

Under Alternative C, mineral development would result in 25,912 acres of short-term and 13,180 acres of long-term surface disturbance (Appendix T). Thus, Alternative C would result in similar adverse impacts to those under Alternative A, but to a greater degree. Most of the Planning Area would remain open to mineral extraction, with the least acreage closed compared to the other alternatives. Most of the impacts would be temporary during the life of the operation with most areas of disturbance reclaimed following closure of operations.

Forest and woodland treatments and recovery of forest products would result in 40,000 acres of short-term surface disturbance under Alternative C, but no long-term surface disturbance due to complete reclamation of these sites (Appendix T). Alternative C would allow larger clear-cuts than Alternative A and the continued use of spur roads to complete other resource goals or for new recreational purposes would increase the potential spread of invasive species from vehicle use in these areas. Commercial forestland would be open to timber harvesting, resulting in the greatest adverse impacts for potential invasive plant species spread from motorized machinery and soil disturbance, compared to the other alternatives. However, managing endemic insect and disease with the full range of silviculture techniques and treatment methods and allowing precommercial thinning and salvage operations would beneficially impact pest management such as bark beetle control.

Utility corridors and linear ROWs in the Planning Area, including pipelines and powerlines, would involve 8,559 acres of short-term and 2,563 acres of long-term surface disturbance (Appendix T), which would

result in impacts similar to Alternative A, but to a greater degree. Alternative C would involve 4,638 acres of short-term and 2,319 acres of long-term surface disturbance from road construction alone, the most of all alternatives (Appendix T). The risk of adverse impacts due to the spread of invasive species is expected to increase proportionally with long-term surface disturbance from new road construction.

Under Alternative C, the creation of new roads and trails for recreational purposes would result in 12,907 acres of short-term and 12,735 acres of long-term surface disturbance, the most of all the alternatives (Appendix T). The resulting impact would be the potential spread of invasive species into new areas where disturbance occurs. Alternative C limits motorized vehicle use to designated roads and trails in less acreage than alternatives B and D—though more acreage than Alternative A—closes the least acreage to motorized vehicle use, and allows off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations, which would result in the greatest potential adverse impacts from the spread of invasive species, compared to the other alternatives. Conversely, less restrictive travel management under this alternative would allow the greatest access to detect new and treat existing invasive species infestations, which may result in a beneficial impact to the control of these species.

In areas developed for recreational use, impacts from recreational development under Alternative C would be similar to those under Alternative A, but to a greater degree. The potential visitor increase to recreational areas may be greater than Alternative B, but if the BLM upgrades or develops facilities in response to demand, the consolidation of recreational activity may result in beneficial impacts to invasive species and pest management as described under Alternative A. Alternative C manages the least areas as SRMAs, and therefore would pursue the least intensive management to maintain the desired recreation setting, resulting in the least beneficial impact to invasive species control.

Alternative C allows the placement of salt, mineral, or forage supplements in wetlands, riparian, or other areas with sensitive vegetation such as reclaimed or reforested areas to maximize livestock use. The potential concentrated livestock use and associated soil disturbance and invasive species spread would be the greatest under Alternative C, compared to the other alternatives.

Under Alternative C, the BLM excludes livestock grazing from the same areas as Alternative A, but manages livestock grazing to optimize commodity production while meeting rangeland health standards, not to provide for the enhancement of other resource values. The potential adverse impacts by allowing livestock grazing in areas where it is likely to contribute to, rather than help control, the spread of invasive species would be greatest under this alternative. Alternative C, by prioritizing monitoring on "I" category allotments and those allotments not meeting rangeland health standards due to current livestock grazing, would result in more monitoring to aid invasive species detection and treatment than Alternative A.

Special Designations

In general, special designations (e.g., ACECs and WSAs) under Alternative C would place the least restrictions on surface-disturbing activities (e.g., mineral development, ROW development, and fire suppression) that facilitate the spread of invasive species. Furthermore, only the Spanish Point Karst and Brown/Howe Dinosaur Area ACECs would be designated under this alternative, providing the fewest beneficial impacts from special designations from limiting surface disturbance to control the spread of invasive species, compared to the other alternatives.

Resources

Alternative C would utilize fire to restore fire adapted ecosystems and reduce hazardous fuels. Vegetation response following planned ignitions and mechanical and chemical treatment varies

depending on a set of factors such as fire conditions, timing, and pre- and post-treatment weather conditions. Mechanical, chemical, or biological treatments would be used across the landscape as needed to restore vegetative diversity and reduce the risk of unnatural fire. Although fire management actions result in the greatest amount of surface disturbance in the short term, by restoring vegetative diversity the risk of invasive species establishment would decrease, resulting in beneficial impacts in the long term. Under Alternative C, the BLM would seek to restore vegetation diversity while decreasing the risk of unnatural fire. Fire management under this alternative is likely to result in the greatest long-term beneficial impact, compared to the other alternatives.

Under Alternative C, the BLM manages grasslands and shrublands toward meeting the *Wyoming Standards for Healthy Rangelands* (Appendix N) in the greatest acreage, compared to the other alternatives. However, the BLM does not manage to maintain native species on contiguous blocks of BLM-administered land. Managing all riparian/wetland areas to meet or make progress toward PFC while prioritizing areas functioning at-risk with a downward trend or in nonfunctioning condition would focus management on those areas most vulnerable to invasive species spread and may result in a greater beneficial impact than riparian/wetland management under Alternative A. Due to the larger extent of vegetation management, Alternative C may result in more beneficial impacts to control the spread of invasive species than alternatives A, B, and D.

Prohibiting the aerial application of pesticides within ½ mile of special status plant species would result in a greater potential adverse impact than Alternative A, but less than Alternative B, by limiting widespread pesticide use to control invasive species.

Proactive Management

The BLM prohibits aerial application of pesticides within 100 feet of riparian/wetland areas and aquatic habitats under Alternative C. Although this restriction would adversely affect the control of invasive species, exceptions could be made to manage riparian weed species, when the beneficial impacts of invasive species control are greater than the risks from pesticides to aquatic habitat when applied in conformance with the label. Proactive management under Alternative C includes expansion of integrated pest management for identified infestations, a beneficial impact, but a reduction in livestock management measures (i.e., livestock flushing) that may prevent new infestations, an adverse impact.

Alternative D

Surface Disturbance

The projected long-term disturbance acreage for Alternative D is approximately 17 percent more than Alternative A, 68 percent more than Alternative B, and 56 percent less than Alternative C. Overall, Alternative D has more stringent reclamation requirements than alternatives A and C, but less than Alternative B. The BLM allows nonnative species for seeding, which would result in similar beneficial impacts to those under Alternative C. Alternative D is likely to result in more short-term adverse impacts than Alternative A, but less long-term adverse impacts by employing reclamation practices that reduce the opportunity for invasive species spread in disturbed areas. The extent of treatments for invasive species and pests under Alternative D is similar to that under Alternative A.

Resource Uses

Under Alternative D, mineral development would result in 25,229 acres of short-term and 12,733 acres of long-term surface disturbance (Appendix T). Mineral development under Alternative D would result in similar adverse impacts to those under Alternative A, but to a lesser degree.

Forest and woodland treatments and recovery of forest products would result in impacts similar to Alternative A, but to a greater degree from allowing clear cuts up to 100 acres. However, managing endemic insects and disease with the full range of silviculture techniques and treatment methods and allowing precommercial thinning and salvage operations would create beneficial impacts similar to Alternative C.

Under Alternative D, utility corridors, new road construction, and linear ROWs, including pipelines and powerlines, would result in impacts similar to Alternative A. However, managing more area as ROW avoidance or exclusion areas under this alternative may consolidate ROW development and, therefore, limit the dispersal of invasive species.

Under Alternative D, the creation of new roads and trails for recreational purposes would involve 5,820 acres of short-term and 3,941 acres of long-term surface disturbance, the second most of the alternatives (Appendix T). The resulting impact would be the potential spread of invasive species into new disturbed areas. Alternative D closes the second largest acreage to motorized vehicle use and limits motorized vehicle use to designated roads and trails in the second largest acreage compared to other alternatives. Alternative D also limits off-road vehicle travel for big game retrieval and dispersed campsite access to within 300 feet of established roads. Under Alternative D, beneficial and adverse impacts to invasive species management would be greater than under alternatives A and C, but less than under Alternative B.

Recreational development under Alternative D in areas outside SRMAs would result in impacts similar to Alternative C. Recreation management actions in SRMAs would result in impacts similar to those under Alternative B, but to a lesser extent because SRMAs encompass less acreage under Alternative D.

Livestock grazing management under Alternative D would result in impacts similar to Alternative A. Allotment monitoring would cause beneficial impacts similar to Alternative C, but to a greater degree. Prioritizing monitoring on allotments that do not meet rangeland health standards due to all livestock grazing, not just current, may increase monitoring in more areas vulnerable to invasive species spread.

Special Designations

Special designations under Alternative D would result in impacts similar to Alternative A, but to a greater degree. In addition to the nine ACECs designated under Alternative A, Alternative D designates four new ACECs and two new management areas that emphasize resource protection, placing more restrictions on resource uses and activities likely to contribute to the spread of invasive species. Although seasonal stipulations on controlling invasive, nonnative pest species in the Chapman Bench Management Area and the Clarks Fork Canyon and Sheep Mountain ACECs may adversely affect invasive species management by restricting control methods or timing, ACEC designations under Alternative D would create more beneficial impacts than under alternatives A and C by limiting the spread of invasive species.

Resources

Fire and fuels management practices under Alternative D would result in impacts to invasive species and pest management similar to Alternative A in both extent and intensity. Similar to Alternative B, Alternative D places more emphasis on using fire as a resource management tool, which may beneficially impact invasive species management if the BLM uses fire more frequently in areas where it helps to control the spread of invasive species.

Vegetation management under Alternative D would create beneficial impacts similar to Alternative B, but to a lesser degree and extent. Based on the amount of projected surface disturbance (Appendix T), Alternative D would actively manage a similar amount of vegetation as Alternative A. However, Alternative D would maintain contiguous blocks of native plant communities and manage some areas under for a higher plant community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable. As a result, vegetation management under Alternative D would result in beneficial impacts similar to Alternative B but to a greater extent. Management of riparian/wetland vegetation would create beneficial impacts similar to Alternative C, but to a greater degree because Alternative D manages certain areas to obtain DFC, which requires more intensive management than PFC.

Avoiding aerial applications of herbicides within ½ mile of BLM special status plant species would result in similar adverse impacts to invasive species management as those under Alternative C, but to a lesser degree.

Proactive Management

Proactive management actions to control the spread of invasive species under Alternative D would create impacts similar to Alternative A.

Alternative E

Surface Disturbance

Under Alternative E, the projected long-term disturbance acreage is least among the alternatives and is approximately 31 percent, 2 percent, 74 percent, 42 percent, and 40 percent less than alternatives A, B, C, D, and F, respectively. Reclamation requirements of disturbed areas under Alternative E would be the same as Alternative B, except in the Greater Sage-Grouse Key Habitat Areas ACEC, which would include additional proactive reclamation requirements for disturbed sites. Although the use of herbicides would be minimized under this alternative in the Greater Sage-Grouse Key Habitat Areas ACEC, the overall amount of surface disturbance, proactive reclamation requirements, and additional management measures in the ACEC would result in the least potential for the spread of invasive species when compared to the other alternatives.

Resource Uses

Mineral development would result in 17,297 acres of short-term surface disturbance and 6,202 acres of long-term surface disturbance under Alternative E. Although these overall disturbance estimates are the same as Alternative B, the location of mineral development may vary due to greater limitations on surface disturbance in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres) under Alternative E.

Approximately 20,000 acres of short-term surface disturbance associated with forest and woodland treatments and recovery of forest products are projected to result under Alternative E (Appendix T);

however, all of this acreage would be reclaimed. Under Alternative E, timber harvest management would be the same as Alternative B, and the associated surface disturbance impacts to invasive species management would be the same as Alternative B. In general, the practices of Alternative E would be the same as Alternative B and would have the most beneficial impact by slowing the spread of invasive species over the largest area of any alternative.

Rates of invasive species establishment and spread are expected to increase proportionally with long-term anthropogenic surface disturbances. Disturbance from pipeline, road development, and new road construction would be the same as Alternative B. However, the location of these disturbances may vary under Alternative E, which manages more areas as ROW exclusion areas than any other alternative.

Recreational developments such as new trails, trailheads, access route improvements, and new motorized touring loops would be the least extensive under Alternative E. These types of developments could result in increased public access and the potential for invasive species spread. Alternative E requires that Special Recreation Permits in the proposed Greater Sage-Grouse Key Habitat Areas ACEC have neutral or beneficial effects to sage-grouse habitat, potentially limiting the recreational activities that may contribute to the spread of invasive species. Therefore, recreational use under Alternative E would result in fewer adverse impacts to invasive species and pest management when compared to the other alternatives.

Management of motorized vehicle use and livestock grazing are the same as under Alternative B, and impacts to invasive species management would therefore be the same as Alternative B.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land in the Greater Sage-Grouse Key Habitat Areas ACECs. The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative E would result in additional benefits to invasive species management in comparison to the other alternatives. Specifically, requirements to include a full reclamation bond to insure restoration of disturbed areas to their original condition and other habitat restoration and vegetation management requirements associated with the Sage-Grouse Key Habitat Areas ACEC, would reduce adverse impacts from surface-disturbing activities in the largest area when compared to the other alternatives.

Resources

Under Alternative E, fire and fuels management practices and impacts are the same as Alternative B with the exception of lands within the Greater Sage-Grouse Key Habitat Areas ACEC, which would be managed with an emphasis on protecting existing sagebrush ecosystems. The design and implementation of fire management within the Greater Sage-Grouse Key Habitat Areas ACEC would be conducted with an emphasis on protecting existing sagebrush ecosystems and would promote the persistence of native plant communities. Among all of the alternatives, fire and fuels management under Alternative E would result in the least short-term surface disturbance (Appendix T) and therefore the least adverse impact of spreading invasive species. In general, the additional fuel management restrictions of areas within the Greater Sage-Grouse Key Habitat Areas ACEC would encourage the long-term establishment of native plant communities. Therefore, Alternative E would result in more long-term beneficial impacts to invasive species management by restoring native vegetation than the other alternatives.

With the exception of lands within the Greater Sage-Grouse Key Habitat Areas ACEC, vegetation management under Alternative E would be the same as Alternative B. Vegetation management in the

Greater Sage-Grouse Key Habitat Areas ACEC will emphasize the restoration and preservation of native sagebrush ecosystems to create a landscape pattern which most benefits sage-grouse. These actions would require the use of native seeds for restoration based on availability, adaptation, and probability of success. Management actions would also be designed to ensure long-term persistence of restorations. The additional vegetation and habitat restoration management strategies of Alternative E would result in the greatest beneficial impacts by promoting growth and establishment of native plant communities, particularly native sagebrush communities, within the largest acreage of all the alternatives.

Proactive Management

Under Alternative E, the same invasive species management methods outlined for Alternative B would apply, but different control and treatment methods would be practiced in the Greater Sage-Grouse Key Habitat Areas ACEC. These include the restriction of activities that facilitate the spread of invasive plants and the development and implementation of methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. In addition, project vehicles would avoid driving through infestations and would be washed when accessing and/or leaving sites. To help protect against invasive plants within the Greater Sage-Grouse Key Habitat Areas ACEC, Alternative E would provide assurance that soil cover and native herbaceous plants are at their ESD potential. In areas without ESDs, reference sites would be used to identify appropriate vegetation communities and soil cover. Under Alternative E, the use of herbicides would be minimized within the Greater Sage-Grouse Key Habitat Areas ACEC and would only be used as a last resort to achieve clearly defined goals and objectives. Flash burners, mowing, and selected hand-cutting would be prioritized in these areas, which may restrict grazing permit holders to more labor-intensive methods to control weeds when compared to the other alternatives. Additional proactive management, as well as the resulting beneficial and adverse impacts, would be the same as Alternative B in areas outside of the Greater Sage-Grouse Key Habitat Areas ACEC. Although the limited use of herbicide may result in an adverse impact on the control of invasive plants, the long-term activity restrictions and additional management practices within the Greater Sage-Grouse Key Habitat Areas ACEC would result in the greatest beneficial impact to the control of invasive species when compared to the other alternatives.

Alternative F

Surface Disturbance

Under Alternative F, the projected long-term disturbance is approximately 40 percent more than Alternative E, 39 percent more than Alternative B, and 12 percent more than Alternative A. The projected long-term disturbance is approximately 57 percent and 2 percent less than alternatives C and D, respectively. With the exception of areas in the Greater Sage-Grouse PHMAs ACEC, the reclamation requirements of Alternative F would be the same as Alternative D. Although more short-term adverse impacts are expected to result from Alternative F than Alternative A, less long-term impacts would occur by employing reclamation practices that reduce the opportunity for invasive species spread in disturbed areas, especially within the Greater Sage-Grouse PHMAs ACEC where additional reclamation requirements would apply.

Resource Uses

Mineral development would result in 25,223 acres of short-term and 12,731 acres of long-term surface disturbance under Alternative F (Appendix T). The mineral development of Alternative F would result in

a lesser degree of adverse impacts than those under alternatives A, C, and D, but more than alternatives B and E.

Approximately 30,000 acres of short-term surface disturbance associated with forests and woodlands treatments and recovery of forest products are projected to result under Alternative F (Appendix T); less than under Alternative A and the same as Alternative D. Impacts from utility corridors, new road construction, and linear ROWs, including pipelines and powerlines, would be the same as Alternative D. However, the location of these developments under Alternative F may vary due to the additional restrictions on anthropogenic disturbances in greater sage-grouse PHMAs under this alternative. The management of ROW avoidance or exclusion areas under Alternative F would be similar to Alternative D and would result in similar impacts.

The creation of new roads and trails for recreational purposes would involve 5,750 acres of short-term and 3,917 acres of long-term surface disturbances under Alternative F, which is similar to Alternative D, more than alternatives A, B, and E, and less than Alternative C. Alternative F closes the same acreage to motorized vehicle use as Alternative D and limits motorized vehicle use to designated roads and trails in the second-largest acreage compared to the other alternatives. The adverse impacts to invasive species management resulting from travel management practices under Alternative F would be greater than alternatives E and B, but less than alternatives A, C, and D.

Under Alternative F, recreational management actions would be the same as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC. As with Alternative E, Alternative F requires that Special Recreation Permits in the proposed Greater Sage-Grouse PHMAs ACEC have neutral or beneficial effects to sage-grouse habitat. Therefore, the recreation management actions of Alternative F would result in impacts similar to alternatives D and E, and would have beneficial impacts on invasive species management by reducing the amount of recreational travel that could contribute to the spread of invasive species.

Impacts resulting from livestock grazing under Alternative F would be the same as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC. Livestock grazing and allotment management in the Greater Sage-Grouse PHMAs ACEC require the incorporation of sage-grouse habitat objectives and management considerations in all BLM grazing allotments through AMPs or permit renewals. Therefore, greater beneficial impacts to invasive species management would result under Alternative F through the management of native sage-grouse habitat within the ACEC.

Special Designations

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative F would result in additional benefits to invasive species management in comparison to the other alternatives. Similar to Alternative E, requirements to include a full reclamation bond to insure restoration of disturbed areas to their original condition and other habitat restoration and vegetation management requirements associated with the Greater Sage-Grouse PHMAs ACEC would reduce adverse impacts from surface-disturbing activities in a larger area than alternatives A, D, and C.

Resources

Under Alternative F, fire and fuel management practices would result in the same impacts to invasive species and pest management as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC. In general, fire management within the Greater Sage-Grouse PHMAs ACEC would be conducted with an emphasis on protecting existing sagebrush ecosystems and would promote the persistence of native

plant communities. Similar to Alternative D, fire and fuels management under Alternative F would result in less short-term surface disturbance (Appendix T) than alternatives A and C, creating a beneficial impact to invasive species management by reducing the opportunity of establishment and spread in recently disturbed areas. Like Alternative E, the additional fuel management restrictions within areas of the Greater Sage-Grouse PHMAs ACEC of Alternative F would encourage the long-term establishment of native plant communities. Long-term fuel management practices under Alternative F would result in more beneficial impacts to invasive species management than would alternatives A, C, and D.

Vegetation management under Alternative F would create the same beneficial impacts as Alternative D, but to a greater degree and extent due to additional vegetation management and habitat restoration actions within the Greater Sage-Grouse PHMAs ACEC that would focus on creating landscape patterns that most benefit sage-grouse. Similar to Alternative E, these actions would require the use of native seeds for restoration activities. Methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants would be developed and implemented under Alternative F while also managing towards achieving a higher or lower plant community state or phase (based on state and transition models in ESDs). However, depending on the condition plant community, achievement of higher plant community or phase may be impossible or impractical. The additional vegetation and habitat restoration management strategies of Alternative F would result in the greatest beneficial impacts by promoting the growth and establishment of native plant communities within the largest acreage of all the alternatives.

Proactive Management

Proactive management actions to control the spread of invasive species under Alternative F would be the same as Alternative D, except within areas of the Greater Sage-Grouse PHMAs ACEC. Within the Greater Sage-Grouse PHMAs ACEC, Alternative F would manage some areas for a higher plant community state or phase (based on state and transition models in ESDs) on a case-by-case basis where site-specific management objectives determine that a higher plant community state or phase is desirable. In addition, project vehicles would be washed and required to avoid driving through infestations to access sites within the Planning Area. The use of herbicides would be minimized within the Greater Sage-Grouse PHMAs ACEC and flash burners, mowing, and selected hand-cutting would be prioritized in these areas. Similar to Alternative E, this management action may restrict grazing permit holders to more labor-intensive methods to control weeds when compared to the other alternatives. Although the use of herbicides to control invasive species would be minimized under Alternative F, the long-term activity restrictions and additional management practices within the Greater Sage-Grouse PHMAs ACEC would result in greater beneficial impacts to the control of invasive species than under alternatives A, C, and D.

Fish and Wildlife Resources

Certain types of management that restricts surface-disturbing activities and other resource uses would, generally, provide habitat protection for fish, wildlife, special status species, and wild horses. Table 4-22 provides an overview of these selected protective management actions by important habitat types where they would occur for each alternative. This table is intended to provide a comparative overview comparison of the alternatives. Further discussion of the effects of these and other management actions for each fish and wildlife habitat types is provided in the proceeding sections. Impacts to special status species appear in sections 4.4.7 through 4.4.9, and impacts to wild horses appear in Section 4.4.10.

Table 4-22. Summary of Protective Management by Alternative for Selected Fish, Wildlife, and Special Status Species

	Alternative	Big Game Crucial Winter Range (acres)	Fish-bearing Streams (miles)	Greater Sage-Grouse Key/PHMA[1] (acres)
Locatable Minerals – Closed	A	26,019	44	8,964
	B	112,541	69	75,754
	C	10,311	11	1,264
	D	21,602	15	6,872
	E	652,927	103	1,227,152
	F	21,602	15	6,872
Oil and Gas Constraints – Closed	A	80,457	51	36,607
	B	919,819	235	1,224,301
	C	42,611	19	23,487
	D	114,861	60	60,430
	E	919,819	235	1,224,301
	F	120,938	62	62,406
Oil and Gas Constraints – Major	A	573,518	150	434,760
	B	397,498	86	0
	C	20,385	42	8,857
	D	683,655	168	686,929
	E	397,498	86	0
	F	675,270	167	685,189
Oil and Gas Constraints – Moderate	A	663,341	86	480,551
	B	0	0	0
	C	491,173	137	669,165
	D	518,801	57	366,859
	E	0	0	0
	F	521,108	58	366,624
Travel Management – Closed	A	24,921	29	4,109
	B	54,273	29	48,939
	C	7,437	8	665
	D	18,450	8	2,448
	E	54,273	29	47,074
	F	18,450	8	2,448

Table 4-22. Summary of Protective Management by Alternative for Selected Fish, Wildlife, and Special Status Species (Continued)

	Alternative	Big Game Crucial Winter Range (acres)	Fish-bearing Streams (miles)	Greater Sage-Grouse Key/PHMAs[1] (acres)
Travel Management – Seasonal Restrictions	A	28,153	8	10,369
	B	606,233	47	1,180,675
	C	28,552	9	10,415
	D	28,627	9	10,456
	E	606,233	47	1,180,675
	F	28,626	9	10,456
Salable Minerals	A	65,182	58	50,070
	B	909,917	143	824,130
	C	105,774	20	68,826
	D	122,048	112	62,200
	E	1,102,823	153	1,226,445
	F	122,048	112	62,200
ROW – Exclusion	A	35,974	59	20,857
	B	105,158	59	132,194
	C	936	2	0
	D	9,213	5	2,087
	E	613,591	93	1,229,615
	F	9,213	5	50,235
Lands with Wilderness Characteristics[2]	A	N/A	N/A	N/A
	B	188,101	54	154,997
	C	N/A	N/A	N/A
	D	N/A	N/A	N/A
	E	188,101	54	154,997
	F	37,204	13	3,561
Livestock Grazing – Closed	A	1,405	3	322
	B	1,315,046	138	1,229,612
	C	1,405	3	322
	D	1,405	3	322
	E	1,315,046	138	1,229,612
	F	1,405	3	322
ACEC	A	35,681	44	25,680
	B	138,932	78	96,272
	C	10,967	9	5,318
	D	54,627	48	24,660
	E	665,963	193	1,232,583
	F	634,085	188	1,116,698

Sources: BLM 2009a; BLM 2013a

[1]PHMA only analyzed for Alternative F.
[2]Includes only lands with wilderness characteristics managed to maintain their wilderness characteristics.

ACEC Area of Critical Environmental Concern
N/A Not Applicable
PHMAs Priority Habitat Management Areas
ROW rights-of-way

4.4.5 Fish and Wildlife Resources – Fish

Wyoming state and federal resource management agencies manage aquatic species (including fish) in the Planning Area. The WGFD has statutory responsibility to protect all aquatic wildlife and is responsible for regulating the sport and commercial take of all fish in the Planning Area. The BLM manages the habitat on BLM-administered lands that supports both game and nongame fish species where they are found, and BLM management indirectly affects all aquatic species both upstream and downstream of BLM-administered lands. This analysis describes the potential impacts to fish habitat on BLM-administered lands.

Adverse impacts result from management actions that degrade fish habitat, including impacts to riparian/wetland habitat, changes in water quality (e.g., temperature, chemistry, etc.), or decreases in water quantity (e.g., natural flow regime) in the Planning Area. Beneficial impacts are those that improve or preserve riparian/wetland habitats and water quality or quantity by maintaining natural flow regimes.

Both natural events and human activities that result in changes to or stressors on habitat components such as vegetation, water quality, or water quantity may result in direct and indirect impacts to fish resources. Direct impacts include management actions that cause onsite disturbances to fish habitat. In addition, management actions that impact recreational access by the public to fish resources would be a direct impact to this resource. Indirect impacts include management actions that result in changes in water quality and quantity that subsequently affect fish. Actions that increase the transport of sediment to and through streams or increase deposition in streams are also considered indirect impacts.

4.4.5.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Activities that cause substantial disturbance to soils and vegetation may adversely affect water quality and quantity, which adversely affects fisheries habitats.
- Surface disturbances accelerate runoff and sediment delivery to stream channels, which alters streamflows and reduces habitat quality for fish that require clear water, moderated streamflows, deep pools, and clean substrates.
- Increased sedimentation adversely affects most fish species in the Planning Area. This analysis, therefore, focuses on the degree of surface disturbance anticipated under each alternative.
- The potential for sedimentation of streams and rivers is minimized through using BMPs.
- The health of fisheries in the Planning Area is directly related to the overall health and functional capabilities of riparian/wetland resources, which in turn reflect watershed health.
- As riparian systems adjust in response to the removal of vegetation or changes in hydrologic conditions, the availability of habitats required to fulfill the life history requirements of fish populations is likely to be affected.

4.4.5.2 Summary of Impacts by Alternative

The principal impacts to fish result from management that increases surface disturbance, resulting in sedimentation and other adverse impacts to water quality and quantity in fish-bearing streams. Increased sediment in fish habitat (streams, rivers, and reservoirs) decreases the potential for fish to

naturally reproduce, fills in pools, leads to channel degradation, decreases light penetration and productivity, alters fish community composition, and increases stream temperature. Alternative C places the fewest restrictions on surface-disturbing activities and has the greatest potential to adversely affect fish habitat, followed by alternatives A, D, F, B, and E. Alternatives D and F are projected to result in greater surface disturbance than Alternative A, but contain more additional reclamation requirements that may limit erosion to a greater degree and, therefore, mitigate adverse impacts to fish habitat. Alternatives B and E would result in the greatest direct beneficial impacts to fisheries through proactive management (e.g., watershed improvement projects), followed by alternatives D and F, A, and C.

4.4.5.3 Detailed Analysis of Alternatives

Potential impacts to fish habitat generally occur in relation to water quality and water quantity as these characteristics directly affect the ability of fish habitat to sustain fish. The analysis below is structured by these headings to identify management that would result in impacts to these characteristics of aquatic habitats. Section 4.1.4 *Water* includes additional detail on potential impacts to water quality and quantity from implementing alternatives. Section 4.4.3 *Vegetation – Riparian/Wetland Resources* describes impacts to riparian/wetland habitat that may also affect fish habitat.

Impacts Common to All Alternatives

The principle impacts to fish habitat result from management actions that affect water quality and quantity. These impacts would be similar under all alternatives, but the degree and intensity of impacts vary by alternative based on restrictions, allocations, projected activity, and other management, as described for each alternative. See *Impacts Common to All Alternatives* in Section 4.1.4 *Water* for a detailed analysis of impacts to surface water quality and quantity. See Section 4.1.3 *Soils* and Appendix V for a more detailed description of the methods used to predict the erosion rates that appear below.

Water Quality

Under all alternatives, fish habitat would be affected by management actions that alter water quality through sedimentation and related degradation from surface-disturbing activities, water temperature changes, water chemistry changes, and riparian area management and restoration.

Increased sediment in fish habitat (streams, rivers, and reservoirs) decreases the potential for fish to naturally reproduce, fills in pools, leads to channel degradation, decreases light penetration and productivity, alters fish community composition, and increases stream temperature. Activities that increase surface runoff can erode stream banks, altering riparian habitat and reducing the quality of in-stream habitat for fish. Under all alternatives, seeps, springs, wet meadows, and riparian vegetation would be maintained in a functional and diverse condition for young greater sage-grouse, resulting in indirect benefits to fish habitat by limiting the alteration of riparian habitat and increasing the quality of in-stream habitat for fish. Changes in aquatic habitats could lead fish to alter their uses of the stream, moving to different areas for feeding and spawning, or eliminate their ability to survive, depending on habitat conditions.

As noted in Section 4.1.4 *Water*, concentrated herbivory may contribute to soil compaction and damage to the vegetative cover and soil crust, thus increasing surface water runoff, erosion, and sedimentation. Fishbearing streams do not flow through the McCullough Peaks or Fifteenmile HMAs under any alternative, so adverse impacts from wild horses would be minimal under all alternatives.

Water Quantity

Water quantity is primarily affected by activities that alter water runoff and water discharge. In areas with little vegetation, less rainfall infiltrates the soil and therefore more runoff may reach stream systems. Greater runoff can cause accelerated erosion and increased sediment loading in streams and rivers. Impervious surfaces and compacted soils may result in higher volumes of water reaching stream systems in shorter time periods, thus increasing flow rate, flood frequency, and erosion. Stream bank disturbance could impact fish habitat by creating bank instability, which could alter flow and destroy pool-riffle formations needed for fish survival.

Produced water from conventional and CBNG wells is sometimes discharged to the surface, contributing additional flows into the surface water system. These discharges can alter the timing, location, and volume of local streamflow patterns. In the Planning Area, produced water discharges, although overall beneficial to stream habitat, result in both beneficial and adverse impacts. Particularly during periods of low flow and spawning, aquatic species may be affected by the amount of produced water discharged to the surface. Produced water discharge can increase flow rates and erosion in stream channels, contributing to sedimentation. BLM policies and BMPs, required as COA, minimize and mitigate, to the extent possible, erosion from produced water surface discharge. Produced water is also generally hotter than naturally occurring surface water, and contains dissolved compounds that can be toxic to fish. Downstream from the discharge point, cooled produced water that has released some of its dissolved chemical components can have a beneficial impact on stream habitat.

Under all alternatives, abnormally incised drainages in lost riparian functioning systems would be restored to raise water tables and increase water storage within greater sage-grouse habitat. In addition, riparian and wetlands areas within greater sage-grouse habitats would be restored. These management actions would benefit fish habitat by decreasing runoff, erosion, and sedimentation and by increasing water quantity and quality.

Alternative A

Surface Disturbance

Surface disturbance results in adverse impacts to fish habitat by increasing soil erosion and sedimentation that degrades water quality. Alternative A is anticipated to have short-term (136,253 acres) and long-term (15,646 acres) surface disturbance over the life of the plan (Table 4-1) causing erosion rates of 567,492 and 25,065 tons per year, respectively, that would contribute to sedimentation. Surface-disturbing activities are prohibited within 500 feet of surface water or riparian/wetland areas to minimize potential water quality impacts. Relative to the other alternatives, Alternative A includes the second fewest restrictions on activities that remove vegetation and compact soils, resulting in more storm water runoff entering streams.

Resource Uses

Under Alternative A, 4,130,352 acres are available for locatable mineral entry, 3,877,232 acres are open for oil and gas leasing, and 3,974,564 acres are open to mineral materials disposal. Alternative A closes areas encompassing 46 miles of fishbearing streams to locatable mineral entry (Table 4-22). There would be some oil and gas development in areas that drain into fishbearing streams, although there are 35 miles of fishbearing streams in areas closed to oil and gas development under Alternative A (Table 4-22). This alternative is anticipated to result in the development of 1,184 new federal wells, and produced water may impact fish habitat by changing flow regimes and contributing to sedimentation.

Under Alternative A, the BLM limits motorized vehicle use to existing roads and trails on 2,137,574 acres. Motorized vehicle use is likely to contribute to sedimentation in areas where existing roads and trails are in close proximity to, or cross, rivers and streams. Allowing off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations may result in new roads and trails that would impact fish where they cross rivers or streams or increase sedimentation. Alternative A closes 68,115 acres to motorized vehicle use and limits it to designated roads and trails in The Rivers SRMA and in areas with fragile soils, reducing adverse impacts from erosion and sedimentation.

Recreation sites (e.g., campgrounds, day use areas) are developed as demand warrants under Alternative A. Campground and recreational facility development in riparian/wetland areas can degrade water quality by removing vegetation and increasing erosion and sedimentation. The increased angler access provided by recreation facilities near water courses can also directly impact fish habitat (e.g., trampling of banks and stream bottoms, accidental fuel/chemical spills). Alternative A provides for and emphasizes opportunities for recreational access to rivers and streams, potentially causing adverse impacts to fish habitat.

Forest management under Alternative A allows for the third highest degree of vegetative treatment, including clear cuts, precommercial thinning, woodland treatments in all woodland types, and prescribed fire, that could contribute to soil disturbance and sedimentation in streams and rivers in the short term. However, Alternative A uses treatments and timber harvests to improve forest health; most of these treatments may decrease the probability of stand replacing wildfires that can cause erosion and sedimentation, and therefore benefit fisheries in the long term.

Special Designations

Special designations under Alternative A that protect riparian habitat and water quality by restricting surface-disturbing activities include the Carter Mountain, Five Springs Falls, and Upper Owl Creek ACECs, in total encompassing 44 miles of fish-bearing streams (Table 4-22). Under this alternative, water impoundments, major diversions, or hydroelectric power facilities are prohibited on all WSR eligible waterway segments. These segments are closed to mineral materials disposal; however, many remain open to mineral leasing and the associated adverse impacts to water quality and quantity. This management in special designations would mostly result in beneficial impacts to fish habitat; however, there also may be an adverse impact because NWSRS management under Alternative A may limit native species restoration activities.

Resources

Alternative A uses treatments and timber harvests to improve forest health; most of these treatments may decrease the probability of stand replacing wildfires that can cause erosion and sedimentation, and result in beneficial impacts to fish habitat in the long term. Riparian/wetland areas are managed to meet or make progress towards meeting PFC under Alternative A, providing long-term benefits to water quality. The prohibition of surface-disturbing activities within 500 feet of riparian/wetland areas provides beneficial impacts to fish habitat by reducing sedimentation into streams and reducing stream bank degradation. Alternative A does not fence wetlands or riparian areas to meet resource objectives, leaving these areas vulnerable to potential impacts from other resource uses or activities and potential degradation of fish habitat.

Proactive Management

Direct beneficial impacts to fish as a result of proactive management under Alternative A result from encouraging reservoir design to establish minimum pools sufficient to maintain viable fisheries,

managing intermittent streams and restoring streams and fisheries habitat on a case-by-case basis, and managing fisheries habitat to improve and enhance its value (e.g., vegetation planting and installing sediment and erosion control structures).

Alternative B

Surface Disturbance

Impacts on fish habitat from surface disturbance would be similar to those described under Alternative A, although to a lesser degree due to decreased surface disturbance. Management under Alternative B would result in less surface disturbance over the short term (73,940 acres) and long term (10,893 acres) resulting in approximately 46 percent and 31 percent less erosion than Alternative A in the short and long term, respectively. Compared to Alternative A, fewer opportunities exist for surface-disturbing activities, including oil and gas and ROW development in areas that contain fishbearing streams (Table 4-22). More areas are designated as having NSO and CSU restrictions along perennial streams, riparian areas, and waterbodies under this alternative. Alternative B prohibits surface-disturbing activities and surface occupancy within ¼ mile of Blue Ribbon or Red Ribbon streams, providing the greatest beneficial impact to water quality and fish habitat compared to the other alternatives. Alternative B includes more restrictions on activities that remove vegetation and compact soils than Alternative A, which would result in less adverse impacts to fish habitat due to increased runoff.

Resource Uses

Minerals development under Alternative B would result in less adverse impacts to fish habitat from sedimentation and other potential impacts to water quality than Alternative A. This alternative closes more area to locatable minerals and oil and gas development containing fishbearing streams (80 and 122 miles, respectively). Alternative B prohibits new surface discharge of produced water, which would limit beneficial impacts to stream habitat, but also potential adverse impacts from altered flow regimes and water chemical properties.

With more areas closed or limited to designated roads and trails, and less area limited to existing roads and trails, Alternative B would result in more adverse impacts from motorized vehicle use to water quality, compared to Alternative A. Prohibiting off-road motorized vehicle use for big game retrieval in areas with limited travel designations would limit adverse impacts to fish from new trail and road proliferation that may impair water quality. Heavily eroded or washed out roads, if alternative routes exist, are closed and reclaimed and all channel crossings are photo point monitored, providing long-term beneficial impacts to water quality. Recreation sites (e.g., campgrounds, day use areas) are developed as demand warrants under Alternative B. However, opportunities for recreational access to some rivers and streams, such as the Laddie Creek and Paint Rock Creek areas, are expanded under this alternative, augmenting potential adverse impacts to fish habitat in these areas.

Forest management actions under Alternative B primarily utilize natural processes to meet forest health goals over commercial thinning or harvesting practices, prohibit clear cuts, and retain old growth forest areas over a 30-year period in HUC Level 4 sub-basins, unless altered by natural processes. Forest management under Alternative B may result in fewer acres of short-term adverse impacts to fish habitat due to sedimentation than Alternative A, but also may result in the greatest risk of wildfire that may degrade fish habitat.

Special Designations

Management in special designations under Alternative B would result in more beneficial impacts to fish habitat compared to Alternative A. Special designations that protect riparian habitat and water quality by restricting surface-disturbing activities include the expanded Carter Mountain, Five Springs Falls, and Upper Owl Creek ACECs, and the proposed Chapman Bench, Clarks Fork Canyon, Rattlesnake Mountain, and Sheep Mountain ACECs, including a total of 78 miles of fishbearing streams (Table 4-22). Under Alternative B, all WSR eligible waterway segments are recommended as suitable for inclusion in the NWSRS. These segments are withdrawn from locatable mineral entry, and closed to mineral leasing, geophysical exploration, and all surface-disturbing activities, providing greater protection for water quality and fish habitat for these segments, compared to Alternative A. However, there also may be an adverse impact because NWSRS management under Alternative B may limit native species restoration activities, similar to Alternative A.

Resources

The BLM manages riparian/wetland areas toward achieving DPC and stabilizes watershed improvement projects to prevent the release of stored sediment if projects no longer meet resource needs, providing greater long-term benefits to fish habitat compared to Alternative A.

Alternative B maintains natural flow regimes in streams supporting fish, providing greater beneficial impacts to water quantity compared to Alternative A. Fencing of wetlands and riparian areas reduces potential bank degradation and sedimentation from other activities and resources uses, resulting in greater indirect beneficial impacts to fish than Alternative A.

Proactive Management

Direct beneficial impacts to fish as a result of proactive management under Alternative B result from restoring important stream segments for fish habitat on 10 lotic miles and 80 lentic acres. Alternative B not only improves existing fish habitat on BLM-administered land, but implements management practices to acquire, develop, and maintain new water sources. Alternative B requires mitigation that includes minimum pool depths and adequate public access routes for new impoundment construction on BLM-administered land, and designs and retrofits culverts to allow fish passage. Overall, Alternative B includes more proactive management to protect and restore fish habitat than Alternative A.

Alternative C

Surface Disturbance

Impacts to fish habitat from surface disturbance would be similar to those described under Alternative A, although to a greater degree due to increased surface disturbance. Management under Alternative C would result in 245,642 acres of short-term surface disturbance and 41,485 acres of long-term surface disturbance (Table 4-1) resulting in 80 percent and 165 percent more erosion in the short and long term, respectively, than Alternative A. Alternative C provides less restriction on surface-disturbing activities and minerals development, potentially affecting more miles of fishbearing streams, and would cause the greatest impacts to water quality compared to the other alternatives.

Resource Uses

Alternative C may result in the greatest amount of change to surface water quantity because the BLM projects the most new federal wells (1,304) and fewer miles of fishbearing streams are in areas closed to minerals development (Table 4-22). Under this alternative, the BLM may not maintain natural flows but

encourages water development projects with adequate and required in-stream flow features to maintain and support fish habitat values. The BLM also uses produced water – in accordance with federal, state, and local laws and regulations – to enhance fish habitat.

With the least area closed (9,274 acres), and the most area open (14,830 acres) to motorized vehicle use, Alternative C is anticipated to result in the greatest adverse impacts from OHV use to water quality compared to the other alternatives. Allowing off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations would result in impacts similar to Alternative A. Allowing motorized vehicle use on existing roads and trails in The Rivers SRMA would cause greater adverse impacts to fish habitat in this area than the other alternatives. Stabilizing heavily eroded or washed out roads and trails would cause greater short-term surface disturbance and potential sedimentation than the other alternatives. The water quality impacts from recreational development under this alternative are similar to Alternative A. The BLM would not emphasize opportunities for recreational access to certain rivers and streams under this alternative, limiting potential adverse impacts to fish habitat from recreational use. The BLM manages livestock grazing to optimize commodity production while meeting rangeland health standards, not to provide for the enhancement of other resources, and allows the placement of salt, mineral, or forage supplements to maximize livestock use, regardless of proximity to riparian/wetland areas, resulting in the greatest potential impact to water quality under this alternative.

Forest management actions under Alternative C generally prioritize resource use over forest health, although Alternative C provides for retaining old growth forests, similar to Alternative B. Logging, timbering, salvage, and silviculture techniques are used to maintain a desirable forest condition that is determined primarily by commercial or economic objectives. Alternative C allows clear cuts up to 100 acres, which would result in greater adverse impacts to water quality than under alternatives A and B.

Special Designations

Spanish Point Karst (designated under all alternatives) is the only ACEC that benefits water quality by restricting surface-disturbing activities and pesticide application; the only other ACEC designated under Alternative C, Brown/Howe Dinosaur Area, is managed to mitigate surface-disturbing activities, but generally allows mineral development and other types of surface-disturbing activities. Under this alternative, none of the WSR eligible waterway segments are recommended as suitable for inclusion in the NWSRS; these areas would be released to other uses and no special management actions would be applied. Under Alternative C, special designations do not provide any substantial beneficial impact to surface water quality or fisheries habitat.

Resources

Riparian/wetland areas are managed to achieve PFC, similar to Alternative A; however, Alternative C emphasizes those areas functioning at-risk with a downward trend or in nonfunctioning condition. Alternative C would provide fewer benefits to fish habitat than Alternative B because watershed improvement projects would be stabilized on a case-by-case basis. In addition, Alternative C has the most potential to adversely impact fish habitat because it would allow surface-disturbing activities in riparian/wetland areas and flood plains on a case-by-case basis. Allowing these types of activities could cause bank degradation, sedimentation, and changes to water quality.

Encouraging water developments that enhance adequate in-stream flow would result in beneficial impacts to fish habitat under Alternative C; however, these impacts may be less than alternatives A and B. Fencing of springs and their associated wetlands reduces bank degradation and sedimentation in site-specific areas, resulting in indirect beneficial impacts to fish habitat in those areas and potentially

downstream of those areas. These beneficial impacts are anticipated to be less than alternatives B and D, but greater than Alternative A.

Proactive Management

The direct beneficial impacts to fish from proactive management under Alternative C are less than under the other alternatives. Restoration efforts of stream segments and fisheries habitat are the same as Alternative A. In general, Alternative C only manages to improve fish habitat or maintain viable fisheries in accordance with required law or policy, while some management actions under alternatives A and D and all management actions under Alternative B surpasses these requirements.

Alternative D

Surface Disturbance

Impacts to fish habitat from surface disturbance would be similar to those described under Alternative A. Alternative D is projected to result in slightly more short-term surface disturbance (Table 4-1) that is estimated to result in a 3 percent and 17 percent increase in erosion in the short and long term, respectively. However, reclamation practices under this alternative, as they are more stringent than those under Alternative A, may limit soil erosion to a greater degree resulting in fewer adverse impacts to fishbearing streams. Additionally, Alternative D provides more restrictions on surface-disturbing activities and minerals development that could affect fishbearing streams than Alternative A.

Resource Uses

Minerals development under Alternative D would result in similar adverse impacts to fish habitat as under Alternative A, but to a greater degree. Alternative D closes more area to oil and gas development that drains into fishbearing streams than Alternative A, but less area to locatable minerals development. Since a greater amount of surface disturbance is projected to result from locatable minerals development, Alternative D may result in greater adverse impacts to fish habitat from minerals development than Alternative A. Alternative D is anticipated to develop fewer new federal wells than alternatives A and C, but more than Alternative B with proportional adverse impacts to water quantity that may affect fish habitat.

Travel and transportation management under Alternative D would result in less adverse impacts than alternatives A and C, but more than Alternative B. Motorized vehicle use under Alternative D would result in less adverse impacts than Alternative A, because the BLM closes a similar amount of acreage to motorized vehicle use but limits 34 percent more area to designated roads and trails. More lands are open to cross-country motorized travel, but these areas are not in close proximity to fish habitat and would not result in direct adverse impacts. Restricting off-road motorized and mechanized travel for big game retrieval to within 300 feet of established roads provided there is no resource damage and no new routes are created would result in less adverse impacts to fish habitat than Alternative A. Potential adverse impacts from recreational access to fish habitat, such as the Paint Rock, Laddie, and Canyon Creeks and the North and South Forks of the Shoshone River would result in similar adverse impacts to alternatives A and B, but to a greater degree. Impacts to fish habitat from recreational development and livestock grazing management under Alternative D would be similar to those under Alternative A.

Forest management actions under Alternative D would result in impacts similar to Alternative A, except for allowing clear cuts up to 100 acres, which would result in adverse impacts similar to Alternative C.

Special Designations

Special designations under Alternative D would result in similar beneficial impacts as those under Alternative A, but to a greater degree from closing the Upper Owl Creek and Five Springs Falls ACECs to oil and gas leasing. Designating the Clarks Fork Canyon ACEC would result in beneficial impacts by protecting additional fish habitat under Alternative D. By not recommending any of the WSR eligible waterway segments as suitable for inclusion in the NWSRS, Alternative D would result in fewer beneficial impacts from fish habitat protection afforded by this special designation under alternatives A and B; however, Alternative D would result in fewer limitations to native species restoration activities.

Resources

Riparian/wetland resources management under Alternative D would result in similar beneficial impacts to those under Alternative A, but to a greater degree. More adverse impacts may result to fish habitat by encouraging the maintenance of natural flow regimes only in prioritized streams; however, developing watershed improvement practices similar to those under Alternative B plus applying BMPs in cooperation with stakeholders would result in greater beneficial impacts than under Alternative A. Fencing reservoirs and riparian areas would result in similar beneficial impacts as those under Alternative B. Surface-disturbance restrictions around surface waters and riparian/wetland areas would result in similar beneficial impacts to those under Alternative A.

Proactive Management

Direct beneficial impacts to fish as a result of proactive management under Alternative D would be similar to those under Alternative A, although to a greater extent. Avoiding surface-disturbing activities within ¼ mile of perennial surface waters, riparian/wetland areas, and WGFD-rated Blue Ribbon or Red Ribbon fisheries (trout streams of national or statewide importance) would likely result in greater beneficial impacts than alternatives A and C. Managing perennial streams to become fish habitat, restoring important stream segments for fisheries habitat on a priority basis, encouraging minimum pool management in existing reservoirs, and designing or retrofitting culverts to allow fish passage on a priority basis would result in beneficial impacts similar to, or greater than, those under Alternative A.

Alternative E

Surface Disturbance

Impacts on fish habitat from surface disturbance would be similar to Alternative B, although to a slightly lesser degree due to decreased surface disturbance. Management under Alternative E would result in less surface disturbance over the short term (71,829 acres) and long term (10,676 acres), resulting in approximately 32 percent and 31 percent less erosion than Alternative A, and 3 percent and 2 percent less erosion than Alternative B in the short and long term, respectively. Alternative E places the greatest restrictions on surface-disturbing activities, including mineral and ROW development in areas that contain fish-bearing streams (Table 4-22), and would therefore result in the least sediment-bearing runoff and the least adverse impacts to fish habitat, compared to the other alternatives.

Resource Uses

Resource uses under Alternative E would result in the least adverse impacts to fish habitat from sedimentation and other potential impacts to water quality. Impacts from resource uses would be similar to Alternative B, but less adverse due to closure of the proposed Greater Sage-Grouse Key Habitat Areas ACEC to locatable mineral entry, mineral materials disposal, renewable energy development, and ROW development. Surface disturbances would be limited to one disturbance per

640 acres and less than 3 percent of the greater sage-grouse Key Habitat Areas, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. These limitations on surface disturbance would reduce erosion rates and sedimentation to adjacent waterways.

Alternative E closes the most miles of fish-bearing streams to locatable mineral entry and ROW development (103 miles and 93 miles respectively). In areas where the proposed Greater Sage-Grouse Key Habitat Areas ACEC overlaps forest and woodland areas, adverse impacts resulting from forest management actions may be reduced due to the greater limitations on surface disturbance. In areas outside the proposed Greater Sage-Grouse Key Habitat Areas ACEC, management of resource uses and the resulting impacts would be consistent with Alternative B.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land within greater sage-grouse Key Habitat Areas that would be designated as an ACEC. Additional limitations on surface-disturbing activities associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC would reduce impacts to fish in comparison with Alternative B and would result in the most beneficial impacts to fish habitat compared to the other alternatives. ACECs designated under Alternative E would encompass 72 miles of fish-bearing streams. All other impacts to fish from special designations outside the Greater Sage-Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Resources

Riparian/wetland area management and watershed improvement practices under Alternative E are generally the same as Alternative B and would provide the same beneficial impacts to fish habitat as Alternative B. Alternative E would also manage the proposed Greater Sage-Grouse Key Habitat Areas ACEC to restore sagebrush steppe habitat using native plants, which may result in indirect beneficial impacts for adjacent fish habitats by reducing erosion in the watershed.

Proactive Management

Proactive management of fish habitat under Alternative E is generally the same as Alternative B, and beneficial impacts to fish would be the same as Alternative B.

Alternative F

Surface Disturbance

Adverse impacts to fish habitat from surface disturbance would be similar to but less than alternatives D and A. Management under Alternative F would result in less surface disturbance over the short term (137,064 acres) and long term (17,663 acres), resulting in approximately 2 percent less erosion than Alternative D in both the short and long terms. Management practices relating to surface disturbance would be the same as Alternative D, except within areas of the proposed Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). In this ACEC, the BLM manages the density of disturbance to not exceed an average of one disruptive activity location per 640 acres and cover less than 3 percent of the greater sage-grouse PHMAs, compared to a larger allowable disturbance of 5 percent in greater sage-grouse PHMAs (1,232,583 acres) under Alternative D.

Resource Uses

Resource uses under Alternative F would result in slightly less adverse impacts to fish habitat than Alternative D and similar adverse impacts as Alternative A, but to a greater degree. This alternative

closes a larger area of federal mineral estate to oil and gas leasing as Alternative D and also applies a NSO stipulation within 0.6 mile of occupied sage-grouse leks within greater sage-grouse PHMAs. However, Alternative F limits surface disturbances to one per 640 acres and 3 percent or less of the Wyoming Density and Disturbance Calculation Tool (DDCT) analysis area, compared to 5 percent under Alternative D, which would afford greater protection for fish habitat within the Greater Sage-Grouse PHMAs ACEC. As a result, Alternative F is anticipated to develop fewer new federal wells than alternatives A, C, and D, but more than alternatives B and E with proportional adverse impacts to water quantity that may affect fish habitat.

In the Greater Sage-Grouse PHMAs ACEC, the number of new roads from ROW development and user-pioneered roads would be greater under Alternative F than alternatives A, B, and E, but less than would occur under alternatives C and D. In areas where the proposed ACEC overlaps forest and woodland areas, adverse impacts resulting from forest management actions may be reduced due to the greater limitations on surface disturbance. Overall, Alternative F would result in less adverse impacts than alternatives A, C, and D, but more than alternatives B and E. Impacts to fish from resource uses outside the ACEC would be the same as Alternative D.

Special Designations

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. Under this alternative, special designations would encompass 69 miles of streams. The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative F would result in greater protection for fish habitat than alternatives A, C, and D, but fewer than under alternatives B and E.

Resources

Management for riparian/wetland areas and watershed improvement projects under Alternative F would be the same as Alternative D, and the benefits to fish habitat would be the same as Alternative D. Alternative F would also manage the proposed Greater Sage-Grouse PHMAs ACEC to restore sagebrush steppe habitat to predisturbance conditions using native plants. Restoration of these habitats may result in indirect beneficial impacts for adjacent fish habitats by reducing erosion in the watershed.

Proactive Management

Proactive management of fish habitat under Alternative F is generally the same as Alternative D, and beneficial impacts to fish would be the same as Alternative D.

4.4.6 Fish and Wildlife Resources – Wildlife

Adverse impacts to wildlife include removal, degradation, or fragmentation of wildlife habitats. Beneficial impacts include actions that conserve or improve habitats, such as big game crucial winter range or nest sites.

Direct impacts to wildlife would result from loss of habitats or from immediate loss of life. Wildlife can be directly disturbed by human activities (e.g., motorized vehicle use, recreation), potentially causing wildlife to abandon a nest site or home range. Disturbance during sensitive periods (i.e., winter, nesting) may adversely impact wildlife populations. The impact from disturbances may be short-term, where the population may be displaced or shift its activities, or long-term, where the population may permanently abandon its home range, threatening its viability. Habitat loss and fragmentation can

result from vegetation treatments, fire and fuels management, mineral exploration and development, construction and maintenance of roads and trails, and development of wind-energy facilities.

Indirect impacts to wildlife result from changing habitat characteristics or habitat quality that affect wildlife. Surface-disturbing activities and other actions that remove vegetation and disturb soil can alter habitat quality. Indirect impacts to wildlife also result from actions that alter habitats to make them unsuitable for future habitation by wildlife species.

4.4.6.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- The BLM, in cooperation with state and other federal wildlife agencies, is responsible for managing habitat (e.g., quality, suitability, usability), whereas state and federal wildlife management agencies (e.g., WGFD, USFWS) have primary authority for overseeing management of wildlife populations. Therefore, this analysis primarily relies on vegetation changes and loss of habitat use due to disruptive activities to estimate impacts to wildlife habitats.
- For each alternative, changes to vegetation types, either in quantity, quality, or increased fragmentation, are compared to baseline conditions. Adverse and beneficial impacts to vegetation types (i.e., wildlife habitats) are assumed to have a corresponding adverse or beneficial impact on wildlife species.
- Disturbance impacts to wildlife are evaluated by comparison to current management practices in the Planning Area; increased protection in time or space are beneficial, whereas reduced protection result in adverse impacts.
- Disturbance during sensitive periods adversely affects wildlife.
- Habitat fragmentation and associated declines in habitat quality have been identified as principal causes for declines in wildlife populations and distribution in a variety of habitat types and spatial scales (WGFD 2010b); therefore, this analysis assumes that habitat fragmentation through the creation of roads, fences, pipelines, and other disturbances would result in impacts to wildlife species proportional to the scale and type of fragmentation anticipated to occur.
- Prescribed fire, where historical fire regimes occurred, is a tool used to manage vegetative communities and generally results in short-term adverse impacts with long-term beneficial impacts to wildlife species and habitats, and in some cases to forage productivity and availability. Certain species and habitats; however, may experience long-term adverse impacts from prescribed fire (e.g., sagebrush obligate species from prescribed fire in sagebrush habitat [Beck et al. 2011]).
- Forest management actions replicating natural historical disturbance regimes and managing wildlife habitats instead of, or in addition to, managing forest products are anticipated to benefit wildlife habitats. In contrast to actions that would maximize saw log production by managing for more marketable tree species, forest management actions would be managing for a diversity of tree species with both structural and age diversity.
- In general, management actions aimed at benefitting specific wildlife species are likely to benefit other species that utilize similar habitat types, rely on the target species as a food source, or receive benefits through other interspecies interactions. Exceptions to this assumption are noted accordingly.

- Alternatives with a larger number of acres of wetlands developed or protected will exhibit a greater benefit to waterfowl and other riparian/wetland wildlife species when compared to alternatives with smaller acreage of wetlands developed or protected.
- Alternatives providing more protection of water sources beneficial to wildlife are anticipated to have the greatest benefit to wildlife.
- Surface disturbance generally causes adverse impacts to wildlife habitats. Lesser amounts of surface disturbance in wildlife habitats have a corresponding lesser adverse impact to wildlife compared to more surface disturbance. The extent of adverse impacts due to surface disturbance depends on the precipitation zone.
- Prohibiting surface disturbance or occupancy is more restrictive and provides more protection for wildlife than avoiding surface disturbance or occupancy.
- The more surface disturbance that occurs on steep slopes or on highly erosive soils, the greater the potential for adverse impacts to wildlife habitats. Adverse impacts from surface disturbance also increase in areas that receive less precipitation.
- The higher the road density and the frequency of use in the Planning Area, the greater the potential to degrade adjacent wildlife habitat quality in the Planning Area.
- The more area used by OHVs and the higher the density of motorized vehicle use, the greater adverse impacts are anticipated to wildlife habitats.
- The BLM utilizes the best available information, management and conservation plans, and other research and related directives, as appropriate, to guide wildlife habitat management on BLM-administered lands.
- The quality and quantity of seasonal ranges and migration corridors are generally considered to be the limiting factors on big game populations in the Planning Area. The ability of these areas to support populations is a factor in determining population levels.
- Natural variability in wildlife health, population levels, and habitat conditions would continue. Periods of mild or severe weather as well as outbreaks of wildlife disease or insects/diseases that impact habitat (e.g., bark beetle, blister rust, mistletoe, and bleeding rust) may impact wildlife population levels.
- Wildlife habitats being protected are generally in desired natural condition and those being managed are being managed toward a more desirable condition.
- Habitat vegetation that trends away from natural vegetation condition (due to increase in invasive species), similarly trends away from natural wildlife species composition.

4.4.6.2 Summary of Impacts by Alternative

The principal adverse impacts to wildlife result from surface disturbance related habitat loss and fragmentation; the principal beneficial impacts to wildlife result from management that restricts surface-disturbing activities in known or potential wildlife habitat and disruptive activities (e.g., motorized vehicle use, recreation) that can cause the abandonment of nest site or home ranges. Based on the actions and uses allowed, alternatives ranked in order of increasing potential adverse impacts and decreasing beneficial impacts to the wildlife categories presented in this section are E, B, F, D, A, and C. Alternatives B and E include the most management to minimize wildlife habitat loss and fragmentation, such as closing areas to oil and gas leasing, followed by F, D, A, and C. Alternative C allows the most surface disturbance and resulting habitat degradation and loss, followed by alternatives A, D, F, B, and E. With the exception of limiting wind-energy development and ROW authorizations to a

greater extent than Alternative A, Alternative C has the fewest measures with which to control habitat loss and fragmentation, followed by A, D, F, B, and E. Alternative E designates the most ACECs, and similar to Alternative B, manages all lands with wilderness characteristics to maintain their wilderness characteristics (476,349 acres), resulting in beneficial impacts to wildlife over a large area; Alternative F manages 49,396 acres of lands with wilderness characteristics to maintain their wilderness characteristics. Alternative C does not restrict surface-disturbing activities in most sensitive areas and has few actions to improve habitat quality. Alternatives E and B place the most restrictions on motorized vehicle use during crucial wildlife periods, followed by alternatives F, D, A, and C. Under alternatives B and E, restricting motorized vehicle use and surface-disturbing activities in the Absaroka Front Management Area provides the greatest beneficial impacts to wildlife species, especially big game and predators. Less restrictive management is applied to the Absaroka Front Management Area under the other alternatives; however, alternatives D and F apply a MLP within the Absaroka Front and Big Horn Front MLP analysis areas that places CSU and TLS stipulations on oil and gas-related surface disturbances. As a result, alternatives D and F would provide more protection for big game in these areas than under alternatives A and C. Under Alternative C, the area is managed consistent with other resource objectives, with the exception of limiting motorized vehicle use to designated roads and trails with seasonal limitations. The area is not managed as a Management Area under Alternative A. Alternatives E and F limit motor vehicle use to designated roads and trails within the proposed greater sage-grouse ACECs, which are comprised by Key and PHMAs, respectively.

The spread of invasive species adversely affects wildlife by displacing native vegetation and altering ecosystem function. Alternative E would slow the spread of invasive species the most because it is projected to involve the least amount of surface disturbance and has the most stringent reclamation requirements, followed by alternatives B, F, D, A, and C. Vegetation treatments under Alternative C would result in the greatest amount of short-term surface disturbance, but if habitat loss and displacement of wildlife is temporary, this alternative may result in the greatest long-term benefit to wildlife by restoring fire adapted habitat and reducing the risk of catastrophic wildfire, followed by Alternative D. Alternatives B and E would result in the least short-term disturbance to wildlife from prescribed fire and fuels treatment, but also would result in the greatest risk of large wildfires that would alter wildlife habitat, followed by alternatives A, F, D, and C.

Alternative E includes the most improvements to habitat quality, provides for more measures to restrict activities that can damage soils and habitats, reserves the most forage for big game on crucial winter range, and sets aside the most land for ACECs with emphasis to benefit wildlife resources followed by alternatives B, F, D, A, and C (Table 4-22). Alternative C has minimal guidance to protect or improve habitat quality, and no ACECs are designated to conserve wildlife habitat. Alternatives D and F would result in similar habitat improvement actions in riparian/wetland areas as Alternative C, but these alternatives place greater restrictions on surface-disturbing activities in these areas than alternatives A and C and apply an NSO restriction on all wetlands greater than 20 acres, limiting potential adverse impacts from long-term surface disturbance to a greater extent. In general, alternatives D and F have similar measures to protect and improve habitat quality in grassland and shrubland communities as under alternatives B and E; however, under alternatives D and F, fewer ACECs are designated that would beneficially affect wildlife such as big game (Table 4-22). Forest management under alternatives D and F would cause impacts similar to Alternative A, except that allowing larger clear cuts may result in habitat loss for some species that prefer closed canopies. Seasonal restrictions on surface-disturbing activities around active raptor nests would affect the most forested habitat under alternatives B and E, followed by alternatives A, D and F, and C. In addition, alternatives B and E provide year-round CSU stipulations to protect approximately 47,651 acres of forested habitat. Alternative E provides the most protection

from surface-disturbing activities for big game on crucial winter range, followed by alternatives B, F, D, A, and C (Table 4-22).

4.4.6.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Surface Disturbance

The precise location of surface disturbance in the Planning Area resulting from implementation of the alternatives cannot be determined. Surface disturbance would occur in a variety of vegetation types all used as wildlife habitat by wildlife. Therefore, the BLM projects that the extent of impacts to wildlife from surface disturbance would generally relate to the amount of surface disturbance in the Planning Area. These activities will be evaluated further during project-specific NEPA evaluations before project authorization. As acreages of surface disturbance and human activity levels increase, the quality and quantity of wildlife habitats would decrease. Long-term surface disturbance accounts for reclamation of some lands following short-term disturbance. Although reclamation restores habitats, thereby reducing long-term surface-disturbance acreage, the location of permanent facilities (e.g., roads, well pads, etc.) adjacent to reclaimed areas may reduce the utility of reclaimed habitats. For example, the higher the density of permanent facilities in an area, the more a habitat is fragmented and the more adverse impacts anticipated for wildlife. In addition, reclaimed areas are more vulnerable to establishment of invasive species and would not initially provide the same level of habitat function, forage, or cover that the original vegetation provided. The timing and type of reclamation is also anticipated to result in impacts to wildlife.

As discussed in Chapter 3, habitat fragmentation occurs when a contiguous habitat is intersected, divided, or segmented by surface disturbance. Fragmentation causes a reduction in usable ranges and the isolation of smaller, less mobile species; a loss of genetic integrity in species or populations; and an increase in abundance of habitat generalists characteristic of disturbed environments (i.e., competitors, predators, and parasites) (Harris 1984). As disturbance reduces the size of contiguous habitat patches, density dependency thresholds of suitable habitats for species may be met, which ultimately may decrease population size and increase disease frequency.

Resource Uses

The principle impacts to wildlife species (especially big game) from minerals development in the Planning Area would be the reduction in usable wildlife habitat and disruption of migration corridors that link seasonal ranges. In areas with continuous surface disturbance, the adverse impacts would be greater.

Impacts from locatable minerals development would include displacement of wildlife from developed areas and avoidance of a larger area around the development because of human presence and noise. Increased bentonite mining, and potentially gypsum mining, along with difficulty in shrub reclamation in the 5- to 9-inch precipitation zone would result in a reduction of sagebrush habitat across all alternatives. Salable minerals extraction would result in short-term, direct impacts to wildlife and associated habitat. Impacts would include displacement and disturbance of animals, removal of vegetation, and loss of habitat. The level of impacts would depend on the size of the salable minerals area and the importance of the altered habitat to wildlife.

Oil and gas development would result in adverse impacts to wildlife habitat. As the number of wells, roads, and facilities increase, habitats in and near well fields may degrade due to invasive species spread

and fragmentation. Due to prolonged reclamation time, oil and gas development in the 5- to 9-inch precipitation zone may result in long-term impacts from habitat removal and fragmentation. Animals that remain in the affected zones are subjected to increased physiological stress. This avoidance and stress response impairs habitat function by reducing the capability of wildlife to use the habitat effectively. In addition, physical or psychological barriers lead to fragmentation of habitats, further limiting the availability of suitable habitat. An area of intensive activity or construction becomes a barrier when animals cannot or will not cross it to access otherwise suitable habitat. These impacts are especially problematic when they occur within limiting habitat components such as crucial winter ranges and reproductive habitats (WGFD 2009b). Studies have shown that actions involving increased human presence have adversely impacted wildlife populations such as mule deer and elk (Freddy et al. 1986; Phillips and Alldredge 2000; Shively et al. 2005). In human-dominated landscapes, human factors have been shown to have a greater effect on elk behavior than natural predators or other environmental factors, including decreased feeding times associated with closer proximity to roads and the adoption of a more vigilant behavioral mode in response to road traffic volumes of at least one vehicle every two hours (Ciuti et al. 2012).

Many sand and gravel areas are associated with riverine and alluvial plains; their development would impact these areas. The vegetative communities associated with these areas would be affected by the extraction of salable minerals. Salable mineral extraction may lower the water table, resulting in the potential loss of cottonwood communities typically associated with these minerals. Nesting birds such as great blue herons, bald eagles, and habitat for numerous waterfowl and migratory birds, and big game during the winter, depend on these communities.

Due to the projected surface disturbance and difficulty in reclamation, especially in arid areas, invasive species would continue to spread under all alternatives. Management actions may prevent the reoccurrence and spread of invasive and noxious weeds to maintain the native vegetative species that provide wildlife forage and habitat. Certain species of noxious weeds are poisonous and potentially fatal to some wildlife species. Prevention and treatment of invasive species would maintain or improve plant community health, thereby benefitting wildlife. Surface disturbance, new road construction, off-road motorized vehicle use, and livestock and wildlife grazing contribute to the spread of invasive species.

Impacts on wildlife from land use authorizations (including ROWs) would depend on (1) the location of the authorizations, and (2) the success of reclamation and mitigation of disturbed lands. Impacts to wildlife habitat would vary with the specific type and location of the requested ROW. There would be short-term impacts from the construction of pipelines, buried fiber-optic lines, and other subsurface actions. However, proper reclamation would restore some level of habitat function in these areas. Depending on the locations of these actions and the long timeframes required for some disturbed sites to return to pre-disturbance vegetation cover, some impacts would be long-term. Aboveground ROW actions, such as communication sites, powerlines, and wind turbines would have long-term impacts. These types of permanent structures are particularly hazardous to avian wildlife because of the potential for collision or electrocution (Erickson et al. 2005).

Unless otherwise specified, motorized vehicle use is limited to existing roads and trails on BLM-administered land. Existing roads and trails may be maintained for continued access. CTTM plans address maintenance of roads, ways, and trails at a site-specific level. Limiting motorized travel to existing roads and trails would result in beneficial impacts to multiple wildlife species by enhancing and increasing security areas where roads are sparse or nonexistent.

Motorized vehicle use management that result in increased human presence would have a localized impact on wildlife. Impacts would include increased displacement of wildlife, increased stress during important time periods (e.g., winter, nesting), and degradation of habitats. Motorized vehicle use may

alter the seasonal use patterns of many wildlife species. The use of motorized over-snow travel on winter range may lead to wildlife disturbance, causing additional stress. New roads created from OHV use would result in disturbance to wildlife in areas that normally do not contain human presence and habitat degradation through vegetation loss. Vehicle-wildlife collisions may increase in areas of high wildlife use and high human activity. Closure and reclamation of unnecessary roads would reduce fragmentation and restore habitat integrity while reducing the potential for wildlife disturbance.

Recreational activities (e.g., hiking, biking, camping, hunting, sightseeing) that result in increased human presence would cause localized impacts to wildlife. These activities would result in increased human presence, which may cause habitat degradation or wildlife disturbance (e.g., dispersal or avoidance). Human disturbance of big game may result in increased energy costs for the alerted animal, either from stress (preparation for flight [i.e., locomotion]) or from flight itself. An animal that has fled or is displaced incurs additional costs through loss of food intake and potential displacement to lower quality habitat. The cumulative energy costs of frequent disturbances may affect survival or reproductive success, especially during seasonally sensitive periods (e.g., winter, breeding, nesting, and early brood-rearing). Phillips and Alldredge (2000) and Shively et al. (2005) demonstrated a 30 percent reduction in elk calf recruitment from an activity as benign as simulated recreational hiking imposed during the calving season. If recreational activities were perform on noncrucial habitats or during seasons when sensitive wildlife species are not present and in compliance with recreation management actions, impacts would be minimal.

Livestock and wild horse grazing may impact wildlife habitat due to competition for forage and habitat use and alteration. Intensive use along stock driveways can cause near-complete removal of vegetation and compaction of soils; and if unfettered, may no longer provide forage or shelter for wildlife. When improper grazing occurs during the late or post-growing season, residual vegetation that could be available on big game winter ranges may be removed. This may also affect the availability of nesting cover for some birds the following spring. Impacts to bird species can be widely varied and grazing may result in positive, negative, or no changes to different species (Bock et al. 1993, Derner et al. 2009). Certain grazing disturbances can enhance forage and habitat for wildlife and may result in increased palatability of forage (Anderson and Scherzinger 1975, Severson and Urness 1994).

Wyoming Guidelines for Livestock Grazing Management and other appropriate BMPs would enhance rangeland health, improve forage for livestock, and meet other multiple use objectives. Appropriate grazing management with an emphasis on *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N), especially in the 5- to 9-inch precipitation zone where rangeland health is sensitive to grazing timing and intensity, will be required in all cases and would be beneficial to wildlife species.

Special Designations

Special designations that conserve vegetation and restrict surface-disturbing and other activities that adversely impact special status wildlife species, such as mineral development, motorized vehicle use, and ROW development would result in beneficial impacts by preventing disruptive activities in sensitive habitats, and limiting habitat loss, fragmentation, and degradation. Under all alternatives, WSAs are managed for naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation according to BLM Manual 6330 (BLM 2012a), and loss or alteration of wildlife habitat would be minimized in these areas. WSAs would benefit wildlife and their habitats by restricting surface-disturbing and other disruptive activities and preserving wilderness characteristics. Conversely, managing WSAs requires the use of natural processes to the extent possible and generally does not allow surface-disturbing activities designed to benefit wildlife habitat, such as vegetation treatments;

WSAs may, therefore, result in adverse impacts to wildlife habitat that would benefit from such treatments. ACECs also benefit wildlife species by restricting surface-disturbing and other activities. The Spanish Point Karst ACEC, designated under all alternatives, is likely to result in beneficial impacts to special status bat species by restricting resource uses and activities that may impact roost habitat. Further analysis is provided in the discussions for each special designation according to the alternative.

Wildlife are likely to react to management and allowed uses by altering their behavior (e.g., changing migration routes or dispersal patterns). Restricting resource uses and activities in special designations and various management areas on BLM-administered land will have uncertain impacts to private lands from wildlife. Wildlife may leave private lands if BLM-administered lands provide more suitable habitat. However, if habitat protection on BLM-administered lands is sufficient to foster increases in wildlife populations, greater numbers may disperse to private lands.

Resources

All alternatives provide some degree of protection to streams, wells, springs, or other water sources by prohibiting or managing surface disturbance within varying distances from water sources. Those alternatives providing the greatest protection of water sources beneficial to wildlife species are anticipated to have the greatest benefit. Wildlife species that use water sources and riparian/wetland habitats in the Planning Area benefit from management actions common to all alternatives that promote the development and enhancement of water sources. The management of riparian/wetland areas to meet PFC and the *Wyoming Standards for Healthy Rangelands* (Appendix N) would improve habitat conditions for various wildlife species. Areas managed to higher standards (e.g., DPC), would result in additional benefits to wildlife.

Prescribed fire and wildfire would have both short-term and long-term impacts to wildlife. Short-term impacts include displacement from habitats, potential disturbance or loss of life for small game and ground nesting birds, and removal of vegetation and forage. The BLM generally conducts prescribed fires outside of the nesting season (depending on elevation, approximately April 15th through July 15th), which would limit direct impacts to nesting birds. Any fire would cause some loss of less-mobile wildlife and not able to avoid the path of the fire. Fire line construction, use of heavy equipment, and other fire suppression activities would damage or destroy vegetation and habitat for wildlife. Timely rehabilitation of these activities is important to maintaining the quality of wildlife habitats. If rehabilitation is not completed, fire suppression activities can cause erosion or the potential spread of invasive species, which results in long-term adverse impacts to wildlife habitat.

Over the long term, fire would generally improve habitat conditions for most wildlife species. Fire can improve the quality of wildlife habitat conditions by releasing soil nutrients, reducing fuel load, or setting back species such as trees that may be encroaching on other habitats such as grasslands and shrublands. Fire would reduce dense understory that has mixed values for various species of wildlife. In vegetative climax communities, fire would return the vegetative community to an earlier stage of succession, increasing forage and cover for a greater diversity of wildlife. Fire can remove excess dead and dying vegetation, reduce hiding cover for prey species and potential thermal cover in the winter months. However, post-fire log and limb fall would increase horizontal cover and may produce snags important for nesting birds in the long term. The extent of impacts to wildlife from fire depends on the extent of change in habitat structure and species composition the fire causes. Resident and migratory bird species would be directly affected by loss of habitat from wildland fires. The duration of habitat loss would depend on the types of vegetation removed and the fire severity.

Forest management practices would change the seral stage of the affected stands. Many forest management practices are designed to alter or set back the seral stage of the forest community. These

activities may increase wildlife species diversity and richness, depending on different species' habitat requirements. Properly mitigated commercial forest management may improve big game habitat in the long term by improving forest age class diversity and distribution, edge effect, and forage community diversity. Conversely, commercial forest management may take important habitat components (e.g., snags, dead and down components, and the largest trees) out of the ecosystem and result in adverse impacts to species that depend on these components. Amphibians, reptiles, and other smaller animals depend on these habitat components for survival, while species such as the snowshoe hare are generally harmed through precommercial thinning practices (USFS 2005b). Properly mitigated commercial forest management would result in beneficial impacts to wildlife species that depend on diverse forest seral stages; however, such treatments may also put stands in a stable state where the forest structure does not mimic natural conditions in untreated parcels. Impacts to wildlife from forest management depend on the type of stand – mostly adverse impacts occur in spruce and subalpine fir stands, while mostly beneficial impacts would occur in aspen, Douglas-fir, and ponderosa pine stands. Habitat loss and fragmentation would be long-term adverse impacts from forest management; displacement of animals, noise disturbance, and increased vehicle traffic would be short-term adverse impacts.

Under all alternatives, the BLM constrains wild horse population numbers to the initial appropriate management level in existing HMAs (Map 45), such that their existing effect to wildlife habitat and populations would be sustained at the current level. Maintaining horse populations at initial appropriate management levels can still result in adverse impacts to wildlife habitat and populations. Wild horses graze areas in the McCullough Peaks and Fifteenmile HMAs on a year-round basis, competing with wildlife directly for some forage species and access to water.

Management actions for cultural and paleontological resources would provide varying degrees of habitat protection by minimizing vegetation loss and erosion and by restricting surface-disturbing activities. If public interpretation facilities generate increased human presence during sensitive seasonal periods (e.g., breeding, nesting, or migration) wildlife could be disturbed.

Proactive Management

Wildlife habitat management would prevent or reduce impacts to wildlife species from surface-disturbing and other disruptive activities through implementing mitigation and BMPs, such as timing stipulations and designations of spatial buffers. These stipulations would provide some mitigation for loss of habitat function or habitat value for wildlife species.

Proactive management actions common to all alternatives that would benefit wildlife by conserving or improving habitat quality or reducing the likelihood of disturbance include prohibiting surface-disturbing and disruptive activities in the Bighorn River HMP/RAMP tracts and the BLM-administered tracts in Yellowtail Wildlife Habitat Management Area and applying an NSO restriction as appropriate; maintaining or improving important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of the *Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management* (Wyoming Interagency Vegetation Committee 2002) and the *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix H); and continuing to use the existing West Slope, Bighorn River, and Absaroka Front HMPs, which contain numerous management actions for wildlife habitat enhancement.

Alternative A

Surface Disturbance – Alternative A

Alternative A would result in 136,253 acres of short-term surface disturbance that may degrade wildlife habitat and 15,646 acres of long-term surface disturbance that may result in habitat loss (Table 4-1). Minerals development, fire and fuels management, and silviculture treatments are the largest sources of short-term disturbance, with minerals development being the largest source of long-term disturbance. Alternative A requires that all surface-disturbing activities are analyzed for suitability and impacts and that vegetation cover is reestablished in disturbed areas within 5 years of initial seeding. These management actions would increase the probability of successful reclamation so that disturbed areas can return to suitable habitat in the long term. Heavily eroded or washed out roads are stabilized on a case-by-case basis, but not closed or reclaimed to return to wildlife habitat. Overall, the projected surface disturbance under Alternative A would result in adverse impacts to wildlife habitats, while associated reclamation practices would help to mitigate these impacts.

Resource Uses – Alternative A

Minerals development would be the greatest contributor to habitat loss and fragmentation. Under Alternative A, 4,130,352 acres are available for locatable mineral entry, which would result in approximately 10,000 acres of long-term disturbance and habitat loss (Appendix T). Under Alternative A, the BLM places constraints on oil and gas leasing and expects the development of up to 1,184 new federal wells. The adverse impacts to wildlife from oil and gas development would be proportional to the actual number of new wells and the imposed constraints.

In general, land acquisition or disposal actions would be performed considering land tenure adjustment criteria with the goal that the exchange, acquisition, or disposal would increase the public benefits of BLM-administered resources, including wildlife resources. Any acquisition of nonfederal surface land that includes high value habitat may result in beneficial impacts to wildlife habitat by allowing for mitigation or restrictions for surface-disturbing and disruptive activities to maintain or enhance the habitat under BLM management. Any disposal of BLM-administered land that contains high value habitat would typically be avoided as this may result in adverse impacts by increasing the potential for development without any required mitigation under BLM authority, and increased human presence would increase disturbance to wildlife utilizing the area. All land tenure actions would be analyzed on a site-specific basis, using a public process, to determine public interest before making a decision. Consolidating land ownership through land tenure adjustments would increase the manageability of lands and result in more contiguous blocks of habitat, which would result in beneficial impacts to wildlife. Under Alternative A, 115,905 acres are identified for disposal by sale, exchange, or other methods, with exchange being the preferred method.

Routing linear ROWs (e.g., pipelines, powerlines, roads) where impacts would be least disturbing would help to minimize fragmentation of sensitive habitats. Routing decisions would be determined with site-specific NEPA analyses before making decisions, and where possible, new utilities would be placed in existing ROW corridors. However, habitat fragmentation would still occur as more ROWs are sited and developed or as an existing ROW corridor is expanded. Under Alternative A, the BLM manages 61,147 acres as ROW exclusion areas, which occur in big game crucial winter range, and greater sage-grouse Key Habitat Areas (Table 4-22), limiting adverse impacts to sensitive wildlife habitat.

Allowing wind-energy development throughout the Planning Area would create collision hazards for bats, greater sage-grouse, and other avian species. Large wind-energy fields also result in surface disturbance, which would permanently change the habitat structure of the wildlife inhabitants. The

number of anticipated wind-energy developments is similar under all alternatives (Appendix T), with the location of wind-energy facilities likely to vary across alternatives. Alternative A considers the development of wind-energy facilities on a case-by-case basis consistent with the Wind Energy Programmatic EIS Record of Decision (ROD), which provides guidance to consider micrositing alternatives, but not broader habitat avoidance efforts, when assessing the impacts of proposed facilities. Based on the lack of general guidelines for siting wind-energy projects outside wildlife habitat or avian concentration areas that would be most affected by new turbines, wind-energy development may result in adverse impacts to wildlife under this alternative, though ROW management would limit these impacts.

Motorized vehicle use restrictions would limit the potential for the proliferation of unauthorized trails and related habitat degradation and wildlife disturbance. Limiting motorized vehicle use to designated roads and trails (797,077 acres) and closing areas to motorized vehicle use (68,115 acres) would help to protect wildlife from human-caused disturbances or to sustain habitat integrity and water quality by preventing vegetation loss or soil erosion and compaction. Permitting off-road motorized vehicle use for big game retrieval and access to dispersed campsites in areas with limited travel designations would increase the likelihood of wildlife disturbance and trail proliferation that may degrade and fragment habitat. Overall, motorized vehicle use with restrictions under Alternative A would result in adverse impacts to wildlife.

Recreational facilities may disturb habitat during construction and lead to increased human presence that can cause avoidance behavior in wildlife and subsequent displacement. Under Alternative A, the BLM develops or upgrades recreation sites (i.e., camping sites, interpretive educational areas, day use areas) and the associated amenities and facilities if demand warrants and enhances opportunities for primitive recreation. Alternative A would result in 350 acres of surface disturbance from recreational site development; the increase in human presence and impact to wildlife would be proportional to the amount of surface disturbance.

Managing livestock grazing systems to limit forage competition between livestock and wildlife for forbs, shrubs, and other desirable plants would aid in wildlife survival at crucial times of the year. Limiting forage competition would be particularly important in the spring, when enhanced nutrition is essential following the demands on body reserves during the winter, and the fall, when high nutrient forage is more limited and animals are trying to build fat reserves (Vavra 1992). Livestock grazing can also affect residual grass cover for bird nests and forb diversity to benefit fledglings. Under Alternative A, the BLM manages livestock grazing to provide for protection or enhancement of other resource values and closes several areas, such as the Bighorn River tracts, to grazing. Alternative A prohibits the placement of forage supplements within ¼ mile of water or riparian/wetland habitats to limit potential adverse impacts from concentrated livestock grazing.

Special Designations – Alternative A

A detailed description of the beneficial impacts to wildlife from special designations, where most applicable, is included below. Special designations under Alternative A that would directly benefit wildlife species by conserving habitat include the Carter Mountain and Upper Owl Creek ACECs. ACECs designated under this alternative encompass 35,681 acres of big game crucial winter range (Table 4-22). Managing WSR eligible waterway segments to protect their free-flowing conditions and outstandingly remarkable values (ORVs) would beneficially impact riparian habitat for various wildlife species.

Resources – Alternative A

Under Alternative A, the BLM utilizes wildland fire to restore fire-adapted ecosystems and to reduce hazardous fuels. Alternative A would result in approximately 70,000 acres of surface disturbance from prescribed fire and mechanical fuels treatment (Appendix T). These management actions would cause short-term adverse impacts to wildlife through temporary habitat loss and disturbance, but rapid recovery of forage and enhanced palatability would benefit wildlife even in the first few years post fire. A greater long-term benefit from preventing catastrophic fire that may lead to extensive habitat loss would outweigh the short-term impacts. Alternative A would result in long-term beneficial impacts to wildlife from fire and fuels management.

Forest management actions may impact feeding, breeding, and sheltering of raptors and other forest-dependent species. Habitat fragmentation and degradation, increased human presence, and habitat access by competitor species that normally cannot use these areas may all impact these species, depending on whether the action is a harvest or thinning, where the access roads are constructed, the type of equipment used, and the rate of habitat rehabilitation. Under Alternative A, the BLM performs commercial forest management in a manner that protects and benefits, watershed, wildlife, and riparian/wetland habitat values with forest health as a primary concern. Properly mitigated commercial forest management would benefit wildlife by diversifying forest seral stages. The BLM restricts clear cuts to no more than 900 feet in any direction in important seasonal wildlife habitat and closes timber access roads on a case-by-case basis. Forest management under Alternative A would result in adverse impacts to wildlife that depends on old growth trees, snags, and downed trees, but also long-term beneficial impacts by reducing hazardous fuels, diversifying stands, and closing certain timber access roads, which ultimately improves habitat for wildlife.

Vegetation treatments may disturb wildlife and result in displacement in the short term, but in the long term, these treatments would benefit wildlife by improving habitat and controlling the spread of invasive species. Under Alternative A, the BLM manages at least 600,000 acres toward DPC objectives that would benefit wildlife and treats 2,000 acres to remove or control the spread of invasive species. The amount of invasive species spread, where seeds or plants are present, would be proportional with the total amount of surface disturbance. Alternative A requires livestock flushing on a case-by-case basis, which may decrease the potential spread of invasive species, especially in grasslands and shrublands.

The BLM manages riparian/wetland areas to meet PFC under all alternatives including Alternative A. Although wildlife habitat would be improved with this management action, because the PFC assessment methodology does not incorporate the habitat requirements of wildlife, additional management would be necessary to ensure that habitats provide conditions suitable to meet the life history requirements of various wildlife species. Alternative A prohibits surface-disturbing activities within 500 feet of water and riparian/wetland areas, which would benefit wildlife by conserving vegetation and valuable habitat for multiple species.

Proactive Management – Alternative A

Proactive management measures that would benefit wildlife are described in detail below. Proactive management actions implemented on a case-by-case basis under Alternative A include determining wildlife seasonal protections for surface-disturbing and disruptive activities related to the maintenance and operation (including production) of developed projects, addressing traditional migration and travel corridors, and determining the appropriate DPC to manage vegetation in crucial winter range. Beneficial impacts to wildlife would result from these actions under Alternative A.

Big Game – Alternative A

As identified in Chapter 3, big game in the Planning Area face certain challenges such as poor habitat conditions, habitat fragmentation, disease, increased development and urbanization, hunter access, and impacts to key forage species from livestock and wild horse grazing. Big game crucial winter range is more sensitive to forest management, road construction, and vegetative change than other seasonal habitats. Since crucial winter range is considered the "limiting factor" to these big game populations, modifications to habitat suitability can impact species survivability and viability (e.g., higher winter mortality, reduced reproductive success), ultimately leading to reductions in population size. This impact would be intensified in areas where crucial winter range is in degraded or poor condition.

Alternative A would result in 27,356 acres of surface disturbance due to minerals development and new road construction, which would result in correlated adverse impacts to big game, relative to the other alternatives. Although Alternative A applies a TLS stipulation to avoid surface-disturbing activities in big game crucial winter range, disturbance is allowed in these areas. Big game have exhibited sensitivity to human activity and disturbance. Mule deer exhibit a stress response to disturbances associated with noise and activity up to 0.29 mile from the source (Freddy et al. 1986). Allowing surface disturbance, including wind-energy development, in big game crucial winter range is likely to disturb and displace species such as mule deer in the short term. The WGFD estimates there would be adverse impacts to pronghorn from oil and gas development on at least 170 acres surrounding each well pad (WGFD 2009b). The greater mobility and adaptability of these species to human activity and disturbed areas would prevent long-term population impacts. However, it is feasible that big game behavior or populations may be altered in the long term at some level of development. Alternative A withdraws approximately 3 percent of big game crucial winter range to locatable mineral entry and closes 6 percent of big game crucial winter range to oil and gas development (Table 4-22), limiting adverse impacts in these areas. Alternative A also closes a small portion of big game crucial winter range to livestock grazing (Table 4-22), increasing forage availability in these areas.

Alternative A does not restrict motorized vehicle use to designated roads and trails in big game crucial winter range, which may adversely affect big game by increasing human access and the probability of disturbance. The use of all-terrain vehicles in elk habitat has been shown to exceed any other human land-use type in triggering increased vigilance in elk (Ciuti et al. 2012). Opening areas to over-snow travel on a case-by-case basis is likely to benefit big game by restricting access to areas of big game crucial winter range. As a result of other resource concerns, 24,921 acres and 28,153 acres of big game crucial winter range are managed as closed or seasonally restricted for motorized travel respectively. In these areas, the probability of vehicle caused disturbance would be lower.

Special designations would result in beneficial impacts to big game where they overlap big game habitat (Table 4-22) and restrict resource uses and activities that degrade big game habitat or can potentially disturb big game (e.g., oil and gas development and motorized vehicle use). Alternative A designates the Carter Mountain and Upper Owl Creek ACECs, which contain big game habitat and restrict motorized vehicle use and minerals development.

Proactive management actions under Alternative A result in multiple beneficial impacts to big game by conserving habitat values from potential impacts from oil and gas development (Freddy et al. 1986, WGFD 2009b) and potential forage competition from livestock (Vavra 1992). Alternative A applies a TLS to avoid surface-disturbing and disruptive activities in big game crucial winter range (1,324,371 acres) from November 15 through April 30 and a CSU stipulation for big game migration corridors, narrow ridges, overlapping big game crucial winter range. Alternative A prohibits the following actions unless adverse impacts can be avoided or mitigated: domestic sheep grazing on pronghorn crucial winter

range, and water development for livestock in elk crucial winter range. The BLM restores 25 to 200 acres of aspen stands per year until 2,000 to 4,000 acres are under management under Alternative A, which would especially benefit moose and deer that prefer woody vegetation as forage.

Trophy Game – Alternative A

Black bears are most affected by management actions in forest and woodland habitats, which generally are not focused on providing habitat for this species. Management actions under Alternative A that would minimize adverse impacts to this species by conserving habitat values include forest management in a manner that protects and benefits watershed, wildlife, and riparian/wetland habitat values and restricting clear cuts to no more than 300 yards in any direction in important seasonal wildlife habitats.

As cougars are typically found in remote, rugged areas, motorized vehicle use restrictions in WSAs under this alternative would minimize potential adverse impacts to this species (USGS 2007). Although no specific management actions for cougars are identified, cougars would experience impacts similar to mule deer, as cougars generally utilize similar habitats as mule deer—their primary prey.

Furbearing Animals – Alternative A

No specific management actions for furbearing animals exist, but other management actions would affect these species. Badger, bobcat, and weasel are habitat generalists and actions in a variety of habitats would affect these mammals. Impacts to various vegetation types can be found throughout this section. Because there would be as adverse and beneficial impacts to these vegetation types, these wildlife species would experience similar adverse and beneficial impacts.

Under Alternative A, no specific management actions aimed at maintaining old growth forests and woodlands exist to promote habitat for furbearing animals such as the American marten and weasel, although any activities proposed are addressed at the site-specific level before harvest decisions. Alternative A does restore 25 to 200 acres of aspen stands per year, which would benefit the American marten.

Several furbearing species (i.e., beaver, mink, and muskrat) are most affected by management actions that impact riparian/wetland habitat or water availability. Impacts to these species are similar to the impacts discussed below in the *Nongame (Migratory Birds)* section for species that use riparian/wetland habitat. The BLM manages riparian/wetland areas to meet PFC or to make progress toward meeting PFC under all alternatives including Alternative A, which would improve habitat suitability for wildlife.

Predatory Animals – Alternative A

The BLM does not perform any specific habitat management activities for predatory animals. Regardless, predatory animals will be affected by BLM management actions for wildlife habitats. These animals are largely habitat generalists and actions in a variety of habitat types would affect these animals. Impacts to various vegetation types can be found throughout this section. Some predatory animals (i.e., coyote and red fox) are highly mobile and would be affected by management actions pertaining to motorized vehicle use and projected new road development (USGS 2007) (Appendix T). In addition, predatory animals are vulnerable to motorized vehicle disturbance and collisions.

Small Game – Alternative A

There are no specific management actions for small game under Alternative A, but other biological resources management actions would affect these species. Habitat fragmentation is an issue for small game populations because they tend to be especially disadvantaged by isolation (Temple 1985). Projected surface disturbance from minerals development and new road construction, second highest

under Alternative A (Appendix T), would fragment small game habitat. Cottontail rabbits are habitat generalists and a variety of actions in all habitat types would affect rabbits. Snowshoe hare and red squirrel inhabit forests and woodlands. Allowing precommercial thinning in overstocked areas and regenerated timber sale areas under Alternative A may cause adverse impacts to snowshoe hares (USFS 2005b). Conversely, performing woodland treatments in aspen stands and regenerating 2,000 to 4,000 acres of aspen stands would benefit snowshoe hare by improving or creating more habitat. The northern flying squirrel occurs most commonly in riparian forests. The *Nongame (Migratory Birds)* section describes impacts to these habitats.

Game Birds – Alternative A

The BLM identifies modifying livestock grazing management, prescribed burning, installing water developments, and building roost structures (i.e., structures that provide protection from predators) as methods for improving habitats for upland game birds (BLM 1992b). Under Alternative A, there are no specific management actions for game birds that utilize grassland. Actions in grassland habitats, such as surface-disturbing activities, reclamation, invasive species control, and livestock and wildlife grazing, would affect these species. Adverse impact to game birds in grasslands under Alternative A would be proportional to overall surface disturbance (Table 4-1). Management actions in their preferred vegetation types would affect other game birds. Pheasants generally prefer habitat associated with riparian areas along river and stream corridors. Actions in forested areas and grass or sagebrush habitats would affect ruffed grouse and blue grouse. Actions in river bottoms, pine forests, and foothills habitats would affect wild turkeys. *Nongame (Migratory Birds)* describes impacts to these habitats.

Waterfowl – Alternative A

Although there are no specific management actions for waterfowl, other biological resource management actions, particularly those pertaining to water and riparian/wetland habitats would affect these species. The BLM manages riparian/wetland areas to meet PFC or to make progress toward meeting PFC under all alternatives, but does not consider wildlife life history requirements when managing vegetation. As a result of livestock grazing management practices and existing wild horse numbers in HMAs, some riparian zones on public land adjacent to streams, small reservoirs, and ponds have been trampled. Alternative A closes Bighorn River tracts to livestock grazing and prohibits forage supplements within ¼ mile of water or riparian/wetland areas, which would minimize adverse impacts to waterfowl habitat from livestock grazing in these areas. The BLM can use produced water to develop and enhance waterfowl habitats under Alternative A, which would benefit these species.

Nongame (Raptors) – Alternative A

The BLM identifies declining habitat quantity and quality as the major causes of decreases in raptor populations (BLM 1992c). Buffer zones around active nests minimize disturbance impacts to raptors in the Planning Area. Under Alternative A, the BLM applies a TLS to prohibit any activity or surface-disturbing activity within ¾ mile of raptor nests from February 1 through July 31; ultimately protecting 337,662 acres surrounding raptor nests. Protective buffers help to minimize, but cannot completely prevent, impacts to raptors because most species are mobile beyond these buffers. The impact from habitat degradation and loss would be proportional to surface disturbance (Appendix T).

Wind-energy facilities can be a source of mortality for raptors because raptors can collide with wind tower blades. High mortality may result if wind towers are placed along a migration path or in nesting areas. Wind-energy facilities also result in habitat loss and human disturbance through construction and maintenance of wind towers and associated facilities. Alternative A manages the location of wind-energy facilities throughout the Planning Area on a case-by-case basis.

Nongame (Migratory Birds) – Alternative A

The BLM (BLM 1992c) states that viable nongame bird populations and biological diversity can be promoted by improving livestock management, prescribed burning, removal of invasive species, seeding, and erosion control. These actions are managed under Alternative A; however, prescribed burning is limited and the spread of invasive species is expected to continue under all alternatives, including Alternative A.

Wind-energy facilities may adversely affect all migratory birds, as discussed for nongame raptors. Wind-energy facilities, and other linear features (e.g., roads, utility corridors), fragment habitat. Fragmentation creates habitat edges, where studies have indicated that the success of nongame bird nests decline (Paton 1994). Livestock grazing management can affect nongame bird habitat. Inadequate livestock grazing management results in adverse impacts to riparian/wetland habitat (Belsky et al. 1999), adversely affecting nongame birds in these areas (Taylor 1986). Likewise, heavy grazing reduces nongame bird species richness in grassland and shrubland habitat (BLM 1978). However, light to moderate intensity livestock grazing can increase plant species diversity (Manier and Hobbs 2007), which may beneficially impact nongame birds in grassland and shrubland communities.

Because of the diversity of bird species and habitat requirements, the descriptions of impacts are categorized under the following habitat guilds listed below: Forest and Woodland Species, Mountain Shrub Species, Sagebrush and Desert Shrub Species, Grassland Species, and Riparian/wetland Species.

Forest and Woodland Species – Alternative A requires forest management in a manner that protects and benefits watershed, wildlife, and riparian/wetland habitat values. Refer to Section 4.4.1 *Vegetation – Forests, Woodlands, and Forest Products* and Table 4-21 for a description of management actions and BLM-authorized activities that would impact forests or woodlands and would similarly affect migratory bird habitat in these areas. Allowing clear cuts up to a 900-foot radius would adversely impact migratory bird species that prefer closed canopies by reducing potential nest sites and fragmenting habitat; however, other species preferring open canopies or forest edges would benefit. The creation of early successional habitat, as a result of clear cuts or wildland fire, can result in replacement of a mature forest bird community with a young forest bird community (Thompson III et al. 1993). There is evidence that the juxtaposition of different aged stands, which creates increased amounts of edge in a forest, may have an adverse impact by reducing the reproductive success of migratory birds (Thompson III et al. 1993). Alternative A allows harvest of some old-growth forests and allows salvage of dead stands with appropriate levels of snag retention to benefit wildlife following site-specific review under NEPA. Overall, forest management practices under Alternative A would result in long-term beneficial impacts to migratory birds in forest and woodland habitats that would outweigh the short-term adverse impacts.

Mountain Shrub Species – Under Alternative A, the BLM manages mountain shrub communities toward DPC objectives that emphasize watershed protection, and livestock grazing. This management action would improve habitat conditions for migratory birds that depend on mountain shrub habitats in these areas. Adverse impacts to mountain shrub communities would result from surface disturbance and invasive species spread, and would be proportional to projected surface disturbance.

Sagebrush and Desert Shrub Species – Species that utilize or depend on sagebrush habitats would generally benefit from management actions for greater sage-grouse, as discussed in Section 4.4.9 *Special Status Species – Wildlife*. Alternative A applies a CSU restriction for ¼ mile around occupied greater sage-grouse leks and a TLS for nesting or early brood-rearing habitats within 2 miles of occupied greater sage-grouse leks. Because the breeding season and habitat of greater sage-grouse and migratory birds tend to coincide, many species of migratory birds benefit from this restriction.

Under Alternative A, the BLM manages salt desert shrub and basin grassland/shrub communities toward DPC objectives to emphasize watershed protection and livestock grazing. Surface-disturbing activities may result in habitat loss and fragmentation and reduced habitat quality, especially in the 5- to 9-inch precipitation zone due to the difficulty of successful reclamation and the potential spread of invasive species. Refer to Section 4.4.1 *Vegetation – Grassland and Shrubland Communities* and Table 4-21 for a description of management actions and BLM-authorized activities that would impact shrubland communities and would similarly affect migratory birds habitat in these areas.

Grassland Species – These species would be affected by actions in grassland habitats, such as surface-disturbing activities, reclamation, invasive species control, and livestock and wildlife grazing. Under Alternative A, the BLM manages foothills-mountain grassland/shrub and basin grassland/shrub communities toward DPC objectives to emphasize watershed protection and livestock grazing. Livestock grazing practices, though managed in accordance with the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming*, may not create the vegetation heterogeneity necessary to increase habitat suitability for migratory birds (Derner et al. 2009). However, habitat quality would be maintained in these areas to benefit migratory birds that depend on these habitats. Refer to Section 4.4.2 *Vegetation – Grassland and Shrubland Communities* and Table 4-21 for a discussion of management actions and BLM-authorized activities that would impact grasslands and would similarly affect migratory bird habitat in these areas. Due to its projected long-term surface disturbance and reclamation requirements, Alternative A would result in habitat loss and degradation in grasslands.

Riparian/Wetland Species – There are no specific management actions for migratory birds that use riparian/wetland habitats. However, other biological resource management actions, particularly those pertaining to water and riparian/wetland habitats, such as surface disturbance restrictions, livestock grazing and riparian area management, and special designations would affect these species. Refer to Section 4.4.3 *Vegetation – Riparian/Wetland Resources* and Table 4-21 for a description of management actions and BLM-authorized activities that would impact wetlands and riparian areas and would similarly affect migratory bird habitat in these areas.

Nongame (Mammals) – Alternative A

Although there are no specific management actions for nongame mammals, other biological resource management actions would affect these species. Nongame mammals are found in a variety of habitats and are affected by management actions in the preferred vegetation type of each species. Impacts to the various vegetation types are described above for nongame migratory birds and are expected to similarly impact nongame mammals.

Although bats can utilize a variety of habitats, caves and abandoned mines are important features for most species. Bats that use caves for roosting, maternity colonies, or hibernation may be affected by recreational caving and surface-disturbing activities near caves, cliffs, or other rock features. Habitat alteration and modification, loss of roosting habitat, and toxic chemicals are threats to bat species in the Planning Area (Keinath 2004; Gruver and Keinath 2006; and Luce and Keinath 2007). Generally, the BLM manages natural caves to meet recreational demand while conserving cave resources and allows activity in abandoned mine land (AML) sites on a case-by-case basis under Alternative A. The Little Mountain ACEC designated under Alternative A would conserve important habitat used by bats, and the use of heavy equipment is restricted over important caves and cave passages in the Little Mountain ACEC to minimize disturbance. Pesticides (specifically insecticides) can result in direct bat mortality, adversely affect reproduction, and reduce the insect prey base (Keinath 2004; Gruver and Keinath 2006; and Luce and Keinath 2007). Aerial application of insecticides under Alternative A may result in direct and

indirect adverse impacts to bats as these species are at risk from poisoning by insecticides due to their diet, high metabolic rates, high rate of food intake, and high rate of fat mobilization.

There are 71,333 acres of identified "badlands/rock outcrop" on BLM-administered land in the Planning Area that may contain potential bat habitats. These areas include the Medicine Lodge and Trapper Creek WSAs, where motorized vehicle use is limited to designated roads and trails under Alternative A, reducing the potential for wildlife disturbance in these areas. No specific management actions for abandoned mines exist under Alternative A. Wind-energy development would affect bats similar to migratory birds. Overall, Alternative A would limit adverse impacts to bats by protecting cave resources and conserving potential bat habitat.

Nongame (Reptiles and Amphibians) – Alternative A

Implementing and/or stipulating appropriate management guidelines in *Habitat Management Guidelines for Amphibians and Reptiles of the Northwestern U.S. and Canada*, *PARC Technical Publication HMG-4* (Pilliod and Wind 2008), and similar future guidance for activities that may impact amphibian/reptile habitat will benefit amphibians and reptiles by preventing, minimizing, or mitigating adverse impacts to these species. Retaining riparian vegetation when removing sediment from reservoirs would also benefit amphibian and reptile species such as aquatic turtles and amphibians in these areas by preserving their habitat. Biological resource management actions in other habitats also would affect reptiles and amphibians. Snakes occur in a variety of habitat types, while lizards typically occur in the drier habitats, particularly those with rock outcrops and cliffs. Impacts of management actions to these habitat types are discussed throughout this section.

Alternative B

Surface Disturbance – Alternative B

Alternative B would result in approximately 73,940 acres of short-term surface disturbance that may degrade wildlife habitat and 10,893 acres of long-term surface disturbance that may result in habitat loss (Table 4-1). Minerals development, fire and fuels management, and silviculture treatments are the largest sources of short-term disturbance, with minerals development being the largest source of long-term disturbance. Alternative B requires that all surface-disturbing activities are analyzed by mapping soils to a series level, collecting soils samples for analysis, and evaluating erosion conditions. This alternative also requires reclamation plans before disturbance, topsoil salvage, and establishing 50 percent of pre-disturbance vegetative cover within three growing seasons and 80 percent pre-disturbance cover within 5 years of initial seeding. These management actions would result in a higher probability of successful reclamation, compared to Alternative A, so that disturbed areas can return to suitable wildlife habitat in the long term. Alternative B requires the stabilization of all heavily eroded or washed out roads, and closes and reclaims these routes if alternative roads and trails are available. Overall, the projected surface disturbance and associated reclamation practices under Alternative B would result in less short- and long-term adverse impacts to wildlife compared to Alternative A.

Resource Uses – Alternative B

Minerals development would be the greatest contributor to habitat loss and fragmentation. Alternative B makes fewer acres available for locatable mineral entry than Alternative A, and is projected to result in approximately 5,000 acres of long-term disturbance that would cause habitat loss (Appendix T). Alternative B also places more constraints on oil and gas leasing for which 502 new federal wells are projected. Alternative B would result in less adverse impacts to wildlife from minerals development, relative to Alternative A.

Impacts to wildlife habitat from lands and realty management actions would be similar to those described under Alternative A. Under Alternative B, there would be more emphasis on retaining and acquiring lands in the Absaroka Front and certain ACECs. All acquisitions would be from willing sellers, and while increased acres have been identified, there is no certainty of acquisitions.

Under Alternative B, the BLM would manage more land as ROW exclusion areas (225,447 acres) compared to Alternative A, including 105,158 acres of big game crucial winter range (Table 4-22). The ROW exclusion areas identified under this alternative would reduce powerline occurrences and lower the risk of raptor electrocution. Alternative B would result in a greater consolidation of ROWs that would cause less habitat fragmentation and would result in the least adverse impacts to wildlife, relative to Alternative A.

Under Alternative B, the BLM avoids locating wind-energy projects in big game crucial winter range. Alternative B provides more Planning Area-wide guidance for the location of wind-energy project development resulting in the least adverse impact to wildlife, compared to Alternative A.

CTTM designations would limit the potential for the proliferation of unauthorized trails and related habitat degradation and wildlife disturbance. Under Alternative B, the BLM closes more area (170,253 acres) to motorized vehicle use and restricts motorized vehicle use to designated roads and trails over more area (2,416,378 acres) than Alternative A. These restrictions would enhance the protection of wildlife from human-caused disturbances and sustain habitat integrity and water quality by preventing vegetation loss or soil erosion and compaction. Overall, motorized vehicle use with restrictions under Alternative B would result in less adverse impacts to wildlife, relative to Alternative A.

Under Alternative B, the BLM does not develop or upgrade recreation sites unless otherwise called for in an SRMA or RMZ. Alternative B would result in more surface disturbance from recreational site development than Alternative A (Appendix T); the increase in human presence and impact to wildlife would be proportional.

Under Alternative B, the Planning Area is open to livestock grazing where it does not conflict with other resource management objectives. Crucial winter range for elk and bighorn sheep—to prevent forage competition and possible displacement (Scolvin et al. 1968; Coe et al. 2004; Stewart et al. 2002)—and greater sage-grouse Key Habitat Areas are closed to livestock grazing and pronghorn crucial winter range is closed to new domestic sheep grazing. The BLM apportions additional sustained yield forage for wildlife, which would have greater beneficial impacts to wildlife, compared to Alternative A, by reducing the potential for competition with livestock (Vavra 1992 and Scolvin et al. 1968).

Special Designations – Alternative B

A detailed description of the beneficial impacts to wildlife from special designations is included below. Special designations under Alternative B that would directly benefit wildlife species by conserving habitat include the Carter Mountain and Upper Owl Creek ACECs and their expansions, the Little Mountain ACEC expansion, and the Chapman Bench, Clarks Fork Canyon, Rattlesnake Mountain, and Sheep Mountain ACECs. Additionally, the Absaroka Front Management Area would be managed to protect and enhance wildlife habitat under Alternative B. Managing WSR suitable waterway segments to protect their free-flowing conditions and ORVs would result in similar beneficial impacts as those under Alternative A, but to a greater degree as Alternative B applies greater protective measures around these segments to protect riparian habitat.

Resources – Alternative B

Under Alternative B, the BLM utilizes wildland fire and other vegetation treatments to restore fire-adapted ecosystems and to reduce hazardous fuels. Alternative B would result in approximately 25,000

acres of prescribed fire and mechanical fuels treatment (Appendix T). These management actions would cause fewer short-term adverse impacts to wildlife through temporary habitat loss and disturbance than Alternative A, but fewer long-term benefits because more area would remain in FRCC 2 and 3, more susceptible to catastrophic fire, and ultimately less fire adapted habitat would be restored. Based on the amount of vegetation treatment, Alternative B would result in less long-term beneficial impacts to wildlife from fire and fuels management than Alternative A, as in certain habitats fire is documented to improve the palatability of wildlife forage and provide age class diversity to habitats (BLM 2007f).

Under Alternative B, the BLM prohibits clear cuts and performs forest management only where natural processes are unable to accomplish forest health goals. Roads not required for other existing uses are closed, which would reduce human presence and the risk of unplanned ignitions in forestlands in the short term, and augment habitat and reduce habitat fragmentation in the long term. Forest management practices under Alternative B would result in less short-term adverse impact to wildlife from disturbance and displacement than Alternative A. Wildlife in spruce and subalpine fir stands would experience mostly beneficial impacts from prohibiting commercial forest management to let natural processes determine forest structure, while species in aspen, Douglas-fir, and ponderosa pine stands would mostly experience adverse impacts due to the lack of fuels reduction and stand diversification. Closing timber access roads would benefit wildlife species in all types of forest.

Under Alternative B, the BLM manages to achieve or make progress towards the reference state plant community based on ESDs, and manages large, contiguous blocks of land by maintaining or enhancing important plant communities. The amount of invasive species spread would be proportional to the total amount of surface disturbance (Table 4-1) in areas where invasive species seeds or plants are present. Alternative B would treat far less acreage to remove or control the spread of invasive species than Alternative A. Alternative B allows the authorized officer to require livestock flushing for 72 hours, which would reduce the potential for invasive species spread to a greater extent than Alternative A. The lesser extent of vegetation treatments under Alternative B would result in less short-term adverse impact to wildlife than Alternative A from disturbance, but less long-term beneficial impacts by enhancing habitat conditions and controlling the spread of invasive species.

The BLM manages all riparian/wetland areas to meet DPC under Alternative B. This management would ensure to the greatest extent, compared to the other alternatives, that riparian/wetland habitats provide conditions suitable to meet the life history requirements of various wildlife species. Alternative B prohibits surface-disturbing activities within ¼ mile of water and riparian/wetland areas and applies an NSO restriction on wetland areas greater than 40 acres, limiting habitat loss and fragmentation in these areas and benefiting wildlife that depend on these areas to a greater extent than under Alternative A.

Proactive Management – Alternative B

Proactive management actions under Alternative B include applying wildlife seasonal protections for surface-disturbing and disruptive activities related to the maintenance and operation (including production) of a developed project when the actions are determined to be detrimental, identifying and preserving traditional migration and travel corridors for big game and migratory birds, and managing vegetation in areas identified as habitat for special status species and big game crucial winter range to the most beneficial DPC while considering the habitat needs of other species. Based on their emphasis on implementation for both habitat protection and enhancement, proactive management actions under Alternative B would result in more beneficial impacts to wildlife, compared to Alternative A.

Big Game – Alternative B

Alternative B prohibits surface-disturbing activities and applies an NSO restriction in big game crucial winter range. The BLM avoids locating wind projects in big game crucial winter range. After Alternative E, Alternative B withdraws the greatest area in big game crucial winter range to locatable minerals and closes the largest area to oil and gas development (Table 4-22). Overall, restrictions on surface-disturbing activities and motorized vehicle use under Alternative B would result in the less adverse impacts to big game than Alternative A.

Alternative B places more restrictions on motorized vehicle use in comparison to Alternative A and prohibits over-snow vehicle use in big game crucial winter range. These actions would provide additional protection from human disturbance of wildlife compared to Alternative A. Under Alternative B, 54,273 acres and 606,233 acres of big game crucial winter range are managed as closed or seasonally restricted for motorized travel respectively. Special designations would result in beneficial impacts to big game where they overlap big game habitat and restrict resource uses that degrade big game habitat or may disturb big game (e.g., oil and gas development and motorized vehicle use).

Alternative B expands the Carter Mountain, Upper Owl Creek, and Little Mountain ACECs that contain important big game habitats, migration corridors, and bighorn sheep populations, and ACECs designated under Alternative B encompass more big game crucial winter habitat than Alternative A (Table 4-22). In addition to restrictions that exist under Alternative A, the Carter Mountain and Little Mountain expansion is closed to oil and gas leasing and withdrawn from locatable mineral entry. The Chapman Bench, Rattlesnake Mountain, and Sheep Mountain ACECs are also designated under Alternative B, which all contain important big game habitat and restrict motorized vehicle use and/or minerals development. Managing all lands with wilderness characteristics specifically to preserve their wilderness characteristics, and the associated restrictions on resource uses and activities, would benefit big game, as 188,101 acres of crucial winter range lie within these lands (Table 4-22).

Proactive management actions under Alternative B result in multiple, primarily beneficial impacts to big game by conserving habitat values from potential impacts due to oil and gas development, reducing competition from livestock, and minimizing human-caused wildlife disturbance. Alternative B prohibits surface-disturbing and disruptive activities in big game crucial winter range (1,324,371 acres) and closes the Absaroka Front Management Area to mineral leasing, geophysical exploration, and motorized vehicle use in certain areas. The BLM limits motorized vehicle use to designated roads and trails with seasonal closures in big game crucial winter range. Alternative B prohibits domestic sheep grazing on pronghorn crucial winter range, and livestock grazing on crucial winter range for elk and bighorn sheep (Table 4-22) to increase forage availability, reduce forage competition and prevent possible displacement of these wildlife populations (Scolvin et al. 1968; Coe et al. 2004; Stewart et al. 2002). Furthermore, prohibiting water developments for livestock in elk crucial winter range unless no adverse impacts to wildlife can be demonstrated reduces the probability of concentrated livestock areas that may compact soil, damage vegetation, and increase the chance of invasive species spread. Conversely, closing elk habitat to livestock grazing entirely removes this resource use as a potential management tool to improve habitat through enhancing forage palatability and may result in adverse impacts to elk in these areas (Frisina 1992; Anderson and Scherzinger 1975).

The BLM restores 100 acres of aspen stands per year over the life of the plan under Alternative B (for a total restoration similar to that of Alternative A), which would especially benefit moose and deer that use habitats with woody vegetation for forage. All of these actions protect habitat for big game and reduce habitat fragmentation and disruptive activities.

Due to the adverse impacts from projected surface disturbance and motorized vehicle use, and the beneficial impacts from proactive management actions and special designations under this alternative, Alternative B would result in less adverse impacts to big game, compared to Alternative A.

Trophy Game – Alternative B

Black bears are most affected by management actions in forest and woodland habitats. Management actions under Alternative B that minimize adverse impacts to this species by preserving habitat values include forest management, when natural processes cannot achieve forest health goals, and prohibiting clear cuts.

As cougars are typically found in remote, rugged areas, the motorized vehicle use restrictions in WSAs under Alternative B would minimize potential adverse impacts to this species the most in these areas, compared to Alternative A (USGS 2007). Under Alternative B, the BLM also manages all lands with wilderness characteristics specifically to preserve their wilderness characteristics, and restricts minerals development and motorized vehicle use in these areas. Alternative B would benefit cougars to a greater extent than Alternative A by reducing the potential of human disturbance in remote areas and providing more beneficial impacts to big game, including mule deer.

Furbearing Animals – Alternative B

Forest management actions under Alternative B maintain old growth forests and woodlands, which would benefit the American marten. Several furbearing mammal species (i.e., badger, beaver, mink, and muskrat) are most affected by management actions that impact riparian/wetland habitat or water availability. Impacts to these species are similar to those described below in the *Nongame (Migratory Birds)* section that use riparian/wetland habitat. Under Alternative B, the BLM manages all riparian/wetland areas to meet DPC, ensuring consideration of habitat requirements for wildlife. Alternative B would result in fewer new oil and gas wells than Alternative A, and therefore may result in less adverse impacts to furbearing mammal species from altering water availability.

Predatory Animals – Alternative B

Alternative B actions that would benefit different vegetative types in the Planning Area are anticipated to benefit habitat generalists, such as predatory animals. Motorized vehicle restrictions and projected new road development under Alternative B are expected to cause less adverse impacts to predatory animals such as the coyote and red fox than Alternative A.

Small Game – Alternative B

Alternative B actions benefiting forests, woodlands, riparian areas, and other habitat types would proportionally benefit the habitat generalist cottontail rabbit, and more habitat-specific species, such as the snowshoe hare and red squirrel. Preventing precommercial thinning except for fuels treatment would benefit snowshoe hare (USFS 2005b), as would regenerating aspen stands for wildlife values. Management actions to retain old growth forests in HUC Level 4 sub-basins would beneficially impact red squirrels by conserving their habitat.

Game Birds – Alternative B

Under Alternative B, management actions that enhance grassland and shrubland habitat, manage toward DPC in riparian/wetland areas, and control invasive species spread in shrub and grassland communities would provide greater benefits to greater sage-grouse, chukar, and gray partridge, compared to Alternative A. Alternative B actions benefiting forests, woodlands, riparian areas, and other habitat types would proportionately benefit other game birds, such as the ruffed grouse, blue

grouse, wild turkey, and pheasant that prefer these habitat types. Impacts to these habitats are discussed below under *Nongame (Migratory Birds)*. Late brood-rearing greater sage-grouse would benefit from alpine habitat conserved in the Carter Mountain and Owl Creek ACECs designated and expanded under Alternative B.

Waterfowl – Alternative B

Although there are no specific management actions for waterfowl, other biological resource management actions, particularly those pertaining to water and riparian/wetland habitats, would affect these species. Under Alternative B, the BLM would manage all riparian/wetland areas to meet DPC with consideration of habitat requirements for wildlife. Alternative B prohibits forage supplements within ½ mile of water or riparian/wetland areas, which would further minimize adverse impacts to these areas from livestock grazing, compared to Alternative A. Under Alternative B, the BLM would not use produced water to develop and enhance waterfowl habitats, resulting in less area of suitable habitat for waterfowl and less beneficial impact from produced water than under Alternative A. However, the risk of high water temperature or impaired water quality adversely affecting waterfowl would be less under Alternative B.

Nongame (Raptors) – Alternative B

Under Alternative B, the BLM applies a TLS to prohibit any activity or surface-disturbing activity within 1 mile of raptor nests from February 1 through July 31 or until young birds have fledged and a year-round CSU to protect the actual nest site from disturbance. The protective buffers around raptor nest sites under Alternative B (569,218 acres) are larger than under Alternative A and would minimize adverse impacts to raptors more than under that alternative. Avoiding locating wind-energy projects in raptor concentration areas would minimize the potential for collision mortality and displacement.

Nongame (Migratory Birds) – Alternative B

Alternative B management actions pertaining to minerals development and motorized vehicle use restrictions; wind-energy development; forest management; management of sagebrush, grassland, and riparian/wetland habitats toward DPC; invasive species control; and fire management would result in the greater beneficial impacts to nongame migratory birds, compared to Alternative A. Although the short-term impacts from prescribed fire and fuels treatments would be less under Alternative B, the increased risk of catastrophic fire that may completely destroy woodland and sagebrush habitat would be greater than under Alternative A.

Designated under Alternative B, the Chapman Bench, Rattlesnake Mountain, and Sheep Mountain ACECs conserve migratory bird nesting habitat.

Forest and Woodland Species – Alternative B closes more area in forests and woodlands to oil and gas development and withdraws more area from locatable mineral development than Alternative A (Table 4-21). This alternative prohibits clear cuts and performs forest management only when natural processes cannot achieve forest health goals. BLM actions for silviculture treatments, forest products, and fuels reduction under this alternative would result in less short-term disturbance than Alternative A, but also pose greater risk for catastrophic fire. Planting conifer areas exposed by wildfire if they do not regenerate naturally within 20 years would result in a longer time before habitat is restored, compared to the other alternatives, but retaining old-growth forests and requiring with appropriate levels of snag retention during salvage would benefit wildlife. Overall, forest management practices under Alternative B would result in less short-term impacts than Alternative A, but the long-term adverse impacts posed by the risk of wildfire would be greater.

Mountain Shrub Species – Under Alternative B, the BLM manages mountain shrub communities to achieve or make progress towards the reference state plant community based on ESDs—which would provide greater benefit to migratory birds, compared to Alternative A—by enhancing habitat in these areas. Designating the Rattlesnake Mountain and Sheep Mountain ACECs would conserve mountain shrub habitat from disturbance.

Sagebrush and Desert Shrub Species – Species that utilize or depend on sagebrush habitats would generally benefit from management actions for greater sage-grouse as discussed in Section 4.4.9 *Special Status Species – Wildlife*. Alternative B applies larger buffers around greater sage-grouse leks and in nesting or early brood-rearing habitats to conserve sagebrush habitat than Alternative A. Under Alternative B, the BLM manages salt desert shrub and basin grassland/shrub communities to achieve the reference state plant community, based on the ESD for the site. Alternative B would result in less surface disturbance that may result in habitat loss than Alternative A, especially in the 5- to 9-inch precipitation zone, and has more stringent requirements for reclamation, which would result in less impacts to migratory birds that depend on sagebrush and desert shrub habitats.

Grassland Species – Actions in grassland habitats, such as surface-disturbing activities, reclamation, invasive species control, and livestock and wildlife grazing would affect these species. Under Alternative B, the BLM would manage grasslands communities to achieve or make progress towards the reference state plant community, which would provide the greatest benefit, compared to the other alternatives, by enhancing habitat for migratory birds in these areas. However, closing crucial winter range for elk and bighorn sheep and greater sage-grouse Key Habitat Areas to livestock grazing would limit the use of livestock grazing as a tool where it may create vegetation heterogeneity that enhances habitat for grassland migratory birds (Derner et al. 2009). Refer to Section 4.4.2 *Vegetation – Grassland and Shrubland Communities* and Table 4-21 for a discussion of management actions and BLM-authorized activities that would impact grasslands and would similarly affect migratory bird habitat in these areas. Due to its projected long-term surface disturbance and reclamation requirements, Alternative B would result in less habitat loss and degradation in grasslands compared to Alternative A.

Riparian/Wetland Species – The restrictions on minerals development and other surface-disturbing activities in riparian/wetland areas and within WSR suitable waterway segments under Alternative B would result in similar beneficial impacts to those under Alternative A, but to a greater degree by further limiting degradation of riparian habitat. Refer to Section 4.4.3 *Vegetation – Riparian/Wetland Resources* and Table 4-21 for a description of management actions and BLM-authorized activities that would impact wetlands and riparian areas and would similarly affect migratory bird habitat in these areas. Based on these management practices, Alternative B would result in greater beneficial impacts to migratory birds that depend on riparian/wetland habitat than Alternative A.

Nongame (Mammals) – Alternative B

Although there are no specific management actions for nongame mammals, other biological resource management actions would affect these species. Nongame mammals are found in a variety of habitats and are affected by management actions in the preferred vegetation type of each species. Impacts to the various vegetation types are described above for nongame migratory birds and are expected to similarly impact nongame mammals.

Generally, the BLM places the greatest restrictions on surface-disturbing activities and motorized vehicle use to conserve cave resources under Alternative B. Activities are prohibited within ¼ mile of AMLs, which would reduce the opportunities for disturbances to bats in these areas. The BLM closes the Medicine Lodge and Trapper Creek WSAs to motorized vehicle use under Alternative B, minimizing human presence and the opportunities for wildlife disturbance in these areas. Little Mountain and

Clarks Fork Canyon ACECs designated under this alternative would protect bat habitat. Alternative B places more restrictions on the aerial applications of pesticides reducing potential adverse impacts to bat species relative to Alternative A. Wind-energy development would affect bats similar to migratory birds. Overall, Alternative B would result in greater beneficial impact to bats than Alternative A by protecting cave resources and conserving potential bat habitat.

Nongame (Reptiles and Amphibians) – Alternative B

The impacts to reptiles and amphibians under Alternative B would be similar to those under Alternative A, although to a lesser extent. Alternative B similarly applies management guidelines identified in *Habitat Management Guidelines for Amphibians and Reptiles of the Northwestern U.S. and Canada*, *PARC Technical Publication HMG-4* (Pilliod and Wind 2008). The adverse impact to these animals would be correlated with surface disturbance (Appendix T) and beneficial impacts would result from habitat conservation and enhancement measures described throughout this section. Alternative B applies a larger buffer around riparian/wetland areas to prohibit surface-disturbing activities, which would benefit amphibians and reptiles such as aquatic turtles in these habitats. Alternative B would result in less adverse impact to reptiles and amphibians than Alternative A.

Alternative C

Surface Disturbance – Alternative C

Alternative C would result in approximately 245,642 acres of short-term surface disturbance that may degrade wildlife habitat and 41,485 acres of long-term surface disturbance that may result in habitat loss and fragmentation (Table 4-1). Minerals development, fire and fuels management, and silviculture treatments are the largest sources of short-term disturbance, with minerals development also being the largest source of long-term disturbance. Alternative C requires that all surface-disturbing activities are analyzed by mapping, collecting, and evaluating soil on a case-by-case basis and that reclamation plans and topsoil salvage are performed on a case-by-case basis. The BLM requires 30 percent desired vegetative cover within three growing seasons, but does not specify a long-term vegetative cover requirement. These management actions would result in the least probability of successful reclamation, compared to the other alternatives, so that disturbed areas would be less likely to return to suitable habitat in the long term. Under this alternative, stabilization, but not closure or reclamation, is required for all heavily eroded or washed out roads. Overall, the projected surface disturbance and associated reclamation practices under Alternative C would result in the greatest short- and long-term adverse impact to wildlife.

Resource Uses – Alternative C

Minerals development would be the greatest contributor to habitat loss and fragmentation. Alternative C makes the most acres available for locatable mineral entry of any alternative, and is projected to result in approximately 20,000 acres of long-term disturbance that could contribute to habitat loss and fragmentation (Appendix T). Alternative C also places the least constraints on oil and gas leasing for which 1,304 new federal wells are projected. Alternative C would result in the greatest adverse impacts to wildlife from minerals development, relative to the other alternatives.

Impacts to wildlife habitat from lands and realty management actions under Alternative C would be similar to those described under Alternative A, however, more area is identified for disposal (including disposal with restrictions and disposal for specific uses) than under the other alternatives.

Under Alternative C, the BLM manages the least land as ROW exclusion areas (7,586 acres), including 936 acres in big game crucial winter range. Alternative C would result in the least consolidation of ROWs and the greatest habitat fragmentation. ROWs under Alternative C would result in the greatest adverse impact to wildlife, relative to the other alternatives.

Under Alternative C, the BLM allows wind-energy projects in big game crucial winter range, raptor concentration areas, and greater sage-grouse nesting, brood-rearing, and winter concentration areas on a case-by-case basis. Alternative C provides more Planning Area-wide guidance for wind-energy project locations and turbines than Alternative A, but allows for their construction in wildlife habitat that may be sensitive to impacts. Wind-energy development under Alternative C would result in the second-greatest impact to wildlife, compared to the other alternatives.

CTTM designations would limit the potential for the proliferation of unauthorized trails and related habitat degradation and wildlife disturbance. Under Alternative C, the BLM closes the least area (9,274 acres) and opens the most area (14,830 acres) to motorized vehicle use, which would result in the greatest potential for human-caused disturbances, vegetation loss, and soil erosion and compaction. Permitting off-road motorized vehicle use for big game retrieval and access to dispersed campsites would result in impacts similar to those under Alternative A. Overall, motorized travel designations under Alternative C would result in less adverse impact to wildlife than Alternative A, due to the larger area with seasonal restrictions.

Under Alternative C, the BLM develops or upgrades recreation sites (i.e., camping sites, interpretive educational areas, day use areas) and the associated amenities and facilities if demand warrants. Alternative C would result in the greatest amount of surface disturbance from recreational site development and OHV play areas; the increase in human presence and impacts to wildlife would be proportional.

Under Alternative C, the BLM closes a similar amount of acreage to livestock grazing as under Alternative A, but manages livestock grazing to optimize commodity production while meeting rangeland health standards. Alternative C allows the placement of forage supplements to maximize livestock use, regardless of habitat sensitivity to potential vegetation impacts. As cattle are more likely to concentrate around forage supplements (Bailey et al. 2001), their placement may increase the impact of livestock grazing on vegetation and soil in these areas that may impact wildlife. The potential for adverse impacts to wildlife from livestock grazing would be greatest under Alternative C.

Special Designations – Alternative C

As only two ACECs are designated under Alternative C (neither of which is proposed to protect wildlife values), this alternative would result in the smallest beneficial impact to wildlife habitat from special designations (Table 4-22). Alternative C does not recommend WSR eligible waterway segments as suitable for inclusion in the NWSRS and, therefore, would not protect riparian habitat in these areas to benefit wildlife as under alternatives A and B. Alternative C also places the least restrictions on motorized vehicle use in WSAs, which would result in the greatest potential for human disturbance of wildlife in these remote areas.

Resources – Alternative C

Under Alternative C, the BLM utilizes wildland fire and other vegetation treatments to restore fire-adapted ecosystems, to enhance forage for commodity production, and to reduce hazardous fuels. Alternative C would result in approximately 140,000 acres of surface disturbance from prescribed fire and mechanical fuels treatment (Appendix T). These management actions would cause the greatest short-term adverse impact to wildlife through temporary habitat loss, fragmentation, and disturbance,

compared to the other alternatives, but would potentially result in the greatest long-term benefit from preventing catastrophic fire and restoring fire adapted habitat. Alternative C would potentially result in the greatest long-term beneficial impact to wildlife from fire and fuels management if management practices consider wildlife habitat needs.

Under Alternative C, the BLM allows forest management in areas classified as commercial forestland without specific regard for wildlife habitat values and allows clear cuts up to 100 acres, which is a larger area than allowed under Alternative A. Not retaining appropriate numbers of snags in salvage operations would adversely impact amphibians, reptiles, birds, and other small animals that depend on snags and downed wood for habitat. Forest management under Alternative C would result in the potential for altered forest structure that does not mimic natural conditions, which would adversely impact wildlife. The BLM allows spur roads to remain open to meet other resource objectives or for new recreational purposes, which would result in short-term adverse impacts from increased human presence and the risk of unplanned ignitions in forestlands, and long-term adverse impacts from habitat loss and fragmentation. Forest management practices under Alternative C would result in the greatest short-term impact to wildlife from disturbance, displacement, and habitat loss. Alternative C may also result in the greatest long-term beneficial impact to species in aspen, Douglas-fir, and ponderosa pine stands by reducing hazardous fuels, if short-term impacts do not result in permanent habitat loss or displacement and forest structure is not substantially altered from natural conditions.

Under Alternative C, the BLM manages toward achieving the *Wyoming Standards for Healthy Rangelands* (Appendix N) and performs habitat enhancement vegetation treatments in sagebrush communities as opportunities and funding allow, consistent with Wyoming Governor's EO 2011-5. The amount of invasive species spread, where invasive seeds or plants are present, would be proportional with the total amount of surface disturbance (Appendix T), and limited by vegetation treatments to remove or control invasive species spread on 4,000 acres. The BLM does not require livestock flushing under Alternative C, which increases the likelihood of invasive species spread that would degrade wildlife habitat, especially in grasslands and shrublands. The greater projected vegetation treatments and prescribed fire under Alternative C would result in the greatest short-term impact to wildlife. Despite treatment measures, surface disturbance and the associated establishment of invasive species would degrade the most habitat and result in the greatest adverse impact to wildlife under Alternative C due to the projected surface disturbance. Long-term benefits to wildlife would be realized only if vegetation management practices consider wildlife habitat needs along with other resource objectives.

The BLM manages all riparian/wetland areas to meet PFC under Alternative C without considerations for wildlife life history requirements. Alternative C allows surface-disturbing activities in flood plains or riparian/wetland areas on a case-by-case basis, which would potentially result in the greatest adverse impact to wildlife species in these areas from habitat degradation or loss.

Proactive Management – Alternative C

Proactive management measures that would result in beneficial impacts to wildlife are described in detail below. Proactive management actions under Alternative C include identifying and developing management for traditional migration and travel corridors for big game and migratory birds and managing vegetation in areas identified as habitat for special status species, or crucial winter range, for big game to the DPC that benefits all grazing/browsing animals. Proactive management actions under Alternative C would result in the fewest beneficial impacts to wildlife, compared to the other alternatives.

Big Game – Alternative C

Alternative C exempts Oil and Gas Management Areas (260,460 BLM-administered surface acres) and ROW corridors (133,184 acres) from discretionary wildlife seasonal stipulations. The BLM allows wind-energy development in big game crucial winter range on a case-by-case basis. Alternative C would result in the greatest acres of surface disturbance due to minerals development and new road construction, which would result in proportional adverse impacts to big game, relative to the other alternatives. Alternative C closes motorized vehicle use on the smallest acreage of big game crucial winter range (7,437 acres) and seasonally restricts travel on the second smallest area of big game crucial winter range (28,552 acres). These less prohibitive restrictions on surface-disturbing activities would result in the greatest adverse impact to big game, compared to the other alternatives, but the seasonal restrictions on motorized vehicle use under Alternative C would limit adverse impacts to big game more than under Alternative A. The areas closed to livestock grazing under Alternative C are similar to those under Alternative A. Special designations under Alternative C would protect the least amount of big game crucial winter range from surface-disturbing activities (Table 4-22).

Proactive management actions under Alternative C result in the fewest beneficial impacts to big game by providing less habitat protection to potential impacts from oil and gas development and competition from livestock due to prioritizing livestock forage allocation over wildlife. The BLM limits motorized vehicle use to designated roads and trails with seasonal closures in the Absaroka Front Management Area to minimize big game disturbance; however, big game crucial winter range is afforded the least protection from surface-disturbing activities and potential disturbance under Alternative C (Table 4-22). Proactive management actions would result in the fewest beneficial impacts to big game under this alternative.

Due to the adverse impacts from projected surface disturbance and motorized vehicle use, and fewer beneficial impacts from proactive management actions and special designations under this alternative, Alternative C would result in the greatest adverse impact to big game, compared to the other alternatives.

Trophy Game – Alternative C

Black bears are most affected by management actions in forest and woodland habitats. Forest management practices under Alternative C result in the greatest short-term adverse impact to black bears from disturbance and displacement, but may result in the greatest long-term benefit, if displacement is not permanent, by improving stand diversity and preventing catastrophic wildfires.

Alternative C places fewer restrictions on motorized vehicle use in WSAs than alternatives A or B, which would result in the greatest potential for human-caused disturbance of cougars in these areas. Management actions affecting big game would have similar impacts on cougars.

Furbearing Animals – Alternative C

The BLM manages forestland under Alternative C for more forest production, resulting in a greater amount of activity that would disturb and displace wildlife. However, old growth forest areas are retained at appropriate locations and distribution levels, which would benefit the American marten in these areas.

Under Alternative C, the BLM manages all riparian/wetland areas to meet PFC without consideration of habitat requirements for wildlife. Alternative C would result in the most new oil and gas wells, and therefore may result in the greatest adverse impact to furbearing mammal species by contributing to the depletion of these rivers. Habitat degradation and loss would be greatest in riparian/wetland areas

under Alternative C, and therefore would result in the greatest adverse impact to furbearing animals in these areas.

Predatory Animals – Alternative C

Alternative C actions that would impact different vegetative types in the Planning Area are anticipated to impact habitat generalists, such as predatory animals. Motorized vehicle use restrictions and new road development under Alternative C are expected to cause the greatest adverse impacts to predatory animals such as the coyote and red fox (USGS 2007).

Small Game – Alternative C

Alternative C actions affecting forests, woodlands, riparian areas, and other habitat types would have proportionate impacts on generalists like cottontail rabbits, as well as more habitat-specific species, such as the snowshoe hare, red squirrel, and flying squirrel. Precommercial thinning practices under Alternative C would result in similar adverse impacts to snowshoe hare, yet to a greater extent, than under Alternative A. Alternative C would result in no beneficial impacts from regenerating aspen stands, as is so under alternatives A and B.

Game Birds – Alternative C

Alternative C would result in the greatest potential habitat loss and spread of invasive species in shrubland and grassland communities due to surface disturbance and the greatest potential habitat loss and degradation of riparian/wetland areas due to surface disturbance and concentrated livestock grazing. Alternative C actions affecting forests, woodlands, riparian areas, and other habitat types would have proportionate impacts on other game birds, such as the ruffed grouse, blue grouse, wild turkey, and pheasant that prefer these habitat types. Impacts to these habitats are discussed below under *Nongame (Migratory Birds)*. Alternative C would result in the greatest adverse impact to game birds. Although using produced water to enhance wildlife habitat may beneficially impact some game bird species, Alternative C would result in the greatest adverse impact to game birds from habitat loss in shrubland and grassland communities and potential habitat degradation in riparian/wetland areas.

Waterfowl – Alternative C

Although there are no specific management actions for waterfowl, other biological resource management actions, particularly those pertaining to water and riparian/wetland habitats, would affect these species. Under Alternative C, the BLM would manage all riparian/wetland areas to meet PFC without consideration of wildlife life history requirements. Alternative C would result in a greater impact from concentrated livestock grazing than the other alternatives, because the BLM would place forage supplements to maximize usage without regard for sensitive habitat. Similar to Alternative A, Alternative C uses produced water to develop and enhance waterfowl habitats in accordance with federal, state, and local laws and regulations, which would have beneficial impacts to waterfowl.

Nongame (Raptors) – Alternative C

Under Alternative C, the BLM applies a TLS to avoid disruptive or surface-disturbing activity within ¼ mile of active raptor nests during specific species nesting periods, or until young birds have fledged. The protective buffers around raptor nest sites under Alternative C (47,651 acres) are the smallest and do not prohibit disruptive activities, which would result in the greatest potential adverse impacts to raptors compared to the other alternatives.

Allowing wind-energy projects in raptor concentration areas on a case-by-case basis would result in greater potential adverse impacts from displacement and collisions than alternatives B and D, but less than Alternative A.

Nongame (Migratory Birds) – Alternative C

Alternative C actions pertaining to minerals development and motorized vehicle use restrictions; wind-energy development; forest management; management of sagebrush, grassland, and riparian/wetland habitats; invasive species control; and fire management would result in the greatest impact to nongame migratory birds. Alternative C would result in the greatest short-term adverse impacts to these species from prescribed fire and fuels treatments; however, the risk of catastrophic fire would be smallest under this alternative.

Alternative C does not designate any ACECs specially designed to protect wildlife values, such as migratory bird nesting habitat.

Forest and Woodland Species – Alternative C withdraws the least area in forests and woodlands to locatable mineral development, closes the smallest area to oil and gas development, allows for the most disturbance in forests and woodlands from silviculture and fuels treatments, and permits the largest clear cuts. Under this alternative, the BLM restores forests exposed by wildfire in the shortest time period and retains old-growth forests, but not snags used by migratory birds for nest sites. Refer to Section 4.4.1 *Vegetation – Forests, Woodlands, and Forest Products* and Table 4-21 for a description of management actions and BLM-authorized activities that would impact forests or woodlands and would similarly affect migratory bird habitat in these areas. Overall, forest management practices under Alternative C would result in the greatest short-term impacts from habitat loss, disturbance, and displacement, but the long-term adverse impacts posed by the risk of wildfire are reduced under this alternative.

Mountain Shrub Species – Under Alternative C, the BLM manages mountain shrub communities toward achieving the *Wyoming Standards for Healthy Rangelands* (Appendix N), which would result in less habitat enhancement, compared to the other alternatives, to benefit migratory birds in these areas.

Sagebrush and Desert Shrub Species – Species that utilize or depend on sagebrush habitats would generally benefit from management actions for greater sage-grouse as discussed in Section 4.4.9 *Special Status Species – Wildlife*. Alternative C applies the smallest buffers around greater sage-grouse leks and in nesting or early brood-rearing habitats. Under this alternative, the BLM manages salt desert shrub and basin grassland/shrub communities toward achieving the *Wyoming Standards for Healthy Rangelands*, which would result in less habitat enhancement, compared to the other alternatives, to benefit migratory birds in these areas. Alternative C would result in the most surface disturbance that may result in habitat loss, especially in the 5- to 9-inch precipitation zone, and has the least stringent requirements for reclamation. The associated loss of habitat and potential spread of invasive species would result in the greatest adverse impact to migratory birds that depend on sagebrush and desert shrub communities.

Grassland Species – Actions such as surface-disturbing activities, reclamation, invasive species control, and livestock and wildlife grazing in grassland habitats would affect these species. Under Alternative C, the BLM would manage foothills-mountain grassland/shrub and basin grassland/shrub communities to achieve *Wyoming Standards for Healthy Rangelands*, which would result in the fewest beneficial impacts to migratory birds from habitat enhancement in grassland communities. Focusing livestock grazing practices on commodity production would not likely create heterogeneous vegetative cover to enhance habitat for grassland migratory birds (Derner et al. 2009). Due to its projected long-term

surface disturbance and reclamation requirements, Alternative C would result in the most habitat loss and degradation in grasslands compared to the other alternatives.

Riparian/Wetland Species – Under Alternative C, the BLM allows surface-disturbing activities in flood plains and riparian/wetland areas as well as the placement of forage supplements to maximize usage, without regard for habitat degradation. Alternative C does not recommend WSR eligible waterway segments as suitable for inclusion in the NWSRS and, therefore, would not result in additional beneficial impacts to riparian habitat for migratory birds. Based on these management practices and the potential water depletion due to oil and gas development, Alternative C would result in the fewest beneficial impacts to migratory birds that depend on riparian/wetland habitat.

Nongame (Mammals) – Alternative C

Although there are no specific management actions for nongame mammals, other biological resource management actions would affect these species. Nongame mammals are found in a variety of habitats and are affected by management actions in the preferred vegetation type of each species. Impacts to the various vegetation types are described above for nongame migratory birds and are expected to similarly impact nongame mammals.

Generally, the BLM places the least restrictions on surface-disturbing activities and motorized vehicle use to protect cave resources under Alternative C, and manages known caves for recreational opportunities. Activities are allowed in AMLs, creating opportunities for bat disturbance in these areas. The BLM allows motorized vehicle use on designated roads and trails in the Medicine Lodge and Trapper Creek WSAs under Alternative C, increasing human presence and the opportunities for wildlife disturbance in these areas. There are no ACECs designated under Alternative C that would conserve bat habitat. Restrictions on the aerial applications of pesticides would be more than alternatives A and D, but less than Alternative B, with correlated impacts to bat species. Wind-energy development would impact bats similar to migratory birds. Overall, Alternative C would result in the fewest beneficial impacts to bats by protecting cave resources and conserving potential bat habitat.

Nongame (Reptiles and Amphibians) – Alternative C

Based on implementation of management guidelines identified in *Habitat Management Guidelines for Amphibians and Reptiles of the Northwestern U.S. and Canada, PARC Technical Publication HMG-4* (Pilliod and Wind 2008) on a case-by-case basis, the projected surface disturbance under Alternative C (Appendix T), and the allowance of surface-disturbing activities in riparian/wetland areas, Alternative C would result in the greatest adverse impact to reptiles and amphibians, compared to the other alternatives.

Alternative D

Surface Disturbance – Alternative D

Alternative D would result in similar short- and long-term surface disturbance as Alternative A, with proportional impacts to wildlife from all surface-disturbing activities in various resource programs. To minimize long-term habitat loss from surface disturbance, Alternative D imposes greater erosion prevention measures and reclamation requirements to disturbed areas than Alternative A. Alternative D requires reclamation plans, stipulations, or measures before surface disturbance, the reestablishment of healthy native or DPCs based on pre-disturbance species composition, and the use of temporary protective surface treatments, such as weed-free mulch, to facilitate reclamation. Overall, the projected

surface disturbance under Alternative D is slightly more than under Alternative A, but the impacts to wildlife habitat would be mitigated to a greater extent.

Resource Uses – Alternative D

Alternative D withdraws less area to locatable minerals entry than Alternative A, but closes more area to oil and gas development in sensitive wildlife habitat such as big game crucial winter range (Table 4-22). Therefore, minerals development under Alternative D would result in less adverse impact to wildlife than under alternatives A and C, but more than under Alternative B.

Impacts to wildlife habitat from lands and realty management actions under Alternative D would be similar to those under Alternative A; however, less area is identified for general disposal than alternatives A and C.

Under Alternative D, the BLM would manage more lands as ROW exclusion areas than under Alternative C, of which 9,213 acres are in big game crucial winter range (Table 4-22). ROWs under Alternative D would result in more adverse impacts than under Alternative B, but less than under alternatives A and C, based on the total acreage managed as ROW avoidance or exclusion areas.

Renewable energy development under Alternative D would result in impacts similar to those under Alternative C, although to a lesser extent because the BLM avoids wind-energy projects in big game crucial winter range and raptor concentration areas, and avoids wind-energy development in greater sage-grouse PHMAs subject to specific exception criteria. Renewable energy development under Alternative D would result in more adverse impacts to wildlife habitat than under Alternative B, but less than under alternatives A and C.

Alternative D limits motorized vehicle use to designated roads and trails in more area than alternatives A and C and closes a similar amount of acreage as Alternative A to motorized vehicle use, protecting more wildlife habitat in the Planning Area than these alternatives. Permitting off-road big game retrieval would result in impacts similar to those under Alternative A, but to a lesser extent because off-road travel is limited to 300 feet from established roads. Overall, CTTM under Alternative D would cause more adverse impacts to wildlife than under Alternative B, but less than under alternatives A and C.

Impacts to wildlife from recreational site development and livestock grazing management would be similar to those under Alternative A.

Special Designations – Alternative D

Beneficial impacts to wildlife from special designations under Alternative D would be similar to those under Alternative A, but to a greater extent. Greater minerals development restrictions and ROW stipulations in the Carter Mountain, Five Springs Falls, Little Mountain, and Upper Owl Creek ACECs, and designating the Clarks Fork Canyon and Sheep Mountain ACECs would result in greater protective measures for wildlife habitat than Alternative A. Similar to Alternative C, Alternative D does not recommend WSR eligible waterway segments as suitable for inclusion in the NWSRS, resulting in no additional beneficial impacts to wildlife by preserving riparian habitat.

Resources – Alternative D

Overall, impacts to wildlife from fire and fuels management and forest, woodlands, and forest products management under Alternative D would be similar to those under Alternative A. Allowing larger areas to be clear cut would result in more habitat loss for wildlife species that prefer closed canopies; however, maintaining the structure and composition of old growth stands would benefit wildlife species that use this habitat type, such as the American marten.

Beneficial impacts to wildlife from grassland and shrubland community management under Alternative D would be similar to those under Alternative B, although to a lesser extent. Under Alternative D, the BLM would manage some areas under for a higher plant community state or phase (based on state and transition models in ESDs) on a case-by-case basis where site-specific management objectives determine that a higher plant community state or phase is desirable, resulting in fewer beneficial impact to wildlife habitat than under Alternative B. However, the BLM would treat more area for invasive species than Alternative B, providing greater long-term beneficial impact to wildlife by preventing the spread of invasive species that may degrade wildlife habitat. Livestock flushing practices would result in similar beneficial impacts as those under Alternative A.

The management of riparian/wetland vegetation under Alternative D would result in similar beneficial impacts as those under Alternative C, but to a greater extent. Managing streams with unique recreational or fishery values to obtain DFC may increase habitat values in these areas more than under Alternative C, but additional management would be necessary to ensure that habitat meets life history requirements for various wildlife species. Alternative D applies more stipulations to surface-disturbing activities near riparian/wetland areas than Alternative C, limiting adverse impacts from surface disturbance, and applies an NSO restriction on all wetlands greater than 20 acres, protecting the most wetland habitat compared to the other alternatives. Overall, beneficial impacts to riparian/wetland habitat for wildlife under Alternative D would be greater than under alternatives A and C, but less than under Alternative B.

Proactive Management – Alternative D

Proactive management measures that would benefit wildlife are described in detail below. Similar to Alternative A, the BLM modifies identified hazard fences in accordance with wildlife needs, prohibits domestic sheep grazing on pronghorn crucial winter range unless adverse impacts can be mitigated, and addresses traditional migration and travel corridors for big game wildlife species and migratory birds on a case-by-case basis under Alternative D. However, Alternative D also requires the use of recent policy and guidance to identify hazard fences and prohibits surface-disturbing activities within 0.5 mile of big game migration corridors in the Big Horn Front MLP Analysis Area, which could increase beneficial impacts to wildlife relative to Alternative A. Similar to Alternative B, the BLM pursues land tenure adjustment authorities for the acquisition of, and interest in, lands for the improved management of important wildlife habitat and applies minerals development restrictions, although to a lesser extent, in the Absaroka Front Management Area. Similar to Alternative C, the BLM performs habitat enhancement vegetation treatments in sagebrush communities as opportunities and funding allow, consistent with Wyoming Governor's EO 2011-5, uses produced water to develop and enhance wildlife habitat, and exempts Oil and Gas Management Areas from discretionary wildlife seasonal stipulations. Overall, proactive wildlife management actions under Alternative D would result in greater beneficial impacts to wildlife than under alternatives A and C, but less than under Alternative B.

Big Game – Alternative D

Alternative D exempts Oil and Gas Management Areas (190,891 BLM-administered surface acres) from discretionary wildlife seasonal stipulations similarly to Alternative C. However, Alternative D does not exempt ROW corridors from seasonal stipulations and avoids wind-energy projects in big game crucial winter range, raptor concentration areas, and greater sage-grouse PHMAs (subject to exception criteria), resulting in less adverse impacts than Alternative C. Impacts from minerals development and new road construction under Alternative D would be less than those under Alternative A because of the additional restrictions applied to the Absaroka Front (253,112 acres) and Big Horn Front (379,308 acres) MLP analysis areas, which include CSU stipulations that limit the location, timing, and amount of surface

oil and gas-related surface disturbances to protect big game. Within Zone 1 of the Absaroka Front MLP Analysis Area (Map 35), Alternative D requires minimum lease sizes and places limitations on the density and total acreage of oil and gas-related surface disturbance per lease. Areas outside elk crucial winter range require a minimum lease size of 640 acres and a maximum of one oil and gas-related facility that does not exceed 32 acres of surface disturbance per lease, whereas areas inside elk crucial winter range require a minimum lease size of 1,280 acres and a maximum of one oil and gas-related facility that does not exceed 64 acres of surface disturbance per lease. Similar restrictions are applied in Zone 3, with the application of specific CSU and TLS stipulations to protect forest vegetation types and recreation settings for hunting. Although Zone 2 is generally available for oil and gas leasing, it is only offered as 2 parcels requiring a Master Development Plan to minimize impacts to big game. These stipulations would have beneficial impacts on big game that utilize the Absaroka Front MLP Analysis Area, particularly elk, by decreasing the density of roads, well pads, and other infrastructure that cause habitat fragmentation as well as the level of human activity in this area. Areas with higher densities of development and higher frequencies of human activity have been correlated with lower use by elk and mule deer (Sawyer and Nielson 2005; Sawyer et al. 2006).

Alternative D also applies a NSO restriction within ½-mile of big game migration corridors within the Big Horn Front MLP Analysis Area, which would result in similar adverse impacts as Alternative B. The application of CSU and TLS stipulations, minimum lease size requirements (1,280 acres), and limitations on the density (one location per lease) and total acreage of oil and gas-related surface disturbance (64 acres per lease), would result in similar beneficial impacts to big game as described for elk crucial winter range within Zone 1 of the Absaroka Front MLP Analysis Area.

Given the generally low to very low potential for oil and gas development (99 percent of the Absaroka Front area and the entire Big Horn Front area are characterized by low to very low potential) and redundancies with restrictions from the management of other resources and resource uses within these MLP analysis areas, the level of impacts is not anticipated to vary greatly by alternative. Overall, the application of MLPs to the Absaroka Front and Big Horn Front MLP analysis areas could result in more beneficial impacts to big game than under alternatives A and C, which apply less extensive TLS and/or CSU restrictions in big game crucial winter range and migration routes. However, anticipated impacts are likely to be less beneficial than under Alternative B, which closes the entirety of the Absaroka Front MLP Analysis Area to mineral leasing and applies NSO restrictions to big game crucial winter range in the Big Horn Front MLP Analysis Area.

Similar to Alternative B, seasonal wildlife protections discussed above would also apply to project maintenance and operation (including production) activities. Potential adverse impacts from this management would be the same as described under that alternative.

As a result of other resource concerns, 18,450 acres and 28,627 acres of big game crucial winter range are managed as closed or seasonally restricted for motorized travel, respectively. Based on these acreages, impacts to big game from potential disturbance would be second-least under Alternative D. Overall, impacts to big game from motorized vehicle use would be less than under alternatives A and C, but more than under Alternative B.

Special designations under Alternative D would protect more big game crucial winter range than under alternatives A and C, but less than under Alternative B. The BLM designates the Sheep Mountain ACEC and manages the Chapman Bench Management Area with additional resource use restrictions that would benefit big game. Designating the Carter Mountain, Upper Owl Creek, and Little Mountain ACECs would result in similar beneficial impacts to those under Alternative A.

Proactive management actions under Alternative D would result in similar beneficial impacts to big game as under Alternative A, but to a greater extent. The BLM would apply various restrictions and stipulations on minerals development in the Absaroka Front Management Area (130,872 BLM-administered surface acres) that would benefit big game more than alternatives A and C. The BLM avoids wind-energy projects in big game crucial winter range under Alternative D as well, minimizing the potential for disturbance and displacement. Allowing the temporary closures of designated roads in big game crucial winter range would limit adverse impacts to big game due to disturbance from motorized travel.

Trophy Game – Alternative D

Adverse impacts to black bears under Alternative D would be similar to those under Alternative A, but to a greater extent as clear cuts are allowed up to 100 acres. Alternative D places more restrictions on motorized vehicle use in WSAs than alternatives A and C, but less than Alternative B, resulting in proportional adverse impacts to cougars from potential disturbance. Managing lands with wilderness characteristics consistent with other resource objectives would result in similar impacts to alternatives A and C. Based on big game management actions, the beneficial impact to cougars under Alternative D would be less than under Alternative B, but greater than under alternatives A and C.

Furbearing Animals – Alternative D

Based on forest management actions, beneficial impacts to furbearing animals under Alternative D would be similar to those under Alternative A, but to a greater extent. Based on projected surface disturbance, reclamation and restoration practices, and vegetation management, habitat generalists such as the badger, bobcat, and weasel would be adversely impacted under Alternative D more than under Alternative B, but less than under alternatives A and C. Management actions in old growth stands under Alternative D would benefit the American marten similarly to Alternative B, but restoring aspen stands only when opportunities and funding allow would result in less beneficial impact than alternatives A and B for the American marten and other furbearing mammals in this habitat. Furbearing species most affected by management actions that impact riparian/wetland habitat or water availability (badger, beaver, mink, and muskrat) would be beneficially affected less than under Alternative B, but more than under alternatives A and C.

Predatory Animals – Alternative D

Alternative D actions that would impact different vegetative types in the Planning Area are anticipated to impact habitat generalists such as predatory animals. Motorized vehicle use restrictions and new road development under Alternative D are expected to cause less adverse impacts to predatory animals, such as the coyote and red fox, than under alternatives A and C, but more than under Alternative B.

Small Game – Alternative D

Alternative D actions affecting forests, woodlands, riparian areas, and other habitat types would have proportionate impacts on the habitat generalists like cottontail rabbits, as well as more habitat-specific species, such as the snowshoe hare, red squirrel, and flying squirrel. Precommercial thinning practices under Alternative D would result in similar adverse impacts to snowshoe hare as under Alternative C, with the potential for limited beneficial impacts to this species from aspen restoration, if opportunities and funding allow.

Game Birds – Alternative D

Alternative D would result in less habitat loss and less potential for invasive species spread in shrubland and grassland communities than alternatives A and C (Table 4-21), with correlated impacts to game

birds. Alternative D actions affecting forests, woodlands, riparian areas, and other habitat types would have proportionate impacts on other game birds, such as the ruffed grouse, blue grouse, wild turkey, and pheasant that prefer these habitat types. Impacts to these habitats are discussed below under *Nongame (Migratory Birds)*. Using produced water to develop and enhance wildlife habitat may beneficially impact some game bird species if the created habitat is suitable.

Waterfowl – Alternative D

Although there are no specific management actions for waterfowl, other biological resource management actions, particularly those pertaining to water and riparian/wetland habitats, would affect these species. Riparian/wetland management actions under Alternative D would result in less beneficial impacts to waterfowl than under alternatives A and B, but more than under Alternative C. Prohibiting forage supplements within ¼ mile of water, wetlands, or riparian areas and applying an NSO restriction to wetland areas larger than 20 acres would result in beneficial impacts similar to Alternative B, but to a greater extent. Special designations under Alternative D, including the Sheep Mountain ACEC, would restrict resource uses and activities, conserving migratory bird habitat. Using produced water to develop and enhance wildlife habitat may beneficially affect some game bird species if water quality is not impacted and the created habitat is suitable.

Nongame (Raptors) – Alternative D

Alternative D would result in more adverse impacts to raptors than Alternative B, but less than alternatives A and C. Although Alternative D seasonally protects less area (47,561 acres) around active raptor nests than Alternative A, it applies a year-round CSU stipulation to protect raptor nest sites and avoids wind-energy development in raptor concentration areas.

Nongame (Migratory Birds) – Alternative D

Alternative D management actions pertaining to minerals development and motorized vehicle use restrictions, wind-energy development, vegetation management, invasive species control, fire and fuels management, and special designations would result in more beneficial impacts to migratory birds than alternatives A and C, but less than Alternative B. The Chapman Bench Management Area and Sheep Mountain ACEC, designated under Alternative D, would conserve migratory bird nesting habitat.

Forest and Woodland Species – Management actions in forest and woodland habitat under Alternative D are similar to those under Alternative A and would, therefore, result in impacts to forest and woodland migratory bird species similar to Alternative A. Alternative D closes more area in forests and woodlands to minerals development than alternatives A and C, but less than Alternative B. Protecting old growth stands and leaving appropriate levels of snag retention to be used by migratory birds as nest sites would result in similar beneficial impacts to those under Alternative B. Alternative D allows larger clear-cuts than Alternative A, which would result in a greater beneficial impact for migratory bird species preferring open habitat but may reduce the reproductive success of some migratory bird species (Thompson III et al. 1993).

Mountain Shrub Species – Under Alternative D, potentially managing some mountain shrub communities for a higher plant community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable would result in similar beneficial impacts, although to a lesser extent, than under Alternative B. Designating the Sheep Mountain ACEC would restrict resource uses and activities that may disturb or displace migratory birds, benefitting mountain shrub species in this area.

Sagebrush and Desert Shrub Species – Species that utilize or depend on sagebrush habitats would generally benefit from management actions for greater sage-grouse as discussed in Section 4.4.9 *Special Status Species – Wildlife*. Alternative D applies more resource use and activity restrictions in greater sage-grouse habitat than alternatives A and C, with proportional limitations in adverse impacts to migratory birds in sagebrush habitat. Based on the restrictions on minerals development in sagebrush and desert shrub habitat (Table 4-21) and the reclamation requirements under Alternative D, this alternative is likely to result in fewer adverse impacts to migratory birds in these habitats than under alternatives A and C, but more than under Alternative B.

Grassland Species – Based on projected surface disturbance and management actions to restrict resource uses and activities in grassland habitat, vegetation management actions, reclamation practices, invasive species control, and livestock grazing management, Alternative D would result in less habitat loss and degradation in grasslands than alternatives A and C, but more than Alternative B, affecting migratory birds proportionately. Allowing livestock grazing in areas closed to grazing as a tool to maintain or improve resource conditions may beneficially impact migratory birds in these areas, if grazing practices create vegetation heterogeneity to benefit these species (Derner et al. 2009).

Riparian/Wetland Species – Vegetation management practices and the management of WSR eligible waterways under Alternative D would result in similar impacts to migratory birds as those under Alternative C, but migratory birds may benefit more from managing certain riparian areas to obtain DFC and prohibiting livestock forage supplements within riparian/wetland areas. Alternative D would also restrict surface-disturbing activities in more wetland areas. Overall, Alternative D would result in more adverse impacts to migratory birds in riparian/wetland habitat than Alternative B, but less than alternatives A and C.

Nongame (Mammals) – Alternative D

Although there are no specific management actions for nongame mammals, other biological resource management actions would affect these species. Nongame mammals are found in a variety of habitats and are affected by management actions in the preferred vegetation type of each species. Impacts to the various vegetation types are described above for nongame migratory birds and are expected to similarly impact nongame mammals. Special designations and restrictions around AMLs under Alternative D would result in similar beneficial impacts to bat species as Alternative B, although to a lesser extent. However, Alternative D proactively minimizes the potential for adverse impacts to bat species from White Nose Syndrome by implementing the decontamination protocol under BLM IM 2010-181 or the National White Nose Syndrome protocol. Adverse impacts from aerial pesticide application would be similar to Alternative A. Wind-energy development would affect bats similar to migratory birds.

Nongame (Reptiles and Amphibians) – Alternative D

Impacts to reptiles and amphibians under Alternative D would be similar to those under Alternative C, although to a lesser extent. Greater surface-disturbance restrictions in riparian/wetland areas than under Alternative C, avoiding reservoir work during amphibian mating and metamorphosis periods, and retaining riparian vegetation to benefit habitat values when cleaning or removing sediment from reservoirs would limit adverse impacts to reptiles and amphibians.

Alternative E

Surface Disturbance – Alternative E

Alternative E would result in approximately 71,829 acres of short-term surface disturbance that may degrade wildlife habitat and 10,676 acres of long-term surface disturbance that may result in habitat loss (Table 4-1), the least of any alternative. Management practices relating to surface disturbance would be the same as Alternative B, except for areas within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). In this ACEC, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) to not exceed one disturbance per 640 acres and cover less than 3 percent of the greater sage-grouse Key Habitat Areas, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. When compared to the other alternatives, the potential for short- and long-term adverse impacts to wildlife would be the least for the surface-disturbing activities of Alternative E.

Resource Uses – Alternative E

Compared to the other alternatives, the restrictions on surface disturbance and conservation measures of Alternative E would provide the greatest protection of wildlife by limiting minerals development and disposal on the largest acreage. Management for resource uses would be the same as Alternative B, except for the Greater Sage-Grouse Key Habitat Areas ACEC, which is closed to mineral materials disposal and withdrawn from mineral entry under Alternative E. Retention of all lands within the proposed Greater Sage-Grouse Key Habitat Areas ACEC would result in beneficial impacts to wildlife by allowing for mitigation or restrictions for surface-disturbing and disruptive activities to maintain high value habitat. Alternative E identifies 24,042 acres for disposal, the same as Alternative B, but fewer acres than alternatives D and F, A, and C, respectively.

ROW management under Alternative E would result in the fewest adverse impacts to wildlife, relative to the other alternatives. Under Alternative E, the BLM would manage more land as ROW exclusion areas (1,322,879 acres) than any other alternatives, including 1,232,583 acres in greater sage-grouse Key Habitat Areas (Table 4-22). In comparison to Alternative B, the additional ROW exclusion areas identified under this alternative would result in a lower risk of raptor electrocutions and greater consolidation of ROWs that would cause less habitat fragmentation. Alternative E also identifies the most acres as renewable energy exclusion areas (1,954,204 acres) in comparison to the other alternatives, which would further reduce habitat fragmentation and loss, as well as collision hazards for avian species.

Management for other resource uses outside of the Greater Sage Grouse Key Habitat Areas ACEC and associated impacts to wildlife would be the same as Alternative B. Alternative E requires that Special Recreation Permits in the proposed Greater Sage-Grouse Key Habitat Areas ACEC have neutral or beneficial effects to sage-grouse habitat, which would reduce the potential for disruptive activities in these areas.

Special Designations – Alternative E

The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative E would result in additional protections for wildlife in comparison to the other alternatives. Specifically, the closure of the proposed Greater Sage-Grouse Key Habitat Areas ACEC to mineral materials disposal, renewable energy development, ROW development, and withdrawal from locatable mineral entry would result in the greatest beneficial impacts to wildlife compared to the other alternatives. Other impacts to wildlife from special designations outside of the Greater Sage-Grouse Key Habitat Areas ACEC would be same as Alternative B.

Resources – Alternative E

The BLM would use similar wildland fire and other vegetation treatments to restore fire-adapted ecosystems and to reduce hazardous fuels as under Alternative B; however, treatments would be designed and implemented with a greater emphasis on protection of sagebrush ecosystems within the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Therefore, management actions within these areas are likely to be more beneficial for sagebrush obligate species as well as other wildlife, such as pronghorn, that rely on sagebrush steppe communities for habitat. Similar beneficial impacts to these species would result from habitat restoration and invasive species management actions, which also emphasize sage-grouse habitat objectives within the proposed Greater Sage-Grouse Key Habitat Areas ACEC.

Impacts to wildlife resulting from management actions for resource protection outside the Greater Sage-Grouse Key Habitat Areas ACEC would be same as Alternative B. In areas where the proposed ACEC overlaps forest and woodland areas, adverse impacts resulting from forest management actions may be reduced due to the greater limitations on surface disturbance.

Proactive Management – Alternative E

Wildlife management under Alternative E is generally the same as Alternative B, and the beneficial impacts would be the same as Alternative B. However, areas in the Greater Sage-Grouse Key Habitat Areas ACEC would provide the greatest benefits to sage-grouse and other species that use sagebrush habitat compared to the other alternatives.

Big Game – Alternative E

Impacts to big game would be the same as Alternative B, except to a lesser extent where big game crucial winter range overlaps the proposed Greater Sage-Grouse Key Habitat Areas ACEC due to additional constraints on resource uses that create surface disturbance in these areas. Alternative E withdraws the greatest area in big game crucial winter range to locatable minerals development (652,927 acres) and would result in the least surface disturbance in comparison to the other alternatives, and would therefore result in the least adverse impacts to big game. Designation of the proposed Greater Sage-Grouse Key Habitat Areas ACEC excludes renewable energy and ROW development over greater areas of big game crucial winter range than the other alternatives (Table 4-22).

Alternative E would designate the most acres of ACEC that overlap big game crucial winter range (665,963 acres), resulting in more beneficial impacts than any other alternative.

Management of invasive species and fire and fuels under Alternative E would result in more beneficial impacts to big game species in the short term from reduced surface-disturbing and disruptive fuels treatments in the Greater Sage-Grouse Key Habitat Areas ACEC, but may potentially result in adverse long-term impacts from more intense wildfires and reduced ability to treat invasive species due to restrictions on fuel management and herbicide use.

As a result of these additional restrictions on resources uses within the proposed Greater Sage-Grouse Key Habitat Areas ACEC, Alternative E would result in the least adverse impact to big game of any alternative.

Trophy Game – Alternative E

Black bears are most affected by management actions in forest and woodland habitats. Alternative E would designate the most acres of ACEC that overlap forest and woodland habitats (129,888 acres),

resulting in less adverse impacts than any other alternative. Limitations on surface disturbance and disruptive activities within the Greater Sage-Grouse Key Habitat Areas ACEC would result in less adverse impacts where black bear habitat is overlapped by the ACEC.

Other impacts to trophy game outside of the Greater Sage-Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Furbearing Animals – Alternative E

Impacts to furbearing animals would be the same as Alternative B, but with fewer adverse impacts in areas where the proposed Greater Sage-Grouse Key Habitat Areas ACEC overlaps the habitats of furbearing animals due to greater limitations on surface disturbance and disruptive activities in these areas compared to other alternatives. Alternative E would designate the most acres of ACECs that overlap forest and woodland habitats (129,888 acres) and riparian/wetland areas (11,040 acres), which would benefit the American marten and furbearing mammal species that use riparian/wetland habitats (i.e., badger, beaver, mink, and muskrat). Other impacts to furbearing animals outside of the Greater Sage-Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Predatory Animals – Alternative E

Impacts to predatory animals would be the same as Alternative B, but with fewer adverse impacts due to limitations on surface disturbance and disruptive activities within the Greater Sage-Grouse Key Habitat Areas ACEC, which covers 1,232,583 acres and overlaps various habitats used by predatory animals, which are typically habitat generalists. Other impacts to predatory animals outside of the Greater Sage-Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Small Game – Alternative E

Impacts to small game animals would be the same as Alternative B, but with fewer adverse impacts where the Greater Sage-Grouse Key Habitat Areas ACEC overlaps forests, woodlands, riparian/wetland areas, and other habitat types used by small game habitat generalists due to additional limitations on surface disturbance and disruptive activities.

Game Birds – Alternative E

Alternative E would designate the most acres as ACECs (1,438,802 acres), which would benefit habitats used by game birds throughout the Planning Area. Under Alternative E, management actions to reduce surface disturbance and control invasive species spread in shrub and grassland communities through special designations would provide the greatest benefit to greater sage-grouse, chukar, and gray partridge, compared to the other alternatives. Impacts to small game birds outside the Greater Sage-Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Waterfowl – Alternative E

Alternative E would designate the most acres of ACECs that overlap riparian/wetland areas (11,040 acres), which would result in fewer impacts to waterfowl due to greater restrictions on surface disturbance and disruptive activities when compared to the other alternatives. Impacts to waterfowl outside of the Greater Sage-Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Nongame (Raptors) – Alternative E

Protective buffers around raptor nest sites would be the same as Alternative B, which would minimize adverse impacts to raptors more than any other alternative. However, Alternative E would exclude wind

energy from the largest area (1,945,204 acres), which would minimize the potential for collision mortality and displacement to the greatest extent among the alternatives.

Nongame (Migratory Birds) – Alternative E

Impacts to migratory birds would be the same as Alternative B across much of the Planning Area, except in areas overlapped by the proposed Greater Sage-Grouse Key Habitat Areas ACEC. In the Greater Sage-Grouse Key Habitat Areas ACEC, additional limitations on surface disturbance and disruptive activities, as well as management that protects and restores sagebrush habitat, would provide additional beneficial impacts to migratory birds. Beneficial impacts from ACECs designated under Alternative E would affect the greatest proportion of habitats used by migratory birds when compared to the other alternatives, as indicated by the following acres of overlap with ACECs:

- Forests and woodlands – 129,888 acres
- Grasslands – 10,112 acres
- Nonnative annual brome – 23,950 acres
- Riparian – 11,040 acres
- Sagebrush – 900,827 acres
- Salt desert – 329,465 acres

Nongame (Mammals) – Alternative E

Impacts to nongame mammals would be similar to those discussed for migratory birds above, as they are found in a variety of habitats and are affected by management actions in the preferred vegetation type of each species.

Alternative E would exclude wind-energy development from more acres throughout the Planning Area than any other alternative (1,954,204 acres), which would result in the least collision hazards for bats. All other impacts to nongame mammals would be consistent with Alternative B.

Nongame (Reptiles and Amphibians) – Alternative E

Alternative E would result in the least surface disturbance of any alternative, and would therefore result in the least adverse impacts to reptiles and amphibians. Alternative E would therefore result in less adverse impacts to reptiles and amphibians than Alternative A, and similar impacts to Alternative B, but to a lesser degree.

Alternative F

Surface Disturbance – Alternative F

Alternative F would result in 137,064 acres of short-term and 17,663 acres of long-term surface disturbance. Impacts to wildlife from surface disturbance under Alternative F are projected to be greater than under alternatives A, B, and E, but less than under alternatives C and D. Management practices relating to surface disturbance would be the same as Alternative D, except within areas of the proposed Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). Additional restrictive management actions, including greater erosion prevention measures and reclamation requirements provided in a larger area under Alternative F, mitigate impacts to wildlife habitat to a greater extent than alternatives A and D.

Resource Uses – Alternative F

Resource uses under Alternative F would result in fewer adverse impacts to wildlife habitat than Alternative D and slightly greater adverse impacts than Alternative A. This alternative closes more federal mineral estate to oil and gas leasing than alternatives A and D. Similar to Alternative D, this alternative and applies a NSO stipulation within 0.6 mile of occupied sage-grouse leks within greater sage-grouse PHMAs. However, Alternative F limits surface disturbances to one per 640 acres and 3 percent or less of the Wyoming Density and Disturbance Calculation Tool (DDCT) analysis area, compared to 5 percent under Alternative D. As a result, Alternative F is anticipated to develop fewer new federal wells than alternatives A, C, and D, but more than alternatives B and E with proportional adverse impacts to wildlife.

Alternative F would require seasonal restrictions on construction of aboveground powerlines or the use of buried powerlines in the proposed Greater Sage-Grouse PHMAs ACEC, which would reduce adverse impacts on wildlife. Alternative F would also limit motorized vehicle use to designated roads and trails and exclude renewable energy development over a greater area than Alternative D, resulting in less adverse impacts than alternatives A, C, and D, but more than alternatives B and E.

Impacts to wildlife from resource uses outside the proposed Greater Sage-Grouse PHMAs ACEC would be the same as Alternative D. Similar to Alternative E, Alternative F requires that Special Recreation Permits in the proposed Greater Sage-Grouse PHMAs ACEC have neutral or beneficial effects to sage-grouse habitat, which would reduce the potential for disruptive activities in these areas.

Special Designations – Alternative F

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative F would result in greater protection for wildlife habitat than alternatives A, C, and D, but fewer than under alternatives B and E.

Resources – Alternative F

Impacts to wildlife from management actions to protect resources would be generally the same as Alternative D; however, the BLM would apply specific management actions for habitat restoration, invasive species management, and fire and fuels management that prioritize the protection of greater sage-grouse populations and habitat in the proposed Greater Sage-Grouse PHMAs ACEC. Therefore, management actions within these areas are likely to be more beneficial for sage-grouse and other sagebrush obligate species than under Alternative D.

Proactive Management – Alternative F

Wildlife management under Alternative F is generally the same as Alternative D, and the beneficial impacts to wildlife would be the same as Alternative D. However, areas in the Greater Sage-Grouse PHMAs ACEC would provide greater benefits to sage-grouse and other species that use sagebrush habitat than alternatives A, C, and D, but less than alternatives B and E.

Big Game – Alternative F

Impacts to big game would be similar to Alternative D, but with fewer adverse impacts where the proposed Greater Sage-Grouse PHMAs ACEC overlaps big game crucial winter range areas due to additional constraints on resource uses in these areas. Specifically, Alternative F places greater limitations on ROW development, renewable energy, and motor vehicle use in greater sage-grouse

PHMAs. In areas where the Greater Sage-Grouse PHMAs ACEC overlaps Oil and Gas Management Areas, the ACEC management would apply, resulting in fewer impacts to big game under Alternative F than alternatives A, C, and D.

ACECs designated under Alternative F would protect 634,085 acres of big game crucial winter range, which is more than under alternatives A, C, and D, but less than alternatives B and E. Like Alternative D, Alternative F applies additional restrictions to the Absaroka Front (253,112) and Big Horn Front (379,308) MLP analysis areas, including CSU stipulations that limit the location, timing, and amount of surface oil and gas-related surface disturbances to protect big game.

Other impacts to big game outside of the Greater Sage-Grouse PHMAs ACEC would be the same as Alternative D.

Trophy Game – Alternative F

Black bears are most affected by management actions in forest and woodland habitats. Alternative F would designate the second-most acres of ACEC that overlap forest and woodland habitats (107,354 acres), resulting in fewer adverse impacts to black bears than alternatives A, B, C, and D. Alternative F would limit motorized vehicles to designated roads and trails on a total of 1,820,427 acres, resulting in fewer potential adverse impacts to cougars than under alternatives A, C, and D, but greater than under alternatives B and E.

Other impacts to trophy game would be the same as Alternative D.

Furbearing Animals – Alternative F

Impacts to furbearing animals would be the same as Alternative B, but with fewer adverse impacts in areas where the proposed Greater Sage-Grouse PHMAs ACEC overlaps the habitats of furbearing animals due to additional limitations on surface disturbance and disruptive activities in these areas. Based on projected surface disturbance, reclamation and restoration practices, and vegetation management, habitat generalists such as the badger, bobcat, and weasel would be adversely impacted under Alternative F more than under alternatives B and E, less than under alternatives A and C, and similar to Alternative D. Alternative F would designate the most second-most acres of ACECs that overlap forest and woodland habitats (107,354 acres) and riparian/wetland areas (8,497 acres), which would benefit the American marten and furbearing mammal species that use riparian/wetland habitats (i.e., badger, beaver, mink, and muskrat). Other impacts to furbearing animals would be the same as Alternative D.

Predatory Animals – Alternative F

Impacts to predatory animals under Alternative F would be the same as Alternative D except in areas where the Greater Sage-Grouse PHMAs ACEC overlaps various habitats used by predatory animals due to additional motorized vehicle use restrictions and projected new road development under Alternative F. Therefore, Alternative F would result in fewer adverse impacts to predatory animals than alternatives A, C, and D, but more than under alternatives B and E.

Small Game – Alternative F

Impacts to small game animals would be similar to Alternative D, but with fewer adverse impacts due to limitations on surface disturbance and disruptive activities where the proposed Greater Sage-Grouse PHMAs ACEC overlaps forests, woodlands, riparian/wetland areas, and other habitat types used by small game habitat generalists. Other impacts to small game outside greater sage-grouse PHMAs would be the same as Alternative D.

Game Birds – Alternative F

Alternative F would result in less habitat loss and less potential for invasive species spread in shrubland and grassland communities than alternatives A, C, and D (Table 4-22), with correlated impacts to game birds. Impacts to game birds would be similar to Alternative D, but with less adverse impacts due to limitations on surface disturbance and disruptive activities where the proposed Greater Sage-Grouse PHMAs ACEC overlaps forests, woodlands, riparian/wetland areas, and other habitat types. Proportionate impacts would occur on other game birds, such as the ruffed grouse, blue grouse, wild turkey, and pheasant that prefer these habitat types. Impacts to these habitats are discussed below under *Nongame (Migratory Birds)*. Impacts to game birds outside the Greater Sage-Grouse PHMAs ACEC would be the same as Alternative D.

Waterfowl – Alternative F

Impacts to waterfowl would be similar to Alternative D, but with fewer adverse impacts in areas where the proposed Greater Sage-Grouse PHMAs ACEC overlaps riparian/wetland areas. ACECs under Alternative F would overlap the second-most acres of riparian/wetland areas (8,497 acres), which would result in fewer adverse impacts to waterfowl due to greater restrictions on surface disturbance and disruptive activities. Other impacts to waterfowl would be the same as Alternative D.

Nongame (Raptors) – Alternative F

Under Alternative F, impacts to raptors would be the same as Alternative D, except in areas where the proposed Greater Sage-Grouse PHMAs ACEC overlaps habitat used by raptors. In addition to providing a protective buffer around nesting sites, Alternative F would implement additional restrictions on surface disturbance in the Greater Sage-Grouse PHMAs ACEC and would provide more beneficial impacts to raptors than alternatives A, C, and D, but less than alternatives B and E.

Nongame (Migratory Birds) – Alternative F

Impacts to migratory birds would be the same as Alternative D, except in areas overlapped by the proposed Greater Sage-Grouse PHMAs ACEC. Additional limitations on surface disturbance and disruptive activities, including motorized vehicle use, as well as management that protects and restores sagebrush habitat, would provide additional beneficial impacts to migratory birds when compared to Alternative D. Beneficial impacts from the designation of this ACEC would be similar to Alternative D, but to a lesser degree due to the fewer restrictions and protective management actions implemented under Alternative F.

Beneficial impacts from ACECs designated under Alternative F would be the greatest in the following habitats used by migratory birds proportionally, as indicated by the following acres of overlap:

- Forests and woodlands – 107,354 acres
- Grasslands – 11,830 acres
- Nonnative annual brome – 33,714 acres
- Riparian – 8,497 acres
- Sagebrush – 809,728 acres
- Salt desert – 200,131 acres

Nongame (Mammals) – Alternative F

Impacts to nongame mammals would be similar to those discussed for migratory birds above, as they are found in a variety of habitats and are affected by management actions in the preferred vegetation type of each species. Other impacts to nongame mammals would be same as Alternative D.

Nongame (Reptiles and Amphibians) – Alternative F

Impacts to reptiles and amphibians under Alternative F would be similar to alternatives C and D, although to a lesser extent due to limitation on surface disturbance and disruptive activities in areas where the proposed Greater Sage-Grouse PHMAs ACEC overlaps riparian/wetland areas. Impacts to reptiles and amphibians in areas outside the Greater Sage-Grouse PHMAs ACEC would be consistent with Alternative D.

Special Status Species

4.4.7 Special Status Species – Plants

Adverse impacts are those that contribute to the decline in abundance or distribution of BLM special status plant species. Beneficial impacts to BLM special status plant species consist of activities that protect habitat or reduce the risk of harm to these species. An increase in BLM special status plant species numbers over time in response to an enhanced habitat or the increased viability of species is considered a beneficial impact.

For this analysis, direct impacts to BLM special status plant species are those actions resulting in damage to or loss of individual BLM special status plants, fragmentation of habitat, loss of habitat quality, loss of pollinators, and loss of soil seed banks. Direct impacts may result from surface-disturbing activities, trampling, herbivory, fire, and herbicide application. Indirect impacts to BLM special status plant species are those actions that aid or compromise the protection of these species. There may be indirect impacts to potential habitats for BLM special status plant species when actions change the habitats in a way that make them unsuitable for future colonization.

For this analysis, short-term impacts to BLM special status plant species include those activities that contribute to the decline in abundance or distribution of a species within 5 years of when the activity occurs. Long-term impacts to BLM special status plants take more than 5 years to manifest on the surface.

The Final Biological Assessment that accompanies this document can be viewed on the Bighorn Basin RMP Revision Project website (http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html) provides additional analysis of potential impacts to Ute ladies'-tresses (a threatened species under the ESA) under the proposed alternatives.

4.4.7.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Where resources overlap, management actions associated with protecting wildlife habitats and cultural resources directly benefit BLM special status plant species.
- Unless specifically designed to enhance BLM special status plant species habitat, surface-disturbing activities or invasive species treatments in BLM special status plant habitat would adversely affect BLM special status plant species.

- As more monitoring and survey data become available, it is possible that additional populations of existing BLM special status plants and unique plant communities might be found.
- The total amount of new surface disturbance allowed by an alternative is an index of potential impacts to BLM special status plants. Success of reclamation measures prescribed as a condition of development is unknown, and could either overestimate or underestimate the potential impact of surface disturbance on BLM special status plant populations.
- The existing provisions in place to protect BLM special status plant species populations are carried out and conditional monitoring is performed (e.g., grazing and surface disturbance reclamation) to ensure BLM special status plant species populations are not jeopardized.
- Management actions that preclude or restrict development, including those not specifically aimed at conserving BLM special status plant species, are assumed to benefit BLM special status plant species where populations overlap with management action boundaries.
- Because the densities and locations of BLM special status plant species in the Planning Area are not entirely known and because the locations of potential actions under the different alternatives also are not known, impact analyses are based on the amount of vegetation and soil disturbed, the threats identified for BLM special status plant species in Chapter 3, and the level of restrictions placed on BLM actions that could adversely impact BLM special status plant species.
- Consultation with the USFWS and following conservation measures identified in the BA for all listed and sensitive species for the BLM *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS* (BLM 2007b) are anticipated to mitigate most impacts to BLM special status plant species.
- Actions that reduce the threat of establishment or spread of invasive species directly benefit BLM special status plant species. IM 2006-073 (BLM 2006c) establishes policy and guidance for use of certified weed-free seed and mulch in restoration projects on public lands.

4.4.7.2 Summary of Impacts by Alternative

The principal adverse impacts to BLM special status plant species result from management that increases surface disturbance and habitat fragmentation; the principal beneficial impacts include management that increases restrictions in known or potential BLM special status plant species habitat. Based on the acreage of surface disturbance, the potential for habitat fragmentation, and proactive management actions and special designations to protect BLM special status plant species, alternatives with the least to most potential adverse impacts to BLM special status plant species are alternatives E, B, F, D, A, and C. Alternative E would result in the least surface disturbance and habitat fragmentation, followed by alternatives B, A, F, D, and C. However, alternatives D and F contain management actions to minimize habitat fragmentation that alternatives A and C do not contain. Alternatives B and E include the most provisions to protect sensitive soils and riparian/wetland areas for the benefit of BLM special status plants, followed by alternatives D and F, A, and C. Restrictions on motorized vehicle use, especially restricting motorized cross-country travel, would reduce adverse impacts to BLM special status plant species the most under Alternative E, followed by alternatives B, F, D, A, and C.

4.4.7.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Various surface-disturbing activities, including mineral exploration and development and the associated roads, ROWs, and corridors, can directly affect individuals, populations, and habitats for BLM special status plant species. Recreational use, collection of plants, fire, as well as livestock, wild horse, and native ungulate grazing may remove or trample vegetation and disturb soil, resulting in adverse impacts to BLM special status plant species. Surface-disturbing activities also can indirectly affect BLM special status plant species by contributing to soil erosion and transporting invasive species into BLM special status plant species habitats. The spread of invasive species could adversely affect BLM special status plants due to the limited size and distribution of these sensitive plants. Surface disturbance also can result in habitat fragmentation, which can isolate populations of BLM special status plant species. Populations of BLM special status plant species typically have a patchy distribution across the landscape, and eliminating one or more populations can prevent gene flow among populations if residual populations are too far apart for sufficient cross-pollination. Habitat fragmentation would be a long-term impact to BLM special status plant species. Implementing the *Wyoming Mitigation Guidelines for Surface-disturbing and Disruptive Activities* (Appendix H) and the *Wyoming BLM Reclamation Policy* (BLM 2012b) minimizes adverse impacts from surface disturbance.

Several BLM special status plant species (e.g., Shoshonea, Absaroka beardstongue, Evert's waferparsnip, Wyoming tansymustard, limber pine, whitebark pine) occur in inaccessible areas, rugged terrain, or on unstable slopes in the Planning Area. As a result, there are fewer threats to these species and the anticipated adverse impacts from surface-disturbing activities are minimal. Management actions that restrict surface disturbance on unstable slopes would result in beneficial impacts to these species. For BLM special status plant species in riparian/wetland areas (e.g., Ute ladies'-tresses, persistent sepal yellowcress), management actions that limit activity in these areas are anticipated to benefit these species by reducing direct impacts from trampling, mining, and recreational activities. Meeting PFC across all alternatives improves habitat for Ute ladies'-tresses and persistent sepal yellowcress.

Livestock grazing may result in both adverse and beneficial impacts to BLM special status plants depending on grazing intensity, timing/season of grazing, range conditions, and precipitation regimes. Livestock grazing may maintain or create habitat for BLM special status plant species by reducing competition. However, livestock grazing may result in direct mortality through trampling, herbivory, and general site degradation (e.g., soil compaction, erosion). Livestock grazing in areas of Ute ladies'-tresses could benefit this BLM special status plant species as long as grazing occurs outside the flowering period. Adverse impacts to Williams' spring-parsley and Hyattville milkvetch from livestock grazing are not anticipated, as cattle and sheep are not known to graze on these plants. Under all alternatives, adherence to *Wyoming Standards for Healthy Rangelands* (Appendix N) would help to limit impacts to BLM special status plant species. Potential adverse impacts from wild horse grazing would be limited to HMAs and would be similar under all alternatives as the initial appropriate management level for the HMAs would remain the same.

Travel and transportation management may adversely affect BLM special status plant species if motorized travel is allowed in areas with these species. Motorized vehicle use disturbs soil and removes vegetation resulting in adverse impacts to BLM special status species plant habitat. The generation of dust from motorized vehicle travel on roads next to BLM special status plant species could affect plant development, growth, reproduction and overall population survival if there are only a few individual

plants in the area. Invasive species are more likely to spread along trails and roads and may out compete BLM special status plant species.

Management in special designations (e.g., ACECs) ultimately protects special status plant species by avoiding or prohibiting surface-disturbing activities in these areas. These designations may increase the interest, popularity, and use of these areas, resulting in increased potential for disturbance and removal of BLM special status plant species and the spread of invasive species.

Some management actions generally benefit all BLM special status plant species. For example, management to control invasive species may benefit BLM special status plants by reducing competition for available habitat. Management actions that protect erosive soils, riparian areas, and steep slopes are beneficial to most BLM special status plant species. Beneficial impacts are anticipated for BLM special status plant species where protection of visual and cultural resources, fish and wildlife habitat, and vegetation overlap with suitable habitat for these species. Requirements for surveys of BLM special status plant species prior to authorization of surface-disturbing activities would reduce impacts to these species by avoiding populations if they are found. In addition, these surveys may identify new locations of BLM special status plant species, thereby increasing knowledge of these species. The BLM would also consult with stakeholders in the permitting process to design projects in a manner that would minimize or avoid potential adverse effects to BLM special status plant species.

Alternative A

Surface Disturbance

Surface-disturbing activities such as energy and mineral development, road construction, and other mechanized disturbance could cause adverse impacts to known BLM special status species plant populations and potential habitats, and undocumented populations. These activities fragment habitats, potentially isolating populations of BLM special status plants. Reclamation mitigates short-term impacts of surface disturbance by minimizing soil erosion and the establishment of invasive species. However, even with reclamation, surface-disturbing activities can have long-term adverse impacts to BLM special status plants through changes in the plant community structure or encroachment of invasive species. Under Alternative A, BLM actions are projected to result in 136,253 acres of short-term surface disturbance on BLM-administered land and 15,646 acres in the long term over the life of the plan (Table 4-1). Maintenance of healthy soil conditions enhances the viability, vigor, and abundance of BLM special status plant species.

Resource Uses

Assuming exploration and development of minerals will continue in the Planning Area and potentially increase for some minerals, the potential for adverse impacts to special status plants will increase proportionately. Alternative A has the second-most acreage open to oil and gas leasing subject to the terms and conditions of the standard lease form and the second-to-least acreage open with major constraints. Required pre-disturbance surveys, mitigation, and reclamation will minimize impacts from mineral development.

The spread of invasive species may adversely affect special status plant species, which are limited in size and distribution. However, due to management of invasive species, the BLM anticipates that adverse impacts from invasive species would be minimal, with cheatgrass being the species with the most potential to adversely impact special status plant species. Management of invasive species could directly benefit special status plants by eliminating direct competition and maintaining habitat health and diversity. In particular, eradication of invasive species in riparian areas (e.g., Tamarisk, Russian

olive) benefits Ute ladies'-tresses and persistent sepal yellowcress. Under Alternative A, aerial application of pesticides is allowed on a case-by-case basis and livestock flushing is required on a case-by-case basis. Livestock flushing minimizes the transport of invasive species in fecal material onto or within BLM-administered lands.

The development of ROWs may result in habitat fragmentation and degradation resulting in adverse impacts to special status plants. The development and use of linear ROWs can also lead to an increase in the spread of invasive species resulting in adverse impacts to special status plants. ROWs concentrated in a corridor tend to localize or confine disturbance to a smaller area and reduce disturbance in areas identified as sensitive. Under Alternative A the BLM manages 61,147 acres as ROW exclusion areas, limiting adverse impacts.

Motorized vehicle use may adversely affect habitat for special status plants. Alternative A has the greatest acreage limited to existing roads and trails and the second least acreage closed to motorized vehicle use in the Planning Area. Invasive species are more likely to spread to areas with roads and trails used by motorized vehicles. Permitting off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations would result in soil disturbance, vegetation removal, and transport of invasive species. Motorized vehicle use is a threat to Rocky Mountain twinpod, Hyattville milkvetch, and Dubois milkvetch (Mills and Fertig 2000b; Fertig 2001; Fertig 2000a), and is anticipated to indirectly and adversely impact known and unknown populations of special status plant species under Alternative A.

Under Alternative A, the Planning Area is open to livestock grazing, except in areas specifically closed including Bighorn River tracts, campgrounds, and exclosures. While trampling and herbivory from livestock grazing may result in direct adverse impacts to special status plant species, Alternative A manages livestock grazing to protect or enhance other resource values, minimizing adverse impacts. In addition, by instituting a ¼-mile buffer around riparian/wetland areas for placement of salt, mineral, or forage supplements, Alternative A minimizes adverse impacts to Ute ladies'-tresses and persistent sepal yellowcress.

Special Designations

Two existing ACECs that include special status species as their value of concern are Five Springs Falls and Upper Owl Creek, although other ACECs may also include BLM special status plant species. Protecting special status plants in these areas directly benefits the species known to occur there. Management of the Five Springs Falls ACEC and Upper Owl Creek ACEC includes NSO restrictions for leasable minerals, resulting in beneficial impacts to special status plants. While Upper Owl Creek ACEC is open to ROW authorizations, a detailed activity plan must be developed and approved before any surface-disturbing activity in the ACEC, which may minimize adverse impacts to special status plant species.

No WSRs are currently designated in the Planning Area; however, twenty waterways meet the WSR eligibility criteria. Management of these waterways to protect their ORVs and their free-flowing conditions, results in beneficial impacts to Ute ladies'-tresses and persistent sepal yellowcress by minimizing disturbances to riparian/wetland habitat.

Resources

Soil compaction and erosion may result in indirect adverse and long-term impacts to special status plant species. Several special status plant species occur in areas with sparse vegetative cover, on steep slopes, and in rocky areas; therefore, management actions that limit activities in these areas and protect the integrity of the soils in the area, are anticipated to have beneficial impacts to these species.

Alternative A does not require reclamation plans, although it reestablishes vegetation cover on disturbed soils within 5 years of initial seeding.

Changes in water management that reduce the periodicity of flooding may impact Ute ladies'-tresses and persistent sepal yellowcress (Heidel 2007, Handley and Heidel 2008). Alternative A encourages the maintenance of natural flow regimes for streams supporting fisheries, but does not require it, which could adversely impact Ute ladies'-tresses and persistent sepal yellowcress.

Wildland fires may affect special status plant species by temporarily removing vegetation, changing plant community composition, and inhibiting plant succession. If special status plants depend on a specific seral stage or associative plants, a wildland fire could upset the ecological balance that supports a sensitive plant's habitat or plant community. Wildland fire also may enhance habitat for special status plants and be a catalyst for their reestablishment and proliferation. Habitat degradation from invasion of Utah juniper due to fire suppression has been identified as a threat to Hyattville milkvetch (Fertig and Welp 2001). Alternative A utilizes wildland fires to restore fire-adapted ecosystems, which could benefit Hyattville milkvetch.

Alternative A manages all riparian/wetland areas to meet or make progress toward meeting PFC, but does not prioritize those not meeting PFC. Under Alternative A, the 500-foot buffer for surface-disturbing activities around riparian/wetland areas would reduce adverse impacts to special status plants in these areas. The buffer reduces the potential for direct removal of special status plants, sedimentation, and the potential for invasive species establishment, which have indirect adverse impacts to special status plant species.

Where restrictions of surface-disturbing activities are implemented for fish and wildlife habitats, special status plant habitats could be improved and adverse impacts to these species minimized. Alternative A institutes a TLS in big game crucial winter range and a CSU stipulation for big game migration corridors, and narrow ridges. Alternative A manages habitat, on a case-by-case basis, for the appropriate DPC based on the presence of special status species, potentially benefitting BLM special status plants in the long term.

Proactive Management

Under Alternative A, proactive management actions implemented include reviewing actions, use authorizations, rangeland improvement projects, invasive species treatments, and fire suppression effects for potential impacts to BLM special status plant species before performing these tasks. For all these tasks, avoidance, minimization and/or compensation measures are implemented on a case-by-case basis. These reviews are anticipated to benefit BLM special status plant species. Alternative A does not identify any buffer around BLM special status plant species for placement of forage supplements; however, mitigations to avoid BLM special status plant species are routinely applied at the site-specific activity level when appropriate.

Alternative B

Surface Disturbance

Under Alternative B, BLM actions are projected to result in 73,940 acres of short-term surface disturbance to BLM-administered land and 10,893 acres of long-term surface disturbance over the life of the plan (Table 4-1). In addition to causing less surface disturbance than Alternative A, Alternative B reduces the potential for habitat fragmentation by maintaining large, contiguous blocks of native plant communities. The restrictions on habitat fragmentation and fewer disturbed acres relative to

Alternative A are anticipated to indirectly benefit BLM special status plant species by protecting potential habitats, minimizing the spread of invasive species, and minimizing soil erosion.

Resource Uses

Under Alternative B, approximately 2,464,754 acres are closed to oil and gas leasing, approximately 9.5 times more acreage than under Alternative A. While required mitigation and reclamation under all alternatives minimizes adverse impacts from mineral development, Alternative B results in fewer adverse impacts to BLM special status plant species than Alternative A due to the greater acreage closed to oil and gas leasing.

Invasive species spread would result in similar potential adverse impacts to those under Alternative A, but to a lesser extent. The BLM treats less acreage to eradicate or control the spread of invasive species under Alternative B; however, this alternative would cause less surface disturbance and the BLM employs greater measures to return disturbed areas to native vegetation communities, leaving less area vulnerable to invasive species establishment. Allowing the aerial application of pesticides within ½ mile of riparian/wetland areas to manage riparian weed species would beneficially impact the Ute ladies'-tresses and persistent sepal yellowcress. Overall, management of invasive species under Alternative B would have less adverse impacts to BLM special status plant species, compared to Alternative A.

Alternative B designates more area (225,447 acres) as exclusion areas for ROWs and corridors resulting in more beneficial impacts to BLM special status plants than Alternative A by minimizing habitat fragmentation and degradation.

Under Alternative B, adverse impacts to BLM special status plant species from motorized vehicle use are anticipated to be less than Alternative A because Alternative B has more acreage closed to motorized vehicle use, less acreage limited to existing roads and trails, and more acreage limited to designated roads and trails. Prohibiting off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations would also reduce the impacts from this action described under Alternative B. The anticipated soil disturbance, vegetation removal, and transport of invasive species under Alternative B are expected to produce less indirect and adverse impacts to unknown populations of BLM special status plant species compared to Alternative A.

Livestock grazing is more limited under Alternative B than under Alternative A, as approximately 270,834 acres of crucial winter range for elk and bighorn sheep and 1,229,612 acres of greater sage-grouse Key Habitat Areas are closed to livestock grazing. Closing more acres to livestock grazing would result in less potential adverse impact to BLM special status plant species from trampling and herbivory. Additionally, Alternative B prohibits forage supplements within ½ mile of BLM special status plant species populations to minimize adverse impacts from livestock grazing. Expanding the McCullough Peaks HMA boundary may increase the extent of adverse impacts from wild horse grazing, but maintaining the initial appropriate management level for wild horses would not change the intensity of impacts. Alternative B would result in greater beneficial impacts to Ute ladies'-tresses and persistent sepal yellowcress than Alternative A because of the larger buffer around riparian/wetland areas with respect to placement of forage supplements. In addition, Alternative B places more emphasis on meeting the rangeland health standards and maximizing multiple use benefits. More effective monitoring, management, and implementation of some grazing systems may benefit BLM special status plant species under Alternative B.

Special Designations

In addition to carrying forward the Five Springs Falls and Upper Owl Creek ACECs that emphasize protection of BLM special status plant species, Alternative B expands the existing Upper Owl Creek,

Carter Mountain, and Little Mountain ACECs, and proposes designating Clarks Fork Canyon, Rattlesnake Mountain, and Sheep Mountain ACECs, all of which support BLM special status plant populations. Other ACECs under Alternative B may include BLM special status plant species as well. Designating these additional ACECs minimizes adverse impacts to the BLM special status plant populations within the boundaries of the ACECs because managing these areas helps protect these populations. This alternative provides more opportunities to maintain BLM special status plant habitats in special designations.

Alternative B manages 20 waterways as suitable for inclusion in the NWSRS, which includes approximately 27,317 acres in the Planning Area. This alternative prohibits surface-disturbing activities on BLM-administered lands in the WSR suitable waterways, withdraws the segments from appropriation under the mining laws, closes the areas to geophysical exploration, and manages the segments as ROW exclusion areas. This type of management protects the values of the segments more than under Alternative A; therefore, the anticipated beneficial impacts to BLM special status plant species under Alternative B are more than under Alternative A.

Resources

Alternative B includes additional protective measures for soils compared to Alternative A. Reclamation plans are developed and approved before starting any surface-disturbing activities, areas are reclaimed based on pre-existing plant communities, and inventories and mapping of soils to determine erosion and degree of soil stability are completed. By understanding the soils better, the BLM can institute required BMPs that will be most effective in each area, thereby potentially reducing erosion, and minimizing adverse impacts to BLM special status plant species. The anticipated level of soil erosion and compaction are expected to be less under Alternative B than under Alternative A.

While Alternative A may fence springs and reservoirs to meet resource objectives, Alternative B may also fence riparian/wetland areas as necessary, potentially increasing the beneficial impacts to BLM special status plant species in these habitats. In addition, Alternative B maintains natural flow regimes for streams supporting fisheries. This is important to Ute ladies'-tresses and persistent sepal yellowcress, which depend on periodic flooding events during their life-cycles.

Under Alternative B, the BLM utilizes wildland fire and other vegetation treatments to restore fire-adapted ecosystems, which could result in the same or fewer beneficial impacts to Hyattville milkvetch than Alternative A because Alternative B relies mostly on natural processes, and less on active restoration. Wildland fire and other vegetation treatments could be used to reduce the invasion of Utah juniper into Hyattville milkvetch habitat.

Alternative B is anticipated to result in greater beneficial impacts to BLM special status plants in riparian/wetland habitats than Alternative A because Alternative B manages these habitats to achieve DPC, prioritizes those areas not meeting PFC, and increases the buffer prohibiting surface-disturbing activities around riparian/wetland habitats to ¼ mile. Through these management actions, the potential for direct removal of BLM special status plants, sedimentation, and spread of invasive plants is less than under Alternative A. In addition, Alternative B applies an NSO restriction to wetlands larger than 40 acres.

Alternative B provides more protections to big game crucial winter range areas by establishing the Absaroka Front Management Area and applying an NSO restriction to these ranges and areas elsewhere, and prohibiting surface disturbance within ½ mile of migration corridors. These restrictions result in beneficial impacts to BLM special status plants in these areas, by reducing removal and trampling of these species. Because the restrictions are NSO, the beneficial impacts are anticipated to be greater than under Alternative A.

Proactive Management

Alternative B includes more restrictions for the protection of special status plant species habitat and provides more protection to known populations of BLM special status plants compared to Alternative A. Range improvement projects are not allowed within ½ mile of known BLM special status plant species, forage supplements are prohibited within ½ mile of BLM special status plants, aerial applications of pesticides are prohibited with 1 mile of BLM special status plants, and surveys are required in potential BLM special status plant habitats before approving any project. The increased buffers and required surveys compared to Alternative A aid in habitat protection and potential expansion of BLM special status plant populations.

Alternative C

Surface Disturbance

Under Alternative C, BLM actions are projected to result in 245,642 acres of short-term surface disturbance on BLM-administered land and 41,485 acres of surface disturbance in the long term over the life of the plan, the greatest acreage of all alternatives (and more than double the acreage of Alternative A) (Table 4-1). Similar to Alternative A, Alternative C increases the potential for habitat fragmentation by not maintaining large, contiguous blocks of native plant communities. By having fewer restrictions on habitat fragmentation and disturbing more acres than alternatives A, B, and D, Alternative C is anticipated to indirectly benefit BLM special status plant species less than the other alternatives. The spread of invasive species and extent of soil erosion would be greatest under Alternative C.

Resource Uses

Alternative C has the greatest acreage open to oil and gas development subject to standard constraints, the fourth greatest acreage subject to moderate constraints, the least acreage subject to major constraints, and the least acreage closed to oil and gas development. While required mitigation and reclamation under all alternatives minimizes adverse impacts from mineral development, Alternative C could result in the greatest adverse impacts to BLM special status plant species due to implementing the least restrictions to these activities.

Under Alternative C, implementing a ½-mile buffer around BLM special status plant species prohibiting aerial herbicide application may result in less adverse impacts from invasive species management to Ute ladies'-tresses and persistent sepal yellowcress than under alternatives A and D (under which aerial application is permitted), but more than Alternative B (under which the BLM implements a 1-mile buffer). Alternative C allows exceptions to this buffer to manage riparian weed species, which could benefit Ute ladies'-tresses and persistent sepal yellowcress in the long term. Under Alternative C, impacts from transport of invasive species by livestock are anticipated to be greater than any other alternative, as flushing of livestock is not required.

Under Alternative C, adverse impacts to BLM special status plant species from OHV use are anticipated to be the greatest of all the alternatives because Alternative C has the least acreage closed to motorized vehicle use, the second greatest acreage limited to existing roads and trails, the second least acreage limited to designated roads and trails, and the greatest acreage open. Permitting off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations would result in impacts similar to those described for Alternative A, but to a greater extent by allowing the creation of new travel routes. The anticipated soil disturbance, vegetation removal, and transport of

invasive species under Alternative C are expected to produce the most indirect and adverse impacts to unknown populations of BLM special status plant species compared to other alternatives.

Similar to alternatives A and D, livestock grazing is closed on Bighorn River tracts, campgrounds, and exclosures. Alternative C may result in greater adverse impacts to Ute ladies'-tresses and persistent sepal yellowcress than alternatives A, B, and D by allowing placement of forage supplements in riparian/wetland areas. Alternative C (and Alternative D) allows the placement of forage supplements after considering the location of BLM special status plant species, which may increase the risk of herbivory and trampling. In addition, Alternative C places more emphasis on livestock forage availability while meeting multiple use objectives. Overall, adverse impacts to BLM special status plants from livestock grazing management under Alternative C are anticipated to be similar to alternatives A and D and greater than Alternative B.

Special Designations

Under Alternative C, only the existing Brown/Howe Dinosaur Area and Spanish Point Karst ACECs are carried forward and no new ACECs are designated. No BLM special status plant species are known to occur in either ACEC. Therefore, beneficial impacts to special status plants from designation and management of ACECs would be the least under Alternative C.

Under Alternative C, does not recommend any WSR eligible waterway segments as suitable for inclusion in the NWSRS. By releasing these areas for other uses to be managed in accordance with adjacent BLM-administered lands, the potential for adverse impacts to Ute ladies'-tresses and persistent sepal yellowcress is greater than alternatives A and B.

Resources

Alternative C includes additional protective measures for soils compared to Alternative A, so that reclamation plans are developed on a case-by-case basis and 30 percent desired vegetative cover is required within three growing seasons. The anticipated level of soil erosion and compaction are expected to be similar to Alternative A.

While Alternative A may fence springs and reservoirs, Alternative C may fence springs and their associated wetland areas, potentially increasing the beneficial impacts to BLM special status plant species in these habitats. Alternative C manages for adequate in-stream flow to support riparian and fisheries values, which may provide fewer beneficial impacts than maintaining natural flow regimes as under alternatives A, B, and D. Because Alternative C only implements BMPs on permitted activity plans to reduce sediment loading in streams and river segments, it would have fewer beneficial impacts to BLM special status plant species than alternatives A, B, and D.

Under Alternative C, the BLM utilizes wildland fire and other vegetation treatments to restore fire-adapted ecosystems, similar to Alternative B, except that under Alternative C active restoration is used, which may create a greater beneficial impact than natural processes alone. This may result in more beneficial impacts to Hyattville milkvetch than Alternative A. Wildland fire and other vegetation treatments could be used to reduce the invasion of Utah juniper into Hyattville milkvetch habitat.

Alternative C may result in similar beneficial impacts to BLM special status plants in riparian/wetland habitats as Alternative A because both alternatives manage these habitats to meet PFC. In addition, Alternative C prioritizes areas functioning at-risk with a downward trend and areas in a nonfunctioning condition. However, Alternative C allows surface-disturbing activities in riparian/wetland areas on a case-by-case basis, potentially increasing adverse impacts to BLM special status plants in these areas. Through these management actions, the potential for direct removal of BLM special status plants,

sedimentation, and spread of invasive plants is greater than under alternatives A, B, and D. Similar to Alternative A, Alternative C does not apply an NSO restriction to wetland areas greater than 40 acres.

Alternative C provides fewer protections to big game crucial winter range, and migration corridors than alternatives A, B, and D. By allowing activities in these areas, Alternative C results in the fewest beneficial impacts to BLM special status plants in these areas because these species may be removed or trampled.

Proactive Management

Alternative C sets aside the least amount of land of any alternative for areas that have management actions to benefit BLM special status plant species. Similar to Alternative B, buffers and restrictions for other resources and surface-disturbing activities around BLM special status plant species will likely provide indirect beneficial impacts to habitats for special status plants. Range improvement projects are not allowed within ½ mile of known BLM special status plant species, forage supplements are prohibited within 300 feet of BLM special status plants, and aerial applications of pesticides are prohibited with ½ mile of BLM special status plants, but surveys are only required in potential habitats for federally listed, proposed, or candidate species before approving any project. The increased buffers and requirement of some surveys compared to Alternative A aid in habitat protection and the potential expansion of the special status plant populations.

Alternative D

Surface Disturbance

Under Alternative D, BLM actions are projected to result in 140,175 acres of short-term surface disturbance on BLM-administered land and 18,306 acres of surface disturbance over the life of the plan, the second most acreage compared to the other alternatives. However, similar to Alternative B, Alternative D reduces the potential for habitat fragmentation by maintaining large, contiguous blocks of native plant communities. Although the BLM allows the use of nonnative seeds that may slow the reestablishment of native plant communities, reclamation practices under Alternative D, would mitigate short-term impacts of surface disturbance more than under Alternative A. Overall, surface disturbance under Alternative D would result in impacts similar to those under Alternative A.

Resource Uses

Alternative D has approximately 911,814 acres open to oil and gas leasing subject to the terms and conditions of the standard lease form, approximately one-fifth of the acreage under Alternative A, and has almost two times more acreage closed to oil and gas leasing than under Alternative A. Minerals development under Alternative D would result in fewer adverse impacts to BLM special status plant species than under alternatives A and C, but more than under Alternative B.

Adverse impacts from management of invasive species under Alternative D would be similar to those under Alternative A. Alternative D results in more surface disturbance than Alternative A, leaving more areas vulnerable to invasive species spread, but employs more measures to restore vegetation in disturbed areas and places more restrictions on motorized travel that can spread invasive species.

Alternative D manages 20,345 fewer acres as ROW exclusion areas than Alternative A, but 1,467,719 more acres as ROW avoidance areas, which would result in more beneficial impacts to special status plant species than under alternatives A and C, but less than under Alternative B.

Under Alternative D, adverse impacts to BLM special status plant species from motorized vehicle use would be more than under alternatives A and B, but less than under Alternative C; Alternative D closes

or limits motorized vehicle use on fewer acres than alternatives A and B, but is more restrictive than Alternative C. Restricting off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations to within 300 feet of established roads would limit the adverse impacts described under Alternative A.

Impacts from livestock grazing management under Alternative D would be similar to those under Alternative A. Allowing the use of livestock grazing, even in closed areas, as a tool to improve resource conditions may beneficially affect BLM special status plant species if grazing is used to enhance native plant communities.

Special Designations

Special designations under Alternative D would result in similar beneficial impacts as those under Alternative B, but to a lesser extent. Alternative D carries forward the Five Springs Falls, Upper Owl Creek, Carter Mountain, and Little Mountain ACECs, and proposes designating the Clarks Fork Canyon and Sheep Mountain ACECs. Alternative D would designate more acreage in ACECs than alternatives A and C, but less than Alternative B. Not recommending WSR eligible waterway segments as suitable for inclusion in the NWSRS would result in similar potential adverse impacts as those under Alternative C.

Resources

Alternative D includes additional protective measures for soils compared to alternatives A and C, but less than Alternative B. Alternative D requires reclamation plans, stipulations, or measures before authorized surface-disturbing activities and develops reclamation plans in coordination with stakeholders. The anticipated level of soil erosion and compaction are expected to be less under Alternative D than under alternatives A and C, but more than under Alternative B.

Similar to Alternative A, Alternative D does not require the maintenance of natural flow regimes for streams supporting fisheries, which would result in similar adverse impacts. Developing watershed improvement projects and fencing springs, wetlands, reservoirs, and riparian areas to meet resource objectives would result in similar beneficial impacts to those under Alternative B.

Fire and fuels management under Alternative D would result in impacts to BLM special status plant species similar to those under Alternative A.

Alternative D would result in beneficial impacts to BLM special status plant species in riparian/wetland habitats similar to Alternative A, but to a greater extent because the BLM manages areas with unique fisheries or recreational value toward achieving DFC. Management toward DFC is assumed to exceed the requirements of managing toward PFC and would therefore result in improved functioning and healthier riparian/wetland areas. Avoiding surface-disturbing activities within ¼ mile of riparian/wetland areas would reduce adverse impacts to BLM special status plant species in these areas similarly to Alternative A. Alternative D also applies an NSO on wetlands greater than 20 acres, resulting in similar beneficial impacts as those under Alternative B, but to a greater extent.

Alternative D provides similar beneficial impacts as those under Alternative B by establishing the Absaroka Front Management Area, but to a lesser extent. Alternative D restricts mineral development in this area less than Alternative B—by using a mix of CSU, TLS, NSO, and closed to leasing restrictions—but more than Alternative C and Alternative A (under which this management area is not recognized). Potential adverse impacts to special status plant species from wild horse grazing under Alternative D would be similar to those described under Alternative B.

Proactive Management

Alternative D avoids range improvement projects that may concentrate herbivory within ¼ mile of BLM special status plant species, unless the project is determined not to adversely impact that population; allows the placement of forage supplements after considering their proximity to BLM special status plant species; implements avoidance, minimization and/or compensation measures for projects and activities in coordination with surface owners on split-estate; avoids aerial applications of herbicides within ½ mile of BLM special status plant species; and allows the application of fire suppression chemicals within ¼ mile of known/documented populations of BLM special status plant species with consent of the authorized officer. Overall, these measures would result in more beneficial impacts to BLM special status plant species than alternatives A and C, but less than Alternative B.

Alternative E

Surface Disturbance

Under Alternative E, BLM actions are projected to result in 71,829 acres of short-term surface disturbance to BLM-administered land and 10,691 acres of long-term surface disturbance over the life of the plan, the least acreage of all alternatives (Table 4-1). Management practices relating to surface disturbance would be the same as Alternative B, except for areas within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). In this ACEC, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) to not exceed one disturbance per 640 acres and cover less than 3 percent of the greater sage-grouse Key Habitat Areas, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. This additional restriction on anthropogenic disturbances would reduce effects from surface disturbance to a greater degree than described under Alternative B. Similar to Alternative B, but to a greater degree, Alternative E would reduce the potential for habitat fragmentation by maintaining large, contiguous blocks of native plant communities which would indirectly benefit BLM special status plant species by protecting potential habitats, minimizing the spread of invasive species, and minimizing soil erosion.

Resource Uses

Compared to the other alternatives, Alternative E would close the most acreage to mineral development and disposal while also placing additional limitations on surface disturbance within the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Therefore, Alternative E would result in the fewest adverse impacts to special status species plants from minerals development. Although alternatives B and E apply similar management actions to eradicate or control the spread of invasive species, the potential for invasive species spread would be reduced under Alternative E due to less surface disturbance. Additional management actions to protect sage-grouse habitat from invasive species under Alternative E would indirectly benefit special status plant species whose habitat overlaps the proposed Greater Sage-Grouse Key Habitat Areas ACEC; however, restrictions on herbicide applications in the ACEC could reduce the ability to control infestations.

Impacts resulting from travel management under Alternative E would be the same as Alternative B and would benefit special status plant species by placing the most limitations on and closures to motorized vehicle use of any alternative.

Alternative E designates the greatest acreage (1,322,879 acres) as exclusion areas for ROWs and corridors, substantially more than any other alternative due to the designation of the proposed Greater Sage-Grouse Key Habitat Areas ACEC as a ROW exclusion area, which would result in the greatest beneficial impacts to BLM special status plants by minimizing habitat fragmentation and degradation.

Impacts to special status plant species from other resource uses would be the same as Alternative B.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land within greater sage-grouse Key Habitat Areas that would be designated as an ACEC. The relative size and additional restrictions on surface-disturbing activities and resource uses in the proposed Greater Sage-Grouse Key Habitat Areas ACEC would result in the most beneficial impacts to special status plant species in comparison to the other alternatives. Impacts to special status plant species from special designations in areas outside the proposed Greater Sage-Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Resources

The resource management of Alternative E and additional management practices to protect and restore sagebrush habitats within the proposed Greater Sage Grouse Key Habitat Areas ACEC would provide the most beneficial impacts to special status plant species by reducing surface disturbance, soil erosion, and compaction in the largest area when compared to the other alternatives. Impacts on special status species plants from other management actions to protect resources would be the same as Alternative B for areas outside of the Greater Sage-Grouse Key Habitat Areas ACEC.

Proactive Management

Proactive management for the protection of special status plant species habitats and known populations would be generally the same as Alternative B. However, the greatest indirect beneficial impacts to special status plant species may result from the management to protect and restore sagebrush habitats within the proposed Greater Sage-Grouse Key Habitat Areas ACEC.

Alternative F

Surface Disturbance

Under Alternative F, BLM actions are projected to result in 137,064 acres of short-term and 17,663 acres of long-term surface disturbance, the third most acreage compared to the other alternatives. However, similar to alternatives B and E, Alternative F reduces the potential for habitat fragmentation by maintaining large, contiguous blocks of native plant communities. Overall, surface disturbance under Alternative F would result in impacts similar to Alternative A and slightly less adverse than Alternative D due to reduced surface disturbance from additional management practices that would reduce the total acreage of surface disturbance in 1,116,698 acres of the Greater Sage-Grouse PHMAs ACEC.

Resource Uses

Minerals development under this alternative would result in fewer adverse impacts to special status plant species than Alternative D due to greater limitations on surface disturbance and additional restrictions placed on minerals development in the Greater Sage-Grouse PHMAs ACEC. Minerals development under Alternative F would therefore result in fewer adverse impacts to BLM special status plant species than under alternatives A, C, and D, but more than under alternatives B and E.

Adverse impacts from management of invasive species would be slightly less than under Alternative D due to management actions within the proposed Greater Sage-Grouse PHMAs ACEC that reduce surface disturbance, place greater restrictions on motorized vehicle travel, and prioritize the health and restoration of sagebrush habitats. However, similar to Alternative E, restrictions on herbicide applications in the ACEC could reduce the ability to control infestations.

Alternative F manages 92,932 more acres as ROW exclusion areas than Alternative D and requires seasonal restrictions on construction of aboveground powerlines or the use of buried powerlines within the proposed Greater Sage-Grouse PHMAs ACEC. Alternative F manages more acres as ROW avoidance areas than does Alternative A. ROW management under this alternative would result in fewer adverse impacts to special status plant species than under alternatives A, C, and D, but more than under Alternative B.

Under Alternative F, adverse impacts to BLM special status plant species from motorized vehicle use would be more than under alternatives B and E, but less than under alternatives A, C, and D, because Alternative F limits motorized vehicle use to designated roads and trails over a greater area.

Impacts from livestock grazing would be similar to alternatives A and D, but with greater potential for indirect beneficial impacts within the proposed Greater Sage-Grouse PHMAs ACEC, which would be managed to protect and restore native sagebrush habitat.

Special Designations

The relative size and additional restrictions on surface-disturbing activities and resource uses in special designations areas under Alternative F would result in greater protections for special status plant species in comparison to alternatives A, C, and D, but fewer than under alternatives E and F. Specifically, additional constraints on oil and gas leasing, motorized vehicle use, and renewable energy development in the proposed Greater Sage-Grouse PHMAs ACEC would reduce surface disturbances and result in fewer adverse impacts to special status plant species than Alternative D. Impacts to special status plant species from special designations in areas outside the proposed Greater Sage-Grouse PHMAs ACEC would be the same as Alternative D.

Resources

Decreased surface disturbance under this alternative would reduce soil erosion and compaction to a greater extent than Alternative D, increasing less adverse impacts to special status plant species. Similar to Alternative E, management actions for habitat restoration, invasive species management, and fire and fuels management that emphasize the conservation and restoration of sagebrush habitats would provide additional benefits to special status plant species within the proposed Greater Sage-Grouse PHMAs ACEC. Impacts on special status plant species from other management actions to protect resources would be the same as Alternative D.

Proactive Management

Management actions under Alternative F for habitat restoration, invasive species management, fire and fuels management, and livestock grazing that prioritize the conservation of native sagebrush habitats within the proposed Greater Sage-Grouse PHMAs ACEC would provide greater protection for special status plant species than alternatives A and C, similar impacts to Alternative D, and fewer beneficial impacts than alternatives B and E. Management of areas outside of the Greater Sage-Grouse PHMAs ACEC and associated impacts to special status plant species would be the same as Alternative D.

4.4.8 Special Status Species – Fish

Adverse impacts are those that degrade water quality (e.g., temperature, chemistry, etc.) in the Planning Area, particularly where there are special status fish species. Beneficial impacts are those that improve and/or preserve water quality and quantity in these areas. Direct impacts are similar to those identified in Section 4.4.5 *Fish and Wildlife Resources – Fish* and include onsite disturbances to fish habitat, while indirect impacts result from changes in water quality and quantity.

For this analysis, short-term impacts to special status fish species include those activities that contribute to the decline in abundance or distribution of a species within 5 years of when the activity occurs. Long-term impacts to special status fish are those that require more than 5 years to manifest, such as efforts to improve habitat over time or remove competitive nonnative species.

In general, management actions that affect fish would also affect special status fish species. Section 4.4.5 *Fish and Wildlife Resources – Fish* provides a detailed analysis of direct and indirect management actions that impact fish. This section focuses on the potential impacts of the alternatives to special status fish species habitat (including habitat of the Yellowstone cutthroat trout, a BLM sensitive species), proactive management that could beneficially impact these species, and potential impacts to federally listed species downstream of the Planning Area.

4.4.8.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Water consumption in the Bighorn River and the Clarks Fork of the Yellowstone River watersheds may adversely affect surface water quantity in the larger Yellowstone River and Missouri River ecosystem.
- Production water from CBNG drilling that is low in salts and other chemicals that may be detrimental to aquatic life forms is assumed to have negligible influence on surface water quantity and quality in the Bighorn River and the Clarks Fork of the Yellowstone River watersheds due to the low likelihood that CBNG activities would occur at high levels in the Bighorn Basin. However, if CBNG activities are located near important habitat for special status fish species, it can be assumed there will be adverse impacts.
- In cooperation with WGFD, the BLM would continue to manage species listed on BLM Wyoming State Director's Sensitive Species List in accordance with BLM manual 6840 (BLM 2001b).
- USFWS would have jurisdiction over the management of threatened and endangered fish and wildlife populations.

4.4.8.2 Summary of Impacts by Alternative

Impacts to special status fish species are generally the same as those for fish, although the beneficial impacts to these species would tend to be greater because of additional protective management for special status species under all alternatives. The principal impacts to fish result from management that increases surface disturbance, resulting in sedimentation and other adverse impacts to water quality and quantity in waterways containing special status species. Increased sediment in fish habitat (streams, rivers, and reservoirs) decreases the potential for fish to naturally reproduce, fills in pools, leads to channel degradation, decreases light penetration and productivity, alters fish community composition, and increases stream temperature. Alternative C places the fewest restrictions on surface-disturbing activities and has the greatest potential to contribute sediment to surface waters in the Bighorn, Shoshone, and Clarks Fork of the Yellowstone rivers, resulting in the greatest potential adverse impact on water quality in Yellowstone cutthroat trout and other special status species fish habitat. Alternative C is projected to result in the highest number of new federal wells (Appendix T), which may result in the greatest water depletion and, therefore, the greatest adverse impact to water quantity in these rivers, followed by alternatives A, D, F, B, and E. Alternatives D and F are projected to result in greater surface disturbance than Alternative A, but contain additional reclamation requirements that may limit erosion to a greater degree and, therefore, mitigate adverse impacts to fish habitat.

Alternatives B and E would result in the greatest beneficial impacts to special status fish species habitat from more definitive proactive management actions and more stringent reclamation requirements relative to the other alternatives. Alternatives B, D, E, and F would provide long-term beneficial impacts by pursuing restoration of Yellowstone cutthroat trout to its native waters in the Planning Area.

4.4.8.3 Detailed Analysis of Alternatives

Allowable uses and management actions with potential to degrade water quality in the Bighorn and Clarks Fork of the Yellowstone Rivers and their tributaries could directly affect special status fish species in the Planning Area and indirectly impact federally listed fish in the Yellowstone River. The types of impacts projected to affect water quality and quantity in these watersheds are anticipated to be common to all alternatives and, therefore, are discussed in the following section. A detailed discussion of the anticipated impacts to fish from changes in water quality and quantity is included in Section 4.4.5 *Fish and Wildlife Resources – Fish*. This section focuses on the direct impacts to special status fish species habitat from proactive management, which varies by alternative.

Impacts Common to All Alternatives

The potential for management to result in adverse impacts to special status fish species is primarily a function of impacts to surface water quality and quantity. Reduced water flow in the Yellowstone River can lead to adverse impacts to the ecosystems that support special status fish species. Increased sediment in the Bighorn and Clarks Fork of the Yellowstone Rivers may contribute to sedimentation in the Yellowstone River.

Water Quality

Water quality is affected by surface-disturbing activities and associated soil erosion, particularly on soils highly susceptible to water erosion that contribute to sedimentation. Sedimentation reduces the quality of in stream habitat for most fish by filling in pools, reducing thermal recovery areas, and covering stream bottoms with a more uniform layer of sediment, which smothers eggs and alevin, thereby reducing fish reproduction rates. Appendix T provides data regarding surface-disturbance acreage and reasonable foreseeable actions related to development by alternative. Principle impacts from surface-disturbing activities would result from removing vegetation and disturbing soil, thereby increasing the potential for offsite erosion and sediment delivery into the Bighorn and Clarks Fork of the Yellowstone Rivers and their tributaries. Other actions, including concentration of livestock, fire and fuels management, OHV use, and reclamation of disturbed areas are anticipated to remove or reduce vegetation and disturb soil, but are expected to have less potential to degrade water quality in the Bighorn and Clarks Fork of the Yellowstone watersheds and therefore less potential to impact fish downstream. See Section 4.1.4 *Water* for more information regarding potential impacts to surface water quality.

Spanish Point Karst (designated under all alternatives) is the only ACEC that benefits water quality by restricting surface-disturbing activities and pesticide application in this area. WSAs contain 0.7 miles of occupied Yellowstone cutthroat trout habitat, and the restrictions on resource uses and activities to maintain their wilderness characteristics may result in indirect beneficial impacts to special status fish species under all of the alternatives.

Water Quantity

Water used for well construction and completion may reduce the amount of water available for use in the Bighorn and Clarks Fork of the Yellowstone Rivers, and therefore in the Yellowstone River

downstream of the Planning Area as well. Produced water from oil and gas wells may alter flow regimes and water quantity in streams containing special status fish species. See Section 4.4.5 *Fish and Wildlife Resources – Fish* for a description of the impacts from produced water. Produced water from CBNG drilling is assumed to have a negligible influence on surface water quantity and quality in the Bighorn River and the Clarks Fork of the Yellowstone River watersheds. See Section 4.1.4 *Water* for more information regarding potential impacts to surface water quantity.

Alternative A

Surface Disturbance

The BLM projects 15,646 acres of long-term surface disturbance from BLM-authorized actions under Alternative A (Table 4-1) resulting in an estimated erosion rate of 25,065 tons per year (Appendix V). Surface-disturbing activities remove vegetation and disturb soil, thereby increasing the potential for offsite erosion and sediment delivery to the Bighorn, Shoshone, and Clarks Fork of the Yellowstone rivers, among the waterways in the Planning Area that drain into the Yellowstone River. Sedimentation fills in pools and covers stream bottoms with a more uniform layer of sediment that adversely affects special status fish species. Surface-disturbing activities would reduce water quality and degrade Yellowstone cutthroat trout and other special status fish species habitat in the Planning Area. The greater the surface disturbance, the greater potential for adverse impacts to special status fish species.

Resource Uses

Under Alternative A, 4,130,352 acres are available for locatable mineral entry, 1,354,593 acres are open with standard constraints for oil and gas leasing, and 3,974,564 acres are open to mineral materials disposal. This alternative would develop an estimated 1,184 new federal wells. Alternative A closes 68,115 acres to motorized vehicle use and limits motorized vehicle use to designated roads and trails in areas with fragile soils, limiting vehicle-caused soil disturbance and resulting contributions to sediment loads. Adverse impacts to special status fish species from sedimentation due to surface disturbance and erosion, depleted water quantity due to mineral development, and altered flow regimes due to soil compaction and produced water discharge would occur but would be mitigated under Alternative A.

Special Designations

Alternative A designates three ACECs, containing 9.8 miles of occupied Yellowstone cutthroat trout habitat that would benefit special status fish species by restricting surface-disturbing activities in these areas and reducing the likelihood of sedimentation in the associated watersheds. Managing all 20 WSR eligible waterways, containing 3.1 miles of Yellowstone cutthroat trout habitat, would result in beneficial impacts to special status fish species habitat relative to the other alternatives by restricting resource uses and activities to maintain the free-flowing conditions of these waterways. However, WSR eligible waterway segment management may prevent construction of fish barriers to protect special status fish species habitat, if the natural free-flowing conditions of the stream would be impaired by these actions.

Resources

Under Alternative A, the BLM requires the stabilization of existing watershed improvement projects where they have failed to promote/enhance/improve watershed stability, and routinely seeds, or requires permittees and operators to seed, disturbed areas with native plant species to reestablish vegetation cover over disturbed soils within 5 years. These actions would beneficially impact special status species fishbearing streams by reducing sedimentation. Alternative A implements watershed

improvement practices from Wyoming's Bighorn Basin water quality plans and encourages natural flow regimes in streams supporting fisheries in compliance with the state's water laws, providing potential indirect beneficial impacts to special status fish species. Surface discharge under Alternative A may have adverse impacts if produced water degrades water quality in special status fish species inhabited streams and rivers. Alternative A places restrictions on surface-disturbing activities around riparian/wetland areas. Forest management under Alternative A allows for 30,000 acres of treatment that could contribute to soil disturbance and sedimentation in the short term, but may have beneficial impacts by preventing stand-replacing wildfires, which may cause much more sedimentation, in the long term. Overall, resource management actions under Alternative A would result in beneficial impacts to special status fish species.

Proactive Management

Proactive management actions that have direct beneficial impacts to special status fish under Alternative A include restoring stream segments for fisheries habitat, constructing barriers to prevent nonnative fish from colonizing habitat occupied by native fish species, and introducing special status fish species to waters outside of their historic range on a case-by-case basis. Additional long-term beneficial impacts may result from considering restoring Yellowstone cutthroat trout to its native waters in the Planning Area. Prohibiting surface-disturbing activities within 500 feet of surface water and/or riparian habitat except when impacts can be mitigated would limit direct adverse impacts to special status fish species habitat.

Alternative B

Surface Disturbance

Impacts to special status fish species would be similar to those described under Alternative A, although to a lesser extent. Surface disturbance under Alternative B (Table 4-1) would result in a 31 percent decrease in long-term erosion (Appendix V) from the baseline condition, which would reduce adverse impacts to special status fish species.

Resource Uses

Compared to Alternative A, Alternative B allows fewer opportunities for resource use that result in surface disturbance and more restrictions are placed on mineral and ROW development, motorized vehicle use, and livestock grazing. Therefore, Alternative B less potential to result in adverse impacts to special status fish species due to resource uses that can affect water quality or quantity than Alternative A.

Special Designations

The special designations under Alternative B would have greater beneficial impacts to special status fish species than Alternative A. Alternative B expands three ACECs (Carter Mountain, Five Springs Falls, and Upper Owl Creek) and designates four new ACECs (Chapman Bench, Clarks Fork Canyon, Rattlesnake Mountain, and Sheep Mountain) that restrict surface-disturbing activities. The Clarks Fork Canyon ACEC protects a large portion of Clarks Fork of the Yellowstone watershed from the adverse impacts of surface-disturbing activities and mineral development, resulting in the greatest direct beneficial impacts to special status fish species in the Yellowstone River. ACECs encompass 42.7 miles of Yellowstone cutthroat trout habitat. Managing all 20 WSR suitable waterways would result in similar impacts to those under Alternative A. Additionally, managing all lands with wilderness characteristics specifically to preserve their wilderness characteristics and restricting resource uses and activities in these areas to

protect wilderness characteristics may beneficially impact 8.8 miles of Yellowstone cutthroat trout habitat under this alternative.

Resources

Similarly to Alternative A, Alternative B stabilizes watershed improvement projects if they are no longer meeting resource objectives to prevent the release of stored sediment. Alternative B provides greater short-term beneficial impacts to special status fish species habitat than Alternative A by requiring more immediate and precisely defined vegetation reestablishment goals in disturbed areas, thereby preventing potential sedimentation. Alternative B also creates greater beneficial impacts than Alternative A by developing watershed improvement practices, which all activity plans and permitted activities include, in cooperation with local governments. The BLM manages forests and woodlands through natural processes under Alternative B, as opposed to mechanical treatments emphasized under Alternative A, likely resulting in less surface disturbance and impacts to water quality in the short term. However, if maintained stand density results in high intensity wildfires, long-term adverse impacts to water quality and flow regimes may result. Alternative B manages all riparian/wetland areas to achieve DPC, increasing the potential for long-term beneficial impacts to special status fish species habitat, relative to Alternative A.

Proactive Management

Proactive management actions under Alternative B would result in greater direct beneficial impacts to special status fish compared to Alternative A. This alternative restores important fisheries habitat on 3 miles of streams, constructs nonnative fish barriers except in WSR suitable waterway segments, removes barriers or constructs fish passageways to enable native fish to occupy all suitable habitats, pursues restoring Yellowstone cutthroat trout to all its original waters, and introduces special status fish species outside their historic range, if environmentally feasible, in coordination with WGFD and other stakeholders.

Alternative C

Surface Disturbance

Adverse impacts to special status fish species from surface disturbance would be greatest under Alternative C. Surface disturbance under Alternative C would be the highest of the alternatives (Table 4-1), resulting in a 165 percent increase in long-term erosion (Appendix V) compared to Alternative A and, therefore, the greatest adverse impact to special status fish species.

Resource Uses

Alternative C provides the least restriction on resource use, especially surface-disturbing activities such as minerals development, having the greatest potential adverse impact on special status fish species by altering water quantity and quality. The BLM manages livestock grazing to optimize commodity production while meeting rangeland health standards, not to enhance other resource values, resulting in the greatest potential adverse impacts to special status fish species from riparian/wetland area degradation and vegetation removal that can impact water quality and quantity.

Special Designations

Other than the Spanish Point Karst ACEC, the Brown/Howe Dinosaur Area ACEC is the only ACEC designated under Alternative C; this ACEC may have a beneficial impact by preventing sedimentation in waterways as surface-disturbing activities must be mitigated, but management of the ACEC generally

allows mineral development and other types of surface-disturbing activities that may affect water quality. ACECs under this alternative contain only 0.2 miles of Yellowstone cutthroat trout habitat. In addition, Alternative C does not recommend any WSR eligible waterway segments as suitable for inclusion in the NWSRS. Under Alternative C, special designations do not provide any substantial beneficial impact to surface water quality or fisheries habitat, and therefore this alternative has the least potential to beneficially impact special status fish species.

Resources

Alternative C only stabilizes watershed improvement projects if they are not meeting resource objectives, on a case-by-case basis. Alternative C applies less stringent restoration requirements than Alternative B to limit soil erosion in disturbed areas. The BLM does not implement watershed improvement plans (BMPs are relied on to mitigate adverse impacts) under Alternative C, providing the least potential beneficial impacts to special status fish species compared to the other alternatives. Forest management treatments emphasize commercial and economic objectives, resulting in the greatest potential impacts to water quality, compared to the other alternatives.

Proactive Management

The proactive management actions that result in direct beneficial impacts to special status fish under Alternative C are similar to those under Alternative A, except that the BLM only restores stream segments with special status fish species on a case-by-case basis and does not construct nonnative fish barriers. Alternative C provides the fewest beneficial impacts to special status fish species from proactive management compared to the other alternatives.

Alternative D

Surface Disturbance

Impacts to special status fish species from surface disturbance would be similar to those described under Alternative A. The projected surface disturbance is slightly more under Alternative D—estimated to result in a 17 percent increase in long-term erosion compared to Alternative A (Appendix V)—but reclamation and restoration practices are likely to limit erosion and sedimentation more than under Alternative A.

Resource Uses

Alternative D allows fewer opportunities for resource use that can result in surface disturbance than Alternative C. The BLM places more restrictions on minerals, ROWs, and motorized vehicle use under Alternative D than under alternatives A and C. Livestock grazing management under Alternative D would result in impacts similar to those under Alternative A. Overall, Alternative D has more potential to result in adverse impacts to special status fish species than Alternative B, but less than alternatives A and C.

Special Designations

Special designations under Alternative D would have a greater beneficial impact to special status fish species than under alternatives A and C, but less than under Alternative B. Alternative D designates the Clarks Fork, PETM, and Sheep Mountain ACECs in addition to the ACECs designated under Alternative A, containing 10.7 miles of Yellowstone cutthroat trout habitat, and applies additional resource use restrictions in the Chapman Bench Management Area to minimize impacts to special status species. Alternative D does not manage any lands with wilderness characteristics specifically to preserve their

wilderness characteristics or recommend any WSR eligible waterway segments as suitable for inclusion in the NWSRS, which would result in fewer beneficial impacts on special status fish species in these areas than Alternative B. Special status fish species habitat would not be protected to the same degree in these areas as under alternatives A and B. However, the BLM could construct fish barriers on these waterways to prevent the spread of nonnative fish species that may adversely impact special status fish species.

Resources

Management actions to stabilize watershed improvement projects and reestablish vegetation in disturbed areas under Alternative D would result in similar beneficial impacts to those under Alternative A, but to a greater extent. Watershed improvement practices would result in similar beneficial impacts to those under Alternative B. Forest management would result in impacts similar to those under Alternative A, but there would be more potential adverse impacts from allowing clear cutting, similar to Alternative C. Management of riparian/wetland resources under Alternative D would be similar to Alternative C. However, managing streams with unique fishery values to meet DFC would result in greater beneficial impacts to special status fish species in these areas. Under Alternative D, the BLM would place more restrictions on surface-disturbing activities near riparian/wetland areas, which would limit impacts to a greater extent. Overall, resource management under Alternative D would result in more beneficial impacts to special status fish species than alternatives A and C, but fewer than Alternative B.

Proactive Management

Proactive management actions under Alternative D would result in similar beneficial impacts to special status fish species as under Alternative B, but to a lesser extent because the BLM would perform similar management actions, but on a priority basis. Surface-disturbance restrictions would limit direct adverse impacts to special status fish species habitat similarly to Alternative A. Pursuing the restoration of Yellowstone cutthroat trout to historically occupied watersheds would result in similar beneficial impacts to those under Alternative B.

Alternative E

Surface Disturbance

Management practices relating to surface disturbance would be the same as Alternative B, except for areas within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). In this ACEC, the BLM manages anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) to not exceed one disturbance per 640 acres and cover less than 3 percent of the greater sage-grouse Key Habitat Areas, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. This additional restriction on anthropogenic disturbances would reduce effects from surface disturbance to a greater degree than described under Alternative B. Under Alternative E, management actions in the Greater Sage-Grouse Key Habitat Areas ACEC would result in the least surface disturbance of any alternative (Table 4-1). In comparison to alternatives A and B, this alternative would respectively result in 32 percent and 2 percent reductions in long-term erosion (Appendix V) and, therefore, the least adverse impact to special status fish species.

Resource Uses

Restrictions on resource uses under this alternative would be generally the same as Alternative B, with additional restrictions and closures to mineral development, renewable energy development, livestock

grazing, and ROW development within the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Impacts resulting from travel management under Alternative E would be the same as Alternative B and would benefit special status fish species by placing the most limitations on and closures to motorized vehicle use of any alternative. When compared to the other alternatives, Alternative E has the least potential to result in adverse impacts to special status fish species due to management practices for resource uses that provide the most improvement to water quality and quantity by increasing infiltration rates and reducing future erosion and sedimentation sources.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of an additional 1,232,583 acres of BLM-administered land in Greater Sage-Grouse Key Habitat Areas ACEC. The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative E would provide the greatest protection for special status fish species through additional protection for surface water quality and quantity. Additional designation of ACECs under this alternative would result in beneficial impacts to approximately 16 miles of Yellowstone cutthroat trout habitat, which would result in greater beneficial impacts than any other alternative.

Resources

Impacts to special status fish species from management actions for resource protection would be similar to Alternative B, but with slightly greater beneficial impacts due to reduced surface disturbance and erosion within the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Habitat restoration, invasive species management, and fire and fuels management within this ACEC would prioritize the conservation and restoration of native sagebrush habitats, with potential beneficial indirect effects to adjacent fish habitats.

Proactive Management

Impacts to special status fish species from proactive management, including fish habitat restoration activities, would be the same as Alternative B.

Alternative F

Surface Disturbance

Impacts to special status fish species from surface disturbance would be similar to Alternative D, although to a lesser extent. Management actions associated with the designation of the Greater Sage-Grouse PHMAs ACEC would result in slightly less surface disturbance than Alternative D. Although Alternative F would result in a 13 percent increase in long-term erosion compared to Alternative A (Appendix V), reclamation and restoration practices under alternatives D and F are likely to limit erosion and sedimentation more than Alternative A.

Resource Uses

Impacts from resource uses under Alternative F would be generally similar to those under Alternative D, except in the proposed Greater Sage-Grouse PHMAs ACEC. Alternative F would place additional restrictions on renewable energy development, ROW development, and motorized vehicle use in the proposed Greater Sage-Grouse PHMAs ACEC, reducing surface disturbance and associated runoff and sedimentation to nearby waterways, compared to Alternative D. Overall, Alternative F has more potential to result in adverse impacts to special status fish species than alternatives B and E, but less than alternatives A, C, and D.

Special Designations

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in Greater Sage-Grouse PHMAs ACEC. Additional restrictions on renewable energy development, ROW development, and motorized vehicle travel within the proposed Greater Sage-Grouse PHMAs ACEC would result in slightly lower impacts to special status fish species in comparison with Alternative D due to reduced impacts from erosion. Designation of ACECs under this alternative would result in beneficial impacts to Yellowstone cutthroat trout habitat. Overall, special designations under Alternative F would result in more adverse impacts to special status fish species than alternatives B and E, but less adverse impacts than alternatives A, C, and D.

Resources

Management actions for resource protection and related impacts to special status fish species would be the same as Alternative D, with slightly greater beneficial impacts in the proposed Greater Sage-Grouse PHMAs ACEC due to reduced surface disturbance and erosion rates. Similar to Alternative E, habitat restoration, invasive species management, and fire and fuels management within this ACEC would prioritize the conservation and restoration of native sagebrush habitats, with potential beneficial indirect effects to adjacent fish habitats.

Proactive Management

Impacts to special status fish species from proactive management would be the same as Alternative D.

4.4.9 Special Status Species – Wildlife

Direct impacts to special status wildlife species result from the direct loss of important habitat or a key habitat feature, such as a nest site or lek area, or from the immediate loss of life. Human activities can directly disturb special status wildlife, potentially causing nest, lek, or home range abandonment. Disturbance during sensitive periods (e.g., winter and breeding) leads to lower recruitment rates and higher mortalities, which results in adverse impacts to special status wildlife species.

Discussed in detail in the introduction to Biological Resources in this chapter and in Chapter 3, habitat loss and fragmentation result in adverse impacts to special status wildlife species. Habitat loss generally results in direct impacts to the individual or population that is immediately affected. The impacts of habitat fragmentation, however, operate indirectly through mechanisms such as population isolation (Saunders et al. 1991); edge effects, such as increased nest predation and parasitism (Paton 1994; Faaborg et al. 1995); encroachment of invasive species; and disruption of migration patterns.

Special status wildlife experience indirect impacts through changes in habitat characteristics or quality, which ultimately can change migration patterns, habitat use, carrying capacity, and long-term population viability. Indirect impacts to habitats for special status wildlife species can also occur when specific actions change habitat to make it unsuitable. Disturbance impacts can range from short-term displacement and shifts in activities to long-term abandonment of home range (Miller et al. 1998; Warmoloy et al. 1988; Connelly et al. 2000).

For the purpose of this analysis, short-term impacts (up to 5 years) to special status wildlife are those activities that an individual or species respond to immediately, but do not impact the population viability of the species. Long-term impacts (more than 5 years) are those that cause an individual or species to permanently abandon an area, or that alter the population viability and survival of the species. Examples of beneficial long-term impacts include restoration of habitat structure or health, or enhancement of forage base to improve populations of special status wildlife species over time.

This section also describes the environmental consequences associated with the impacts to greater sage-grouse and its habitat from activities carried out in conformance with this RMP, in addition to BLM management actions. In undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation in PHMA, the BLM will require mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. In addition, to help implement this RMP, a Western Association of Fish and Wildlife Agencies (WAFWA) Management Zone Regional Mitigation Strategy (per Appendix Y) will be developed within one year of the issuance of the ROD. The strategy will elaborate on the components identified in Chapter 2 (avoidance, minimization, compensation, additionality, timeliness, and durability), and will be considered by the BLM for management actions and third party actions that result in habitat loss and degradation. The implementation of a Regional Mitigation Strategy will benefit greater sage-grouse, the public, and land-users by providing a reduction in threats, increased public transparency and confidence, and a predictable permit process for land-use authorization applicants.

The Final Biological Assessment that accompanies this document can be viewed on the Bighorn Basin RMP Revision Project website (http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html) provides additional analysis of potential impacts to federally listed threatened, endangered, candidate, or proposed species under the proposed alternatives. Special status wildlife species addressed in the Biological Assessment are the black-footed ferret, Canada lynx, gray wolf, greater sage-grouse, grizzly bear, and mountain plover.

4.4.9.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Impacts to special status wildlife species are based primarily on potential impacts to habitats managed by the BLM.
- Precise quantitative estimates of impacts generally are not possible because the exact locations of future actions are unknown, population data for special status wildlife species are often lacking other environmental variables, or habitat types affected by surface-disturbing activities cannot be predicted.
- The more habitat available for a species, the greater the benefit to the targeted species.
- Prohibiting all surface-disturbing and disruptive activities in greater sage-grouse seasonal habitats is more beneficial to greater sage-grouse than avoiding these activities, as avoidance provides discretion for each proposed activity and applies mitigations, where prohibition precludes all activity.
- Within historical fire regimes, prescribed fire is used to manage vegetative communities and can result in short-term adverse impacts with long-term beneficial impacts to wildlife, certain desirable wildlife habitats, and in some cases to forage productivity and availability.
- Measures to protect one species generally result in long-term benefits to other species in that habitat.
- Because of the migratory nature and relative mobility of some special status wildlife species (e.g., waterfowl, migratory birds, and raptors), these species are affected by actions on non BLM-administered land more so than other species. In the case of migratory species, impacts to winter and migration habitats could adversely impact the viability of some species. Winter and

migration habitats are assumed to be at least as important to long-term viability of these species as breeding and nesting habitats.

- Removal of sagebrush habitat will have a long-term adverse impact on sagebrush obligate species in the 5- to 9-inch precipitation zone.
- The USFWS may designate additional wildlife species as threatened and endangered as additional data are collected and evaluated. These species would be managed in accordance with the ESA and as directed by decisions in the alternatives.

4.4.9.2 Summary of Impacts by Alternative

Impacts to special status wildlife species are generally the same as those for wildlife and include habitat loss and fragmentation (adverse impacts) from surface disturbances and protection of habitat through management that increases restrictions in known or potential habitat (beneficial impacts). Overall, Alternative E is projected to result in the least surface disturbance and would have the least potential to cause habitat loss and fragmentation in the short- and long-term, followed by alternatives B, A, F, D, and C. Alternatives B and E provide the greatest beneficial impacts to special status wildlife habitats by including the most proactive actions to restore and enhance habitats. Except for seasonal motorized vehicle restrictions in the Absaroka Front Management Area, Alternative C would have the greatest adverse impacts to wildlife habitats and, therefore, the fewest beneficial impacts for special status wildlife species. Alternatives A, D, and F would be similar in terms of surface disturbance, though the mitigation and reclamation requirements under alternatives D and F may lead to fewer impacts than Alternative A. Alternatives B and E, and to a lesser extent alternatives D and F, benefit special status wildlife species by protecting large areas of contiguous native habitats in the Absaroka Front Management Area, ACECs, and lands with wilderness characteristics managed to maintain their wilderness characteristics; alternatives A and C would protect fewer large blocks of contiguous habitat. Alternatives C, D, and F exempt Oil and Gas Management Areas (430,674 BLM-administered surface acres under Alternative C and 348,617 BLM-administered surface acres under alternatives D and F) from seasonal wildlife restrictions (with the exception of the areas overlapped by the proposed Greater Sage-Grouse PHMAs ACEC under Alternative F), resulting in adverse impacts to special status wildlife species.

Livestock grazing management under Alternative C would adversely affect grizzly bears and gray wolves the most, followed by alternatives A, D and F, and B and E. Gray wolves would benefit more from forest, woodland, and forest products management under alternatives A, D, and F, and less under alternatives B, C, and E. Timber harvesting practices, old-growth stand retention, surface-disturbance restrictions around raptor nests, and snag retention under alternatives B and E would result in the most beneficial impacts to Canada lynx, followed by alternatives D and F, A, and C.

Alternative E protects the largest area of greater sage-grouse leks, nesting and early brood-rearing habitats, and winter concentration areas, followed by alternatives B, F, D, A, and C. Alternative E, and to a lesser extent Alternative B, places comparatively greater restrictions on resource uses and activities in greater sage-grouse Key Habitat Areas. Alternatives D and F also apply protective management for greater sage-grouse, although to a lesser extent than Alternative E, in PHMAs. Similar to alternatives E and F, Alternative D applies adaptive management principles to identify when changes in management may be needed in order to continue meeting greater sage-grouse conservation objectives. Although livestock grazing in greater sage-grouse habitat can have both adverse and beneficial impacts (e.g., alternatives D and F allow livestock grazing to improve greater sage-grouse habitat), the more restrictive management under alternatives B and E would be the most beneficial to this species. Other sagebrush-dependent species (e.g., Brewer's sparrow, sage sparrow, and sage thrasher) are anticipated to benefit

the most from protective management actions for greater sage-grouse under Alternative E, followed by alternatives B, F, D, A, and C. Chapter 3 provides a discussion of identified threats to greater sage-grouse while Table 4-23 provides a comparison of management actions across the range of alternatives and summarizes impacts for each threat.

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
General Limitations on Surface Disturbance and/or Disruptive Activities in Greater Sage-Grouse Habitat					
MANAGEMENT SUMMARY					
Apply a CSU stipulation for discretionary actions to prohibit surface-disturbing and disruptive activities within 0.25 miles of occupied leks. Apply a TLS to avoid surface-disturbing and disruptive activities in nesting and early brood-rearing habitats within 2 miles of occupied leks or other nesting and brood-rearing habitat (March 15 to July 15; February 1 to July 31). Apply a TLS to avoid surface-disturbing and disruptive activities in winter concentration areas from November 15 to March 14.	Prohibit surface-disturbing and disruptive activities within 0.6 miles of occupied leks. Apply a TLS to avoid surface-disturbing and disruptive activities in nesting and early brood-rearing habitats within 3 miles of occupied leks or other nesting and brood-rearing habitat (February 1 to July 31). Avoid surface-disturbing and disruptive activities in winter concentration areas from November 15 to March 14. Anthropogenic disturbance must not exceed one disturbance per 640 acres and must cover less than 5 percent of priority habitat regardless of ownership.	Apply a CSU stipulation for discretionary actions to prohibit surface-disturbing and disruptive activities within 0.25 miles of all occupied leks. Apply a TLS to avoid surface-disturbing and disruptive activities in nesting and early brood-rearing habitats within 2 miles of occupied leks or other nesting and brood-rearing habitat (March 15 to July 15). Apply a TLS to avoid surface-disturbing and disruptive activities in winter concentration areas from November 15 to March 14. Exempt Oil and Gas Management Areas and ROW corridors from discretionary wildlife seasonal stipulations.	Prohibit surface-disturbing and disruptive activities within 0.6 miles of occupied leks inside priority habitat and within 0.25 miles of occupied leks outside priority habitat. In priority habitat, apply a TLS to restrict disruptive activity within 0.6 miles of occupied leks and prohibit or restrict surface-disturbing and disruptive activities in nesting and early brood-rearing habitat from March 15 to June 30. Outside priority habitat, apply a TLS to restrict disruptive activity within 0.25 miles of occupied leks and prohibit or restrict surface-disturbing and disruptive activities in nesting and early brood-rearing habitat within 2 miles of occupied leks from March 15 to June 30. Apply a TLS to avoid surface-disturbing and disruptive activities within winter concentration areas from November 15 to March 14. Limit the density of disturbance in priority habitat to 5 percent of the DDCT analysis area.	Prohibit surface-disturbing and disruptive activities within 0.6 miles of occupied leks. Apply a TLS to avoid surface-disturbing and disruptive activities in nesting and early brood-rearing habitats within 3 miles of occupied leks or other nesting and brood-rearing habitat (February 1 to July 31). Avoid surface-disturbing and disruptive activities in winter concentration areas from November 15 to March 14. Anthropogenic disturbance must not exceed one disturbance per 640 acres and must cover less than 3 percent of priority habitat regardless of ownership.	Prohibit surface-disturbing and disruptive activities within 0.6 miles of occupied leks inside priority habitat and within 0.25 miles of occupied leks outside priority habitat. In priority habitat, apply a TLS to restrict disruptive activity within 0.6 miles of occupied leks and prohibit or restrict surface-disturbing and disruptive activities in nesting and early brood-rearing habitat from March 15 to June 30. Outside priority habitat, apply a TLS to restrict disruptive activity within 0.25 miles of occupied leks and prohibit or restrict surface-disturbing and disruptive activities in nesting and early brood-rearing habitat within 2 miles of occupied leks from March 15 to June 30. Apply a TLS to avoid surface-disturbing and disruptive activities within winter concentration areas from November 15 to March 14. Anthropogenic disturbance must not exceed one disturbance per 640 acres and must cover less than 3 percent of the DDCT analysis area within priority habitat.

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Impact Summary: Limitations on surface disturbance and disruptive activities in proximity to greater sage-grouse leks and within seasonal habitats under alternatives E and F would protect the greatest overall area, particularly through the inclusion of additional areas outside of priority habitat, followed by alternatives B, D, A, and C. Limitations on the density of surface-disturbance within priority habitats would vary based on the delineation of the DDCT analysis area for a given project, but alternatives E and F would generally allow less cumulative disturbance (3 percent) than alternatives B and D (5 percent) within priority habitat.					
Threat – Sagebrush Elimination					
MANAGEMENT SUMMARY					
No specific management provided for conducting habitat enhancement vegetation treatments in sagebrush communities.	Conduct habitat enhancement vegetation treatments on at least 200 acres per year in sagebrush communities.	Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow.	Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow, designing treatments to maintain or improve sagebrush habitat in stands with less than 15 percent cover. Treatments that reduce sagebrush canopy cover to less than 15 percent may be allowed if sufficient canopy cover is maintained in adjacent areas.	Conduct habitat enhancement vegetation treatments on at least 200 acres per year in sagebrush communities. Do not reduce sagebrush canopy cover to less than 15 percent unless required to meet greater sage-grouse conservation objectives or provide strategic habitat protection. Restore native (or desirable) plants and create landscape patterns that most benefit greater sage-grouse using the reference state of the appropriate ESD. Avoid sagebrush reduction/treatments to increase livestock or big game forage in occupied habitat.	Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow, designing treatments to maintain or improve sagebrush habitat in stands with less than 15 percent cover. Do not reduce sagebrush canopy cover to less than 15 percent unless required to meet greater sage-grouse conservation objectives or provide strategic habitat protection. Manage areas for a higher plant community state or phase (based on state and transition models in ESDs) on a case-by-case basis to achieve sage-grouse seasonal habitat objectives. Avoid sagebrush reduction/treatments to increase livestock or big game forage in occupied habitat.
Impact Summary: All alternatives would reduce sagebrush elimination by managing to maintain suitable canopy cover and understory diversity in greater sage-grouse nesting habitat and existing nonnative grass seedings with less than 5 percent canopy cover. Beneficial impacts from the restoration of non-functioning riparian systems and brood-rearing habitat in riparian/wetland areas would also be common to all alternatives. Requiring habitat enhancement vegetation treatments to maintain or improve sagebrush stands with less than 15 percent canopy cover under alternatives D, E, and F could reduce habitat fragmentation and habitat loss to a greater extent than the other alternatives; however, exceptions allowed under Alternative D could result in greater sagebrush elimination in certain areas. Requiring the treatment of 200 acres of sagebrush communities annually, at minimum, would help to ensure ongoing maintenance and restoration of greater sage-grouse habitat over the life of the plan under alternatives B and E. By managing sagebrush communities toward appropriate ESDs, alternatives E and F may provide more comprehensive targets for and measures of treatment success than canopy coverage alone. Alternatives E and F also avoid sagebrush reduction/treatments designed to increase forage for other uses, which would help to maintain the integrity of occupied habitat. Overall, alternatives E and F include the most proactive measures for reducing sagebrush elimination through vegetation treatments and are most likely to achieve the RMP objectives of increasing connectivity of occupied greater sage-grouse habitats and maintaining at least 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover in priority habitat.					

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Threat – Fire					
MANAGEMENT SUMMARY					
No specific management provided for fire and fuels in sagebrush communities.	No specific management provided for fire and fuels in sagebrush communities.	No specific management provided for fire and fuels in sagebrush communities.	Treatments that reduce sagebrush canopy cover to less than 15 percent may be allowed if sufficient canopy cover is maintained in adjacent areas.	Do not reduce sagebrush canopy cover to less than 15 percent unless required to meet greater sage-grouse conservation objectives or provide strategic habitat protection. Use fire to treat sagebrush in less than 12-inch precipitation zones only after exhausting all other feasible treatment options. Design fuels management projects in priority sage-grouse habitat to strategically and effectively reduce wildfire threats over the greatest area.	Do not reduce sagebrush canopy cover to less than 15 percent unless required to meet greater sage-grouse conservation objectives or provide strategic habitat protection. Use fire to treat sagebrush in less than 12-inch precipitation zones only after exhausting all other feasible treatment options. Design fuels management projects in priority sage-grouse habitat to strategically and effectively reduce wildfire threats over the greatest area.
Impact Summary: All alternatives require suppression of fires threatening greater sage-grouse habitat and only allow the use of prescribed fire if demonstrated to meet greater sage-grouse conservation objectives through NEPA analysis. Prohibiting fuels treatments that reduce sagebrush canopy cover to less than 15 percent under alternatives E and F could reduce habitat fragmentation and habitat loss to a greater extent than the other alternatives. Alternative D also applies a 15 percent sagebrush canopy cover requirement, but allows exceptions that may result in greater habitat loss in certain areas. In contrast, Alternative E and F only allow exceptions to provide strategic habitat protection or conserve habitat quality for greater sage-grouse. Alternatives E and F restrict the use of fire to treat sagebrush in low-precipitation zones and design fuels management projects to strategically reduce wildfire threats over the greatest area in priority greater sage-grouse habitat; this management would require careful coordination of proposed prescribed fires and fuels treatments with greater sage-grouse conservation objectives, but is unlikely impede the use of these tools to reduce the risk of catastrophic wildland fires. Overall, the management of fires and fuels treatments under alternatives E and F is likely to result in the most beneficial impacts and achieve the RMP objective of protecting greater sage-grouse habitat through fuels treatments. Alternatives A, B, and C contain no specific management for fire and fuels in sagebrush communities.					

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Threat – Conifer Encroachment					
MANAGEMENT SUMMARY					
Manage conifer encroachment to improve wildlife habitat and forest health conditions.	Manage conifer encroachment to improve wildlife habitat and forest health conditions.	Manage conifer encroachment to enhance livestock grazing.	Manage conifer encroachment to improve wildlife habitat and forest health conditions as well as make progress toward potential natural communities, as determined by the site's ESD.	Manage conifer encroachment to improve wildlife habitat and forest health conditions.	Manage conifer encroachment to improve wildlife habitat and forest health conditions.
Impact Summary: All alternatives require removal of conifers encroaching into sagebrush habitat, with priority given to areas closest to occupied leks. More long-term benefits may be achieved by reintroducing fire regimes that would limit conifer encroachment in sagebrush habitat; this management is also common to all alternatives. Managing conifer encroachment to improve wildlife habitat conditions under all alternatives except Alternative C is likely result in beneficial impacts to the greater sage-grouse, for which habitat conservation is a management high priority. Although Alternative C would protect sagebrush habitat from conifer encroachment, managing these areas to enhance livestock grazing without consideration for wildlife habitat conditions under this alternative is likely to result in the least beneficial impacts to greater sage-grouse. Alternative D may result in the most beneficial impacts of all the alternatives by managing areas treated for conifer encroachment toward more comprehensive vegetation community goals (i.e., ESDs) than conifer elimination alone.					
Threat – Weed and Annual Grass Invasion					
MANAGEMENT SUMMARY					
No specific management provided for invasive, nonnative plant species in greater sage-grouse habitat. Require livestock flushing at the discretion of the authorized officer.	No specific management provided for invasive, nonnative plant species in greater sage-grouse habitat; however, this alternative manages to maintain contiguous blocks of native plant communities and minimize fragmentation, while allowing for other resource uses. Implement a 72-hour livestock flushing protocol at the discretion of the authorized officer.	No specific management provided for invasive, nonnative plant species in greater sage-grouse habitat. Do not require livestock flushing.	No specific management provided for invasive, nonnative plant species in greater sage-grouse habitat; however, this alternative manages to maintain contiguous blocks of native plant communities and minimize fragmentation, while allowing for other resource uses. Require livestock flushing at the discretion of the authorized officer.	Restrict activities in greater sage-grouse habitat that facilitate the spread of invasive plants. Implement a 72-hour livestock flushing protocol at the discretion of the authorized officer and require vehicle washing. Use native seeds and plants to restore greater sage-grouse habitat to its ESD potential in areas that have been disturbed or invaded by nonnative plants. If sagebrush reduction/treatments are conducted, create plans to restore high-quality habitat in areas with invasive species and minimize the use of herbicides. Monitor and control invasive vegetation post-treatment.	Require livestock flushing at the discretion of the authorized officer and require vehicle washing. Use native seeds and plants to restore greater sage-grouse habitat to a higher plant community state or phase (based on state and transition models in ESDs) in areas that have been disturbed or invaded by nonnative plants. If sagebrush reduction/treatments are conducted, create plans to restore high-quality habitat in areas with invasive species and minimize the use of herbicides. Monitor and control invasive vegetation post-treatment. Consider potential changes in climate when selecting native

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
				Design post emergency stabilization and rehabilitation management to ensure long-term persistence of seeded or pre-burn native plants. Allocate native seeds for future use and consider potential changes in climate when selecting native post-fire seedings.	post-fire seedings.
Impact Summary: Developing an invasive species and pest management plan and coordinating with local counties and other stakeholders on invasive plant species management in accordance with current guidance could reduce the potential for invasive species establishment and spread in greater sage-grouse habitats under all alternatives. In addition, all alternatives manage to promote the growth and persistence of native plants that would provide seasonal food and concealment for greater sage-grouse. All alternatives except Alternative C may require livestock flushing, which would reduce the potential for weed spread in greater sage-grouse habitat. Specific time requirements for livestock flushing under alternatives B and E and vehicle washing requirements under alternatives E and F could further reduce opportunities for weed spread. Although alternatives B and D do not include specific management for invasive, nonnative plant species in greater sage-grouse habitat, these alternatives may result in beneficial impacts through efforts to maintain contiguous blocks of native plant communities. Alternatives E and F include similar management requirements for maintaining and monitoring native plant communities in greater sage-grouse habitat; however, Alternative E also manages to restore these habitats to their full ESD potential, conducts post fire rehabilitation to ensure persistence of native plants, and proactively reserves native seeds for future use, which may result in more beneficial impacts than any other alternative.					
Threat – Mining					
MANAGEMENT SUMMARY					
No specific management provided for mining in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures to mining established to protect other resources and resources uses would apply.	No specific management provided for mining in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures to mining established to protect other resources and resources uses would apply.	No specific management provided for mining in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures to mining established to protect other resources and resources uses would apply.	In priority habitat, allow only one energy or mining facility per 640 acres. The cumulative value of existing and proposed disturbance must not exceed 5 percent of habitat.	Pursue a withdrawal from appropriation under the mining laws and close priority habitat to mineral material disposals. Make existing claims within this area subject to validity exams or buyout and consider applying seasonal restrictions. Restore salable mineral pits no longer in use. Seek to acquire subsurface mineral rights to conserve or restore greater sage-grouse habitat.	Consider applying seasonal restrictions to mining activities in priority habitat. Restore salable mineral pits no longer in use. Seek to acquire subsurface mineral rights to conserve or restore greater sage-grouse habitat.
Impact Summary: Priority habitat is considered unsuitable for coal mining pursuant to federal regulations under all alternatives. All alternatives also require that disturbance of springs and riparian areas is minimized during mining activities, which would help to maintain suitable water sources and brooding habitat for greater sage-grouse. The BLM may pursue a withdrawal from appropriation under the mining laws for locatable minerals in special status species habitats under any alternative, but only proposes to do so under Alternative E. Limitations on the density of disturbance in priority habitats under Alternative D would minimize cumulative impacts from mining and other disturbances. The withdrawal of priority habitat to locatable mineral entry and closure to mineral material disposals would make Alternative E most effective in reducing adverse impacts from mining in greater sage-grouse habitat on BLM-administered lands.					

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Threat – Energy Development					
MANAGEMENT SUMMARY					
No specific management provided for energy development in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures to energy development established to protect other resources and resources uses would apply.	Avoid wind energy projects in nesting, brood-rearing, and winter habitat areas. Priority habitat is closed to mineral leasing. Apply a NSO restriction to mineral leasing within a 0.6-mile radius of all occupied leks and within winter concentration areas. Wells must not disturb more than 15 acres within a 640-acre section and the cumulative value of existing and proposed disturbance must not exceed 5 percent of habitat within the section.	Allow wind energy projects in greater sage-grouse nesting, brood-rearing, and winter habitat areas. No specific management provided for mineral leasing in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures to energy development established to protect other resources and resources uses would apply.	Avoid wind energy projects in priority habitat. Inside priority habitat, apply a NSO restriction to mineral leasing within a 0.6-mile radius of occupied greater sage-grouse leks. Outside priority habitat, apply a NSO restriction to mineral leasing within a 0.25 miles of occupied leks. In priority habitat, allow an average of one energy or mining facility per 640 acres. The cumulative value of existing and proposed disturbance must not exceed 5 percent of habitat.	Avoid wind energy projects in nesting, brood-rearing, and winter habitat areas. Priority habitat is closed to mineral leasing. Apply a NSO restriction to mineral leasing within a 0.6-mile radius of all occupied greater sage-grouse leks and within winter concentration areas. Apply NSO conditions of approval on existing leases to the extent feasible within greater sage-grouse priority habitat. Limit proposed surface disturbance to 3 percent for an area when permitting APDs on existing leases that are not yet developed. Close priority habitat to geophysical exploration.	Avoid wind energy projects in priority habitat. Inside priority habitat, apply a NSO restriction to mineral leasing within a 0.6-mile radius of occupied leks. Outside priority habitat, apply a NSO restriction to mineral leasing within a 0.25 miles of occupied leks. Apply NSO conditions of approval on existing leases to the extent feasible within priority habitat. Limit proposed surface disturbance to 3 percent for an area when permitting APDs on existing leases that are not yet developed and require a minimum lease size of 640 contiguous acres. Allow geophysical exploration in priority habitat if appropriately mitigated.
Impact Summary: Surface disturbing and disruptive activities associated with energy development would be subject to general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures to energy development established to protect other resources, to varying degrees, under all alternatives. All alternatives with the exception of alternatives A and C avoid wind energy projects in greater sage-grouse priority or seasonal habitats, which would likely require projects to be located and designed to minimize impacts. Alternative C could result in the most adverse impacts by specifically allowing wind energy development in seasonal habitats. Neither Alternative A nor Alternative C include specific management for mineral leasing in greater sage-grouse habitat. NSO restrictions applied to greater sage-grouse leks under alternatives B, D, E, and F may reduce disturbances and disruptive activities that could contribute to declines in lek attendance or lek abandonment; however, Alternatives B and E close priority habitat to mineral leasing and apply larger protective lek buffers outside of priority habitat, which would eliminate the potential for new oil and gas related disturbances across a large portion of the Planning Area and provide more protection to areas outside of priority habitat than the other alternatives. Limitations on the density of disturbance in priority habitat under alternatives B and D would minimize cumulative impacts from mining and other disturbances. Alternatives E and F have the greatest potential to reduce impacts in areas already leased for mineral development by applying NSO conditions of approval, when feasible, to the existing leases and limiting surface disturbance to 3 percent of the lease area in greater sage-grouse priority habitat. Overall, Alternative E is likely to be most effective in minimizing impacts from energy development and meeting the RMP objective to mitigate adverse impacts to greater sage-grouse from fluid mineral development on BLM-administered lands.					

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Threat – Infrastructure					
MANAGEMENT SUMMARY					
No specific management provided for infrastructure development in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures or restrictions on infrastructure development to protect other resources and resources uses would apply.	Manage areas within a 0.6 miles of all occupied leks as ROW exclusion areas. Manage priority habitat as a ROW avoidance area. No specific management provided for new road construction in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures or restrictions on road construction to protect other resources and resources uses would apply.	No specific management provided for infrastructure development in greater sage-grouse habitat; however, general restrictions on surface-disturbing and disruptive activities for greater sage-grouse and overlapping closures or restrictions on infrastructure development to protect other resources and resources uses would apply.	Manage priority habitat as a ROW avoidance area. In priority habitat, avoid locating new collector roads within 1.9 miles and other new roads within 0.6 miles of occupied leks. Construct roads to minimum design standards need for production activities. In priority habitat, co-locate major overhead powerlines within 0.5 miles of an existing 115 kV or greater powerline or within a designated corridor. Distribution lines may be authorized when effectively mitigated.	Manage priority habitat as a ROW avoidance area. Manage areas within a 0.6 miles of all occupied leks as ROW exclusion areas. Prohibit new road construction within 4 miles of occupied leks, and avoid new road construction in occupied habitat. Allow only below ground ROWs within designated ROW corridors. Co-locate new ROWs associated with valid existing rights within existing ROWs or where impacts to greater sage-grouse are minimized. Remove, bury, or modify existing powerlines and require burial of new ROWs in designated ROW corridors within priority greater sage-grouse habitat. Use existing roads or realignments to access valid existing rights when feasible, otherwise build new roads to the minimum design standards necessary.	Manage priority habitat as ROW avoidance areas. Locate new primary and secondary roads greater than 1.9 miles from the perimeter of occupied leks in priority habitat. Consider alternatives that would locate new tertiary roads greater than 0.6 miles from occupied leks. Allow only below ground ROWs within designated ROW corridors. Remove, bury, or modify existing powerlines and require burial of new ROWs in designated ROW corridors within priority greater sage-grouse habitat. Construct new transmission lines between July 1 and March 14 (or between July 1 and November 30 in mapped winter concentration areas) and within 0.5 miles on either side of existing 115 kV or larger transmission lines. Use existing roads to access valid existing rights when feasible, otherwise build new roads to the minimum design standards necessary.
Impact Summary: Alternatives B, D, E, and F manage greater sage-grouse priority habitats as ROW avoidance areas; however, Alternatives B and E would generally be most effective in protecting occupied leks from infrastructure development by excluding ROW development within 0.6 miles of these areas. Alternatives D, E, and F include requirements to co-locate new powerline ROWs, which would generally confine new disturbances to areas with lower habitat value. Alternatives E and F also require burial of ROWs within designated ROW corridors and would remove or modify existing powerlines in priority habitat, which could reduce habitat fragmentation and potential risks of collision and predation. Seasonal limitations on the construction of transmission lines under alternatives D and F would minimize disruption of greater sage-grouse during sensitive periods. Designing roads to minimum standards necessary is a common requirement of alternatives D, E, and F that would reduce the overall level of disturbance from new road development in priority greater sage-grouse habitats. Alternatives D, E, and F avoid or prohibit the development of new roads in close proximity to greater sage-grouse leks. Alternative B would reduce the					

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
potential for habitat fragmentation, disruptions, and vehicle strikes associated with road development to the greatest extent by prohibiting new road construction within 4 miles of occupied leks. Alternatives A and C provide no specific management for infrastructure development in greater sage-grouse habitats and the potential for adverse effects from infrastructure development are greatest under these alternatives. Overall, alternatives E and F are likely to result in the least adverse impacts to greater sage-grouse from infrastructure development.					
Threat – Grazing					
MANAGEMENT SUMMARY					
Common to All Alternatives: Prioritize the processing of grazing permits/leases in priority habitat. *Common to All Alternatives:* Manage livestock grazing to achieve the Wyoming Standards for Rangeland Health. *Common to All Alternatives:* NEPA analysis for renewals and modifications of livestock grazing permits/leases that fall within priority habitat may consider Greater Sage-grouse Habitat Conservation Objectives and management considerations, Land Health Standards (43 CFR 4180.2), ecological site potential, and/or local variability. Renewals and modifications will also include one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. *Common to All Alternatives:* Require new fences in priority habitat to be located in a manner that minimizes disturbance and that the visibility of existing fences be increased where documented strikes are a problem.	Close priority habitat to livestock grazing. Prohibit new livestock water development in greater sage-grouse nesting habitat. See also *Common to All Alternatives* management under Alternative A.	No specific management prescribed for livestock grazing in greater sage-grouse habitat. Allow new livestock water development in greater sage-grouse nesting habitat. See also *Common to All Alternatives* management under Alternative A.	Prioritize allotments in priority habitat for field checks to ensure compliance with grazing permits. Allow new livestock water development in greater sage-grouse nesting habitat when impacts can be mitigated. See also *Common to All Alternatives* management under Alternative A.	Close priority habitat to livestock grazing. Prohibit new livestock water development in greater sage-grouse nesting habitat. See also *Common to All Alternatives* management under Alternative A.	Allow livestock grazing in priority habitat. Prioritize the completion of rangeland health assessment in priority habitat and develop specific objectives to achieve greater sage-grouse habitat objectives. Reduce grazing in important seasonal habitats for greater sage-grouse. Allow new livestock water development in greater sage-grouse nesting habitat when impacts can be mitigated. See also *Common to All Alternatives* management under Alternative A.

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
No additional specific management prescribed for livestock grazing or new livestock water developments in greater sage-grouse habitat.					
Impact Summary: Alternatives B and E close priority habitat to livestock grazing outright and prohibit the new livestock water developments, which would eliminate potential adverse impacts from loss of herbaceous cover due to overgrazing, invasive species spread, loss or degradation of water sources, or drowning hazards. Although Alternative F allows livestock grazing in priority habitat, it includes a number of mitigation and monitoring requirements to help ensure that livestock grazing activities are aligned with greater sage-grouse habitat objectives. Proper livestock grazing is likely to be compatible with greater sage-grouse conservation objections under all alternatives; however, prohibitions on livestock grazing under alternatives B, E and F are likely to be most effective in reducing threats to greater sage-grouse.					
Threat – Recreation					
MANAGEMENT SUMMARY					
Common to All Alternatives: Motorized vehicle use on BLM-administered land is limited to existing roads and trails on an interim basis until completion of travel management planning. Designation changes from "limited to existing roads and trails" to "limited to designated roads and trails" upon the completion of a travel management plan. No specific management prescribed for motorized vehicle use or other recreational activities in greater sage-grouse habitat; however, overlapping closures or restrictions based on other resources and resources uses would apply.	Motorized vehicle use is limited to designated roads and trails in priority habitat with a seasonal closure from February 1 to July 31. See also *Common to All Alternatives* management under Alternative A.	No specific management prescribed for motorized vehicle use or other recreational activities in greater sage-grouse habitat; however, overlapping closures or restrictions based on other resources and resources uses would apply. See also *Common to All Alternatives* management under Alternative A.	No specific management prescribed for motorized vehicle use or other recreational activities in greater sage-grouse habitat; however, overlapping closures or restrictions based on other resources and resources uses would apply. See also *Common to All Alternatives* management under Alternative A.	Motorized vehicle use is limited to designated roads and trails in priority habitat with a seasonal closure from February 1 to July 31. Only authorize SRPs that have neutral or beneficial effects to greater sage-grouse in priority habitat. See also *Common to All Alternatives* management under Alternative A.	Only authorize SRPs that have neutral or beneficial effects to greater sage-grouse in priority habitat. See also *Common to All Alternatives* management under Alternative A.
Impact Summary: Seasonal limitations on motorized vehicle use in greater sage-grouse priority habitat under alternatives B and E would reduce the risk of collisions and disturbance from off-trail use. Alternatives E and F only authorize SRPs that would occur in locations or during times that would not result in adverse impacts on greater sage-grouse. Based on these restrictions, Alternative E is anticipated to result in the fewest adverse impacts on greater sage-grouse from recreation. Alternatives A, C, and D do not include specific management for recreation in greater sage-grouse habitat.					

Table 4-23. Key Management Actions and Their Effectiveness in Reducing Threats to Greater Sage-Grouse (Continued)

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F

Notes:

a) Management actions summarized in this table have been adapted from Table 2-9, Detailed Alternatives. In some cases, descriptions in this table have been generalized for ease of comparison. Please refer to Table 2-9 for a full description of management actions.
b) Threats were identified from the Final Report on Greater Sage-Grouse Conservation Objectives (COT Report – USFWS 2013a).
c) Alternatives B and E generally contain management for greater sage-grouse Key Habitat Areas, while D and F contain management for PHMAs. For ease of comparison and due to the similarity of these habitat areas, the term "priority habitat" is used throughout the table.
d) The summaries contained above focus on greater sage-grouse specific management most relevant to each threat; however, there would also be influence from overlapping management for other resources and resource uses.
e) For discretionary actions, the BLM may choose to apply required design features and/or mitigation not included in this table on a case-by-case basis.

Alternatives B and E protect the largest area around active raptor nests (including a year-round CSU stipulation around all nests) and would be the most beneficial to these species, followed by alternatives A; D and F; and C. Alternative C restricts activities that may potentially disturb raptor nesting sites (including a TLS stipulation of 0.25-mile around nests). Adverse impacts to bald eagles from surface disturbance would be greatest under Alternative C, followed by alternatives A, D and F, and B and E. Impacts from recreation in riparian/wetland areas to this species would be greatest under Alternative A, followed by alternatives B and E, D and F, and C. Proactive management actions in the Chapman Bench area under alternatives B, D, E, and F would beneficially affect the mountain plover and long-billed curlew. Livestock grazing and vegetation management under Alternative C is most beneficial to the mountain plover when compared to the other alternatives, while adverse impacts to prairie dogs under this alternative would result in adverse impacts to the mountain plover as well.

4.4.9.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

The types of projected impacts to special status wildlife species under the various alternatives are similar to the impacts described in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*. Therefore, this section includes only instances where impacts are different from those described for wildlife. Authorized activities for resource uses may disturb special status wildlife species by causing displacement or excessive stress during critical life stages. Management actions and allowable uses under all alternatives would involve habitat loss, degradation, reclamation, protection, enhancement, and fragmentation. However, the intensity of impacts would vary by alternative. Refer to Appendix T for projected short- and long-term surface disturbance from BLM actions.

Resource Uses

Oil and gas development may result in adverse impacts to special status species, including the greater sage-grouse, under all alternatives. Increased bentonite mining, and potentially gypsum mining, along with the difficult nature of shrub reclamation in the 5- to 9-inch precipitation zone would result in adverse impacts to special status wildlife species in sagebrush habitat under all alternatives. However, under all alternatives, adverse impacts would be lessened through implementation of the Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (Appendix H) and BMPs (Appendix L).

Subject to valid existing rights, the BLM would prioritize leasing and authorizing development of fluid mineral resources in greater sage-grouse habitat areas in the following order: 1) outside of PHMAs and GHMAs, 2) non-habitat areas inside of PHMAs and GHMAs, and 3) least suitable habitat areas inside of PHMAs and GHMAs. Where adverse effects to greater sage-grouse populations or habitat are anticipated, the BLM would work with the project proponent in developing an APD to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources.

Avoiding the aerial application of pesticides, though minimizing drift into non-target areas in greater sage-grouse habitat, may result in adverse impacts in some situations because ground application can be a greater disturbance to greater sage-grouse. Avoiding pesticide application in greater sage-grouse breeding habitat during the brood-rearing season may preclude beneficial impacts if pesticides are necessary to control pests that would substantially reduce forage cover (e.g., grasshoppers). Conversely, pesticide application to reduce pests such as grasshoppers may result in adverse impacts to young birds by decreasing food availability.

Special status bird, raptor, and bat species can collide with wind-energy and utility infrastructure, causing a direct adverse impact due to mortality and displacement. Projected renewable energy development is the same for all alternatives (Appendix T), requiring the placement of these structures to minimize impacts. Large wind-energy fields involve surface disturbance, which could permanently change the habitat structure for the wildlife inhabitants.

Livestock grazing can alter special status wildlife species habitat resulting in adverse or beneficial impacts. Livestock grazing at the appropriate intensity and timing can be beneficial to grassland and shrubland habitats and the associated special status wildlife species, such as greater sage-grouse. In allotments where grazing by wild horses or livestock removes nest or brood cover, reduces the production of annual forbs, or restricts access to water, impacts to special status wildlife species, such as greater sage-grouse, would be adverse. Potential adverse impacts to greater sage-grouse from livestock grazing would be minimized under all alternatives by managing to achieve the Wyoming Standards for Rangeland Health. In addition, prioritizing grazing permits/leases in PHMAs to investigate if modification is needed prior to renewal would help to reduce the potential for the continuation of livestock grazing management in priority greater sage-grouse habitat that is degrading habitat.

All alternatives manage land tenure adjustments with a goal of preserving important resource values (including habitat for special status species). Maintaining lands in federal ownership would continue BLM review and authorization of discretionary activities that could adversely affect special status species and facilitate more consistent management across a species' range than may be feasible in areas that contain a patchwork of landownership.

Under all alternatives, PHMAs and GHMAs are subject to temporary closures to motorized vehicle use at the discretion of the authorized officer to prevent adverse impacts to greater sage-grouse. These closures would result in short-term beneficial impacts on greater sage-grouse and other sagebrush obligate species by reducing disruptive activity and risk of vehicle strikes.

Special Designations

Special designations that restrict surface-disturbing activities and resource uses that adversely affect special status wildlife species, such as mineral development, motorized vehicle use, and ROW development provide beneficial impacts to these species. Under all alternatives, WSAs are managed for naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation. These special designations provide multiple beneficial impacts by restricting activities and resource uses that degrade habitat and disturb special status wildlife species. The Spanish Point Karst ACEC, designated regardless of the alternative, would limit adverse impacts to special status bat species in this area.

Resources

Similar to livestock grazing, fire and fuels management can alter special status wildlife species habitat, resulting in adverse and beneficial impacts. Replicating historical fire regimes in grassland, shrubland, and forest and woodland habitats, although potentially resulting in adverse impacts to special status wildlife species in the short term, can prevent catastrophic wildfires likely to cause more adverse impacts, but only in areas where cheatgrass has not become prevalent and annual precipitation is sufficient to restore burned areas (e.g., above 12 to 14 inches annually). Wildland fire is used to restore fire-adapted ecosystems and in the long term improves forest health for many wildlife species such as mule deer and elk that summer and winter in these habitats. This in turn benefits special status wildlife species such as grizzly bears and gray wolves, which are predators of big game. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for a more detailed description of resource uses that impact wildlife.

Special status wildlife species are anticipated to benefit both directly and indirectly where restrictions are implemented that conserve different habitat types from surface-disturbing and wildlife-disturbing activities. For example, managing riparian/wetland areas to meet PFC improves habitat conditions for various special status wildlife species that inhabit these areas. Conservation of sagebrush habitat will not only benefit greater sage-grouse, it will benefit other sagebrush-dependent species such as the sage thrasher and sage sparrow.

Proactive Management Actions

Select management actions and allowable uses are anticipated to benefit special status wildlife species by promoting individual species and their habitats or by restricting or altering activities of other resource programs (e.g., mineral development, motorized vehicle use, and fire and fuels management). Collectively, this section describes these actions as proactive management actions, which include restricting certain types of development, managing habitat fragmentation, and developing and protecting water sources and associated habitats for special status wildlife species in cooperation with the WGFD.

Under all alternatives, implementing, where appropriate, conservation measures, terms and conditions, and appropriate BMPs and reasonable and prudent measures in existing state programmatic biological opinions for the bald eagle, Canada lynx, gray wolf, black-footed ferret, and grizzly bear would minimize and mitigate adverse impacts from resources uses and activities. Biological opinions are available on the project website at http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html.

The greater sage-grouse is a BLM sensitive species known to occur in the Planning Area. Numerous management actions common to all alternatives from the *BLM National Sage-grouse Habitat Conservation Strategy* that would beneficially affect the greater sage-grouse by protecting and enhancing its habitat include: insecticide and pesticide restrictions, water source maintenance and protection, riparian/wetland area restoration, and vegetation treatments. All alternatives apply a protective buffer to restrict surface-disturbing activities around occupied greater sage-grouse leks and nesting and early brood-rearing habitat, providing beneficial impacts to greater sage-grouse and other sagebrush obligate species by protecting undisturbed sagebrush steppe habitats from potential mineral, industrial, and recreational facility development. The prioritization and removal of conifers encroaching into sagebrush habitats would benefit greater sage-grouse and other sagebrush obligate species by reducing habitat loss.

All alternatives apply a protective buffer around all active raptor nests, benefitting special status raptor species and other special status wildlife species that share this habitat. Applying measures, such as seasonal timing limitations, project design modifications, pre-disturbance surveys, and buffers, to avoid taking migratory birds under all alternatives would have beneficial impacts on migratory birds by avoiding disturbance during occupancy periods and minimizing habitat loss.

The impacts to special status wildlife species are described under individual alternatives in terms of anticipated surface disturbance; the potential impacts from other resource uses, special designations and resource program actions; and proactive management followed by a more detailed description of impacts.

Alternative A

Surface Disturbance – Alternative A

In general, the impacts to special status wildlife species from surface disturbance parallel the impacts to all wildlife. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for a general discussion of these

impacts. This section emphasizes what are likely to be the greatest impacts from surface disturbance to special status wildlife species.

Estimated short- and long-term surface disturbance from BLM actions in the Planning Area under Alternative A (Table 4-1) would result in loss, degradation, and fragmentation of sagebrush habitat. Loss of grassland and shrubland habitat will directly affect special status species that depend on these habitats. Surface disturbance, when it increases erosion and sedimentation, can also result in adverse impacts to special status wildlife species that depend on riparian/wetland habitats. Riparian/wetland habitat degradation due to surface disturbance is anticipated under Alternative A, which may result in adverse impacts to special status wildlife species inhabiting those areas.

Resource Uses – Alternative A

Minerals development would result in adverse impacts to special status wildlife species under Alternative A. Specifically, studies have identified mineral and oil and gas development as a potential cause of declining greater sage-grouse populations (Wyoming Sage-grouse Working Group 2003). Minerals development would result in 13,770 acres of long-term surface disturbance in grassland and shrubland communities under Alternative A that may result in habitat loss. Noise from mineral facilities operations, especially oil and gas facilities can also impact special status bird species relying on aural cues such as the greater sage-grouse. Alternative A is projected to result in 1,184 new federal oil and gas wells that would result in adverse impacts from habitat loss and noise disturbance.

Surface disturbance related to powerlines under Alternative A would be approximately 338 acres. Powerlines can directly affect raptor species through electrocution and current policy requires mitigating construction methods to avoid electrocution, when permitted on BLM-administered lands. Wind-energy development can also directly affect raptors and other birds through collisions and displacement, and indirectly through habitat fragmentation. Although renewable energy development across all alternatives is anticipated to be equal, Alternative A does not exclude wind-energy developments on any part of the Planning Area and the projected impacts to special status bird species from this resource use is greatest under this alternative.

Alternative A would limit impacts to special status wildlife species by closing 68,115 acres, including threatened and endangered species habitat, to motorized vehicle use that can disturb special status species. Projected surface disturbance from roads totals 1,966 acres in the short term and 983 acres in the long term under Alternative A, contributing to habitat loss and potentially forming barriers that fragment habitat for some special status wildlife species (Appendix T).

Livestock grazing under Alternative A is generally managed to provide for protection or enhancement of other resource values (e.g., wildlife). The BLM prohibits forage supplements within ¼ mile of riparian/wetland areas to avoid adverse impacts to this habitat. Special status wildlife species categories potentially affected by livestock and wild horse grazing include trophy game, game birds, nongame mammals, migratory birds, and amphibians.

Special Designations – Alternative A

Under Alternative A, the BLM designates the Five Springs Falls and Upper Owl Creek ACECs, which have special status species as a value of concern. Additionally, Alternative A restricts certain resource uses and activities within WSR eligible waterway segments, which would beneficially impact special status species that use riparian habitat. Special designations would limit adverse impacts to special status wildlife species under Alternative A.

Resources – Alternative A

The impacts of resource management to special status wildlife species are addressed more specifically below. An overview of resource management as it applies to special status wildlife species habitat is included here under each alternative.

Fire and fuels management is likely to cause similar impacts to special status wildlife species across all alternatives. Under Alternative A, wildland fire is used to restore fire-adapted ecosystems and to reduce hazardous fuels, likely resulting in long-term beneficial impacts to all special status wildlife species, except in areas with lower precipitation, where wildland fire is not expected to enhance grassland or shrubland habitats.

Currently, the BLM manages invasive species primarily through cooperative efforts with county Pest Control Districts. Recent permitted activities under APDs, or ROWs, require weed treatment by the APD or ROW holder. Weeds have spread on public lands in developed oil and gas fields, along roads and pipelines, and with increasing recreational use. In general, Alternative A allows for expansion of these resource uses and is predicted to continue the spread of invasive species. The spread of invasive species is anticipated to degrade sagebrush and riparian/wetland habitats most acutely, and result in adverse impacts to special status wildlife species that depend on these habitats in the long term.

Forest management under Alternative A pursues some measures anticipated to disturb special status wildlife species and degrade/destroy habitat. These activities include precommercial thinning, woodland treatments, prescribed burns, timber harvest, and clear cutting limited to 300 yards in any direction. However, timber harvesting performed in a manner that protects and benefits wildlife would limit disturbance and reduce fuel loads to lower the risk of wildfire, providing long-term benefits. Special status wildlife species categories directly affected by forest management include raptors, mammals, and bats.

Under Alternative A, the BLM manages grassland and shrubland communities on a small portion of the Planning Area for watershed protection and livestock grazing without any specific management actions for improving these habitats for wildlife. Reclamation of grassland and shrubland vegetation, especially in lower precipitation zones, would minimize long-term impacts to special status wildlife species that depend on these habitats. Under Alternative A, the BLM reclaims disturbed areas by routinely seeding, or requiring permittees and operators to seed, these areas with native seed mixes without specific requirements regarding topsoil salvage, temporary protective surface treatments, or reclamation plans. Special status wildlife species categories directly affected by grassland and shrubland management and reclamation include the greater sage-grouse, raptors, migratory birds, and nongame mammals.

Alternative A provides riparian/wetland communities the third most protection, compared to other alternatives. All riparian/wetland areas are managed to meet, or make progress toward meeting, PFC. Special status wildlife species categories directly affected by riparian/wetland management and protection include raptors, migratory birds, mammals, and amphibians.

Proactive Management – Alternative A

In general, proactive management under Alternative A provides benefits and mitigates adverse impacts to special status wildlife species. Impacts due to proactive management, and other impacts, are described in detail under each special status wildlife species category below.

Trophy Game – Alternative A

The BLM implements, as appropriate, various measures from the existing state programmatic biological opinion for the grizzly bear to minimize adverse impacts to this species under all alternatives. Other

measures included in Alternative A that may provide beneficial impacts to grizzly bear habitat include big game crucial winter range and migration corridor seasonal closures and restrictions, seasonal surface-disturbance restrictions around raptor nests, protection of elk calving areas, and limitations of geophysical operations and other surface disturbances around greater sage-grouse leks, all of which may occur in grizzly bear habitat.

Livestock grazing management is likely to result in adverse impacts to grizzly bears as a result of accidental or illegal take (e.g., a herder shooting a bear attacking livestock) or bear removal by the WGFD due to livestock depredation. Conflicts have been more prevalent on sheep allotments and more difficult to resolve without phasing out sheep grazing (BLM 2005f). Under Alternative A, the Planning Area is open to livestock grazing except for Bighorn River tracts, campgrounds, and exclosures, which may result in adverse impacts to grizzly bears where livestock grazes in grizzly bear habitat.

Predatory Animals – Alternative A

Under Alternative A, there are no specific management actions for gray wolves; however, management actions that protect the habitat gray wolves and their prey (primarily elk) utilize are anticipated to benefit gray wolves in the Planning Area. Management actions limiting human activities, ROW development such as roads, and habitat fragmentation also will benefit gray wolves. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more detail on impacts to big game.

Under Alternative A, harvesting timber in a manner that protects and benefits wildlife habitat values would beneficially impact gray wolves by creating of patchwork pattern of forest stands that will enhance forage used by elk and other big game (BLM 2004f). However, new roads created for timber management may disturb and displace gray wolves with more human access. Closing spur roads after completion of timber management would limit these impacts.

Under Alternative A, management actions that may directly or indirectly minimize impacts to gray wolves include prescribed burns to enhance big game forage and seasonally prohibiting surface-disturbing activities around active raptor nests. Alternative A also applies a CSU stipulation for big game migration corridors, indirectly benefitting gray wolves. These restrictions benefit gray wolves only where their habitats, or their prey's habitats, overlap.

Game Birds (Greater Sage-Grouse) – Alternative A

See Table 4-23 for a summary of management actions and impacts under Alternative A specific to greater sage-grouse. A detailed discussion follows in the sections below.

Alternative A applies a CSU stipulation to prohibit surface-disturbing and disruptive activities within a ¼ mile of occupied greater sage-grouse leks and a TLS to avoid such activities in nesting and early brood-rearing habitats within a 2-mile radius of the perimeter of the occupied greater sage-grouse leks (834,543 acres), in identified greater sage-grouse nesting and brood-rearing habitat outside the 2 mile buffer (626,564 acres), and in winter concentration areas (172,809 acres). Such management would reduce the potential for adverse impacts to greater sage-grouse by limiting the potential for ROW and mineral development directly adjacent to occupied leks year round, while providing additional restrictions during sensitive nesting and early brood-rearing periods. However, Braun (2002) indicates that adverse impacts to greater sage-grouse can occur within ¼- or ½-mile buffers and accordingly recommends no surface disturbance within 3 miles of occupied leks. Therefore, Alternative A would still allow development at distances where declines in lek attendance or lek abandonment could occur. Combined with the lack of an overall management strategy to address landscape-level threats to sagebrush habitat from human and natural activities, Alternative A is anticipated to result in adverse impacts to greater sage-grouse in the short and long term.

Leasable mineral development could result in adverse impacts to greater sage-grouse and their habitat through changes to habitat components, habitat fragmentation, and noise and other disruptions. This could potentially reduce survivability and breeding of affected populations. Specific risks to greater sage-grouse from oil and gas development include elevated mortality due to collisions with structures and vehicles, risk of West Nile virus due to increased mosquito habitat from holding ponds, stress, disturbance of birds that may force them into suboptimal habitats with elevated predation rates (resulting in a decline in habitat suitability), and direct habitat loss (Walker et al. 2007). Holloran et al. (2010) found that male greater sage-grouse yearlings were 4.6 times more likely to establish leks outside compared to inside areas with oil and gas infrastructure, and yearling female avoidance responses indicated a loss of functional nesting habitats within 3,000 feet of the infrastructure of natural gas fields. These results suggest that conventional oil and gas development adversely affects greater sage-grouse by excluding individuals from developed areas. Alternative A closes 41,120 acres of greater sage-grouse PHMAs to oil and gas development, which would limit these impacts (Table 4-22). However, adverse impacts could result in areas that are available for oil and gas development subject to the standard lease form or open seasonally. BLM authorization for permits to drill could include conditions of approval that would limit potential adverse impacts on greater sage-grouse on a case-by-case basis. However, unless such conditions of approval are applied in a coordinated and consistent manner across the Planning Area and connected habitats, they would not alleviate adverse impacts from oil and gas development.

The CSU restrictions and TLS stipulations for surface-disturbing and disruptive activities described above, as well as the designation of ROW avoidance areas, could reduce adverse impacts from the location of ROW and renewable energy facilities on BLM-administered land in greater sage-grouse seasonal habitats and around occupied leks. In areas where new ROWs or renewable energy projects are allowed, vegetation loss, habitat degradation, and invasion of exotic plant species could occur. New ROW development could fragment formerly intact habitat, severing greater sage-grouse travel routes to seasonal habitat areas. Disturbance and noise from human presence, vehicles, and equipment could cause greater sage-grouse to temporarily or permanently abandon the area. Habitat abandonment could lead to successful relocation if nearby habitat is available, while displacement to lower quality habitat could reduce survival or reproduction success due to physiological stress or lack of forage and cover (Blickley et al. 2012). High profile structures associated with certain renewable energy or ROW development or communication sites could serve as perches for raptors that prey on greater sage-grouse, while linear ROW disturbances could enhance access for predatory animals, such as foxes. Management that encourages the placement of new ROW and communication sites in or near previously disturbed areas could reduce the potential for adverse impacts to specific leks or habitats by concentrating development in previously disturbed areas less used by greater sage-grouse.

Prolonged fire suppression has allowed fuels to build up to the point that an unplanned wildfire is likely to be much larger and greater in intensity. Alternative A utilizes wildland fires to restore fire-adapted ecosystems and employs the full suite of available fuels treatment options (mechanical, chemical, and biological) across the landscape as needed to restore vegetative diversity and reduce the risk of unnatural fire within those ecosystems. Depending on the extent, location, severity of a fire, and seral vegetation type affected, fire management would have short-term to long-term adverse impacts on greater sage-grouse resulting from the direct removal or alteration of habitat and injury or death from fire or smoke inhalation or indirect effects including changes in species movement patterns and lek attendance in burned habitat and reduced population viability. In areas that are available for fuels treatments, changes in vegetation can result in adverse impacts on greater sage-grouse, such as direct habitat loss, habitat fragmentation, and disruption to species; however, it can also result in beneficial impacts, such as habitat restoration. In the short term, fuels treatments and prescribed fires may also introduce new human presence that is disruptive to greater sage-grouse, though the application of CSUs

and TLSs would reduce these adverse impacts by helping to the limit the timing and location of these activities. Fire and fuels management actions that reset vegetation seral stage can increase susceptibility to invasion by undesirable plant species. Noxious and invasive weeds are often of lower value to wildlife, degrade wildlife habitat by reducing optimal cover or food, and change site-specific fire ecology in ways that result in the loss of shrub communities. Sagebrush-steppe communities are among the ecosystems most vulnerable to invasion and degradation by invasive plant species.

Although both wildfire and prescribed fire adversely affect habitat in the short term by removing vegetation and disturbing soil, the long-term beneficial effects of fire often outweigh the short-term adverse impacts. Over the short term, the plant community is changed dramatically by a fire, as taller and denser vegetation is replaced by a more open habitat. Additionally, fire can improve the quality of greater sage-grouse habitat by releasing soil nutrients, reducing fuel load, or setting back tree encroachment into shrubland or grassland habitats. The herbaceous and woody plants that establish following a burn provide abundant foliar tissue and seeds. These are more palatable for greater sage-grouse and encourage an influx of insects that provide valuable nourishment for greater sage-grouse chicks. As the area gradually recovers, however, many of the pre-fire components become reestablished, and the area again supports a healthy plant community. This cycle may take decades or centuries, depending on the dominant plant species. Alternatively, vegetation restoration might never occur if climatic conditions are no longer suitable for the former dominants.

Managing the large majority of BLM-administered lands as open to livestock grazing could alter greater sage-grouse habitats components in a manner that decreases the suitability and extent of greater sage-grouse habitats in the Planning Area (Wyoming Sage-grouse Working Group 2003). Although livestock grazing management has limited direct effects on sagebrush species, it affects the height and density of herbaceous material within sagebrush vegetation communities that provide cover for greater sage-grouse. However, livestock grazing management can maintain healthy rangeland conditions that are compatible with greater sage-grouse habitat requirements (i.e., nesting, brood-rearing, and summer habitat) when properly designed and monitored (Crawford et al. 2004). Managing the timing and intensity of grazing can promote desirable plant communities and annual management of the standing crop to provide cover for the greater sage-grouse (Wyoming Office of the Governor 2013). Monitoring is important to ensure grazing intensity and duration does not remove required herbaceous cover and litter important for maintaining greater sage-grouse habitats. Although rangeland productivity is improving in the Planning Area, the current focus of management and monitoring does not emphasize the protective cover of vegetation and litter required by greater sage-grouse. Therefore, management of livestock grazing under Alternative A may not improve the quality or quantity of habitats for greater sage-grouse, particularly given the other threats affecting the species.

Alternative A manages several HMAs for wild horses. In contrast to properly managed grazing livestock, year-long grazing by wild horses in HMAs holds little potential to improve habitat for greater sage-grouse due to inherent difficulties in managing wild horse distribution and forage utilization. However, population management that meets the established appropriate management level for wild horses in the HMAs could help maintain wild horse use in balance with habitat quality and quantity for greater sage-grouse.

Designing range improvement projects to meet multiple-use objectives and mitigate impacts to other resource values, and prohibiting the placement livestock supplements within ¼ mile of water, wetlands, riparian areas, reclaimed or reforested areas, or other areas determined by the authorized officer (which could include greater sage-grouse habitats) could reduce impacts to greater sage-grouse. Managing supplement placement could prevent trampling and degradation of greater sage-grouse habitat, particularly in riparian/wetland areas and late season brood rearing habitat. Supplements

would be placed in locations that both promote proper grazing distribution and prevent inappropriate livestock use on riparian habitat, minimizing soil compaction and damage to vegetation, and could decrease grazing pressure and competition for riparian vegetation. Water developments could also adversely affect greater sage-grouse habitat, particularly in nesting habitat and riparian areas, through reductions in forage, cover, or possible nest trampling due to increased distribution of animals. However, implementation of the Wyoming Standards for Healthy Rangelands on BLM-administered lands could ensure that habitat is not degraded by over-use of livestock.

Modifying identified hazard fences and requiring analysis and construction of new fences in accordance with appropriate wildlife needs and the *BLM Fencing Handbook 1741-1* would generally beneficially affect greater sage-grouse. Fences can affect greater sage-grouse by creating travel barriers, altering distribution patterns, increasing stress and energy loss, and causing injury or death from entanglement or collisions. Modifying or constructing fences to BLM standards could reduce impacts to greater sage-grouse by decreasing the chances of collision or entanglement if the fences were fitted with anti-collision markers. Studies in Wyoming show that fence markers can reduce sage-grouse mortality from wire fence collision by 70 to 83 percent (Christiansen 2009, Stevens et al. 2012). Where fences were constructed with anti-collision standards for special status species, greater sage-grouse could be less likely to be injured or perish due to fence impacts. Where fences are constructed with perch inhibitors for raptors, greater sage-grouse would be less likely to be subject to hunting from predatory bird species. Removal of fences reduces threats of injury or death from impacts to fences, opens up travel corridors, and could allow access to additional forage and cover. Fences, regardless of their construction, can reduce potential adverse impacts from livestock trampling of cover and forage where they serve to exclude livestock from greater sage-grouse habitat.

Designating 25,680 acres as ACECs within greater sage-grouse Key Habitat Areas (Table 4-22) and managing all eligible WSRs to maintain their suitability for inclusion in the NWSRS would result in beneficial impacts to greater sage-grouse. The restrictions on resource uses and activities in these areas would limit the potential for habitat fragmentation and loss from development, and could limit stress from human presence in these areas during development. Conversely, these special designation areas could draw recreation and tourism, potentially increasing disruptions from human presence for recreational use.

Limiting motorized travel across the large majority of the Planning Area to existing roads and trails, until such time as travel management planning is complete and routes are either designated or closed, or designated as roads and trails could lessen impacts to greater sage-grouse from vehicle use. Route closures will not be determined until the travel management process is complete, but interim-management limiting cross-country travel and the construction of new roads and routes could prevent some adverse impacts to greater sage-grouse. Cross-country motorized vehicle use, which is allowed on a limited acreage under Alternative A, may create corridors that could be used by predatory animals and establish social trails that attract additional vehicle travel. Motorized vehicles could cause direct mortality of greater sage-grouse. Linear disturbances can create barriers to movement, fragmentation of habitat, and overall habitat loss for special status species. Vehicle travel may also cause vegetation loss, erosion, and the spread of invasive, non-native plant species.

Alternative A uses DPC to emphasize watershed protection, forestland health, and livestock grazing, and allows a wide variety of vegetation management techniques to achieve specific vegetation community objectives. Temporary disruptions from human activities and vegetation removal could displace greater sage-grouse into less desirable habitat and could increase competition for available resources with other species and habitat uses. However, because the BLM would design vegetation treatments to meet specific resource objectives (including habitat and cover for greater sage-grouse), the long-term benefits

from vegetation management could outweigh these short-term adverse impacts. Because this alternative does not manage specifically to maintain contiguous blocks of native vegetation communities, it may result in the fragmentation of habitat and may reduce the potential for habitat to meet all greater sage-grouse needs.

Although the extent of sagebrush habitat degradation from the presence of invasive plant species has not been quantified for the Planning Area, there is potential for these species to proliferate and substantially affect greater sage-grouse habitats (Wyoming Sage-grouse Working Group 2003). Therefore, the anticipated continued expansion and spread of invasive species under Alternative A would result in adverse impacts to greater sage-grouse and sagebrush habitats.

Managing conifer encroachment to improve wildlife habitat and forest health conditions, and removing encroaching conifer in sagebrush habitat, would benefit greater sage-grouse habitat over the long term. In addition to management that reintroduces wildland fire into historically fire-adapted ecosystems, treatment of conifer encroachment could limit the conversion of additional sagebrush-steppe to forest, and could create additional habitat for greater sage-grouse over the long term. In the short term, such treatments may also introduce adverse human presence that is disruptive to the birds, or provide areas that are suitable for expansion of invasive plant species.

Alternative A does not require project proponents to locate facilities or use equipment that reduces noise in proximity to greater sage-grouse leks. Noise above certain decibel levels may result in disturbance of greater sage-grouse, and studies have indicated that noise could adversely affect the communication abilities of strutting males (LaGory et al. 2001; Dantzker et al. 1999). Holloran (2005) and Blickley et al. (2012) suggest that noise emitted from drilling operations could reduce lek attendance by male and possibly female greater sage-grouse.

Where surface disturbances in greater sage-grouse habitat occur, application of the Wyoming BLM Reclamation Policy and requiring that reclamation achieve vegetation cover reestablishment within five years could reduce long-term adverse impacts. Although initial disturbance would result in habitat loss, reclamation activities could restore sagebrush habitat over the long term. Some areas of habitat, such as greater sage-grouse winter concentration areas, could be difficult to restore to original conditions due to the composition and size of sagebrush in these areas. Surface disturbance may also provide opportunities for invasive plant species (e.g., cheatgrass) to establish, making it difficult to restore sagebrush habitat with native species in some areas and achieve reclamation success.

Nongame (Raptors) – Alternative A

Special status raptor species would be affected by surface-disturbing activities, fire and fuels management, invasive species spread, motorized vehicle use, livestock grazing (Johnson and Horn 2008; Torre et al. 2007), and management actions for biological resources under Alternative A. The late winter, spring, and early summer periods, when courtship, nest construction, incubation, and early brooding periods occur, would be more sensitive to disturbance because adult raptors are more prone to abandon nests at these times (USFWS 2002).

Surface disturbance causes localized adverse impacts to raptor prey species by temporarily and permanently disturbing habitats for small mammals and birds. Under Alternative A, no activity or surface disturbance is allowed for up to a ¾-mile radius from any active raptor nest from February 1 through July 31 to prevent nest disturbance and abandonment. Surface-disturbing activities are restricted at known bald eagle nests and communal winter roosts, but not in terrestrial foraging habitats, and therefore may adversely impact bald eagles (BLM 2003b) and other special status raptor species. Bald eagles are also directly affected by impacts to riparian/wetland habitat. See Section 4.4.3

Vegetation – Riparian/Wetland Resources and the *Nongame (Migratory Birds)* section for likely impacts to bald eagles.

Constructing roads, powerlines, and other development facilities can contribute to loss and fragmentation of raptor habitats and ultimately impacts the diversity and abundance of raptor populations (USFWS 2002). For example, utility poles can provide perching and nesting structures for raptors, but also can result in mortality to raptors through collision and electrocution (APLIC and USFWS 2005); current policy requires mitigation be applied to construction design for power poles permitted on BLM-administered land. Wind-energy facilities can be a source of mortality for raptors if they collide with wind tower blades. High mortality could result if wind towers are placed along a migration path or in nesting habitat. Wind-energy facilities also could be a source of habitat loss and fragmentation, and human disturbance from construction and maintenance activities. The ROD for Wind Energy Development (BLM 2005e), which guides management under Alternative A, provides BMPs to minimize impacts to raptors, but lacks specific guidelines to avoid adverse impacts. Likewise, wind-energy development is considered on a case-by-case basis and no areas are excluded from wind-energy development under Alternative A, so the potential impacts to raptors are greatest under this alternative.

As recreational use is often concentrated in riparian areas, human activity in these areas may cause bald eagles to avoid or abandon otherwise suitable habitats (BLM 2003b). Developing or upgrading recreation sites and establishing day use facilities at Wardel and Harrington reservoirs would adversely impact bald eagles under Alternative A. Similarly, managing the Bighorn River SRMA to maximize recreation opportunities may also adversely impact bald eagles due to disturbances from recreationists.

Livestock grazing in riparian/wetland areas may indirectly contribute to adverse impacts on bald eagles if soil erosion, degradation of stream bank conditions, introduction of noxious weeds, and the reduction of viable cottonwood tree sapling recruitment result (BLM 2003b). Under Alternative A, the Bighorn River tracts are closed to livestock grazing, limiting adverse impacts to bald eagles in these areas.

Special status raptors are affected by wildlife-disturbing activities that contribute to habitat loss, fragmentation, and degradation. Such actions include, but are not limited to, clear-cutting, snag removal, industrial activities, and invasive species control. For example, clear-cutting directly impacts raptor habitat for those raptors (e.g., northern goshawk) that prefer closed canopies. Other raptor species, such as ferruginous hawks, may benefit from openings in the canopy when in pursuit of prey. Snag removal indirectly affects raptors by degrading habitat and reducing potential nest sites. Alternative A allows for clear cutting and timber salvage of dead stands, which would adversely impact raptors by reducing habitat and nest sites. In the long term, the continued spread of invasive species in the Planning Area, combined with the loss and fragmentation of raptor habitats by wind energy, mineral development, and associated infrastructure projected under Alternative A, are expected to have adverse impacts to special status raptor species.

Nongame (Migratory Birds) – Alternative A

Although impacts to migratory birds on their winter habitat are not subject to BLM management, impacts to breeding and nesting habitats from surface-disturbing activities, invasive species management, fire and fuels management, and management actions for biological resources on BLM-administered lands are anticipated for these species. Where possible, site-specific assessments and discretionary permit actions will mitigate these impacts. Surface disturbance is anticipated to have localized adverse impacts to breeding and nesting habitats for migratory birds. Habitat impacts from surface disturbance may include temporary and permanent loss of breeding and nesting habitats due primarily to mineral development. Fragmentation and degradation of habitats for migratory birds also are anticipated from surface-disturbing activities and associated development and the spread of invasive

species. In general, management actions and projected development under Alternative A are likely to result in adverse impacts to migratory birds from habitat loss, fragmentation, and degradation.

Because of the diverse species in the migratory bird category, the discussion below organizes these species into the following habitat guilds:

- Sagebrush and shrubland species: Brewer's sparrow, loggerhead shrike, sage sparrow, and sage thrasher
- Grassland species: Baird's sparrow, long-billed curlew, and mountain plover
- Riparian/wetland species: yellow-billed cuckoo, trumpeter swan, and white-faced ibis

Sagebrush and Shrubland Species – Similar to the greater sage-grouse, the Brewer's sparrow, sage sparrow, and sage thrasher depend on sagebrush habitats, though they may use other shrubland types, particularly during the nonbreeding season. The loggerhead shrike uses a more diverse mix of shrubland and grassland types, including sagebrush. There are no proactive management actions specific to sagebrush and shrubland migratory birds under Alternative A, but measures to protect greater sage-grouse discussed under *Game Birds* would generally benefit other sagebrush and shrubland species. Adverse and beneficial impacts to sagebrush habitats discussed under *Surface Disturbance* and *Game Birds* apply to migratory birds that occur in similar habitats. Although precise habitat requirements may vary between certain sagebrush and shrubland species, restrictions on surface disturbance are likely to benefit the suite of species in areas where their ranges overlap.

Sagebrush and shrubland species may benefit from prescribed fire used to improve plant community health in shrubland communities, but only where healthy native vegetation and adequate annual precipitation (above 12 to 14 inches) are present. Any wildland fire occurrence in lower precipitation zones or where cheatgrass is present would likely reduce sagebrush and increase cheatgrass occupancy (Keeley 2006). In the long term, allowable uses resulting in habitat loss would adversely impact sagebrush and shrubland migratory birds, but management actions implemented under Alternative A would limit adverse impacts to these species.

Grassland Species – Grasslands make up less than 1 percent of the Planning Area. Under Alternative A, there are no management actions specific to special status migratory birds that utilize grasslands, other than the mountain plover. Refer to Section 4.4.2 *Vegetation – Grassland and Shrubland Communities* and Table 4-21 for a discussion of management actions and BLM-authorized activities that would impact grasslands and would similarly affect migratory bird habitat in these areas. Due to its projected long-term surface disturbance and reclamation requirements, Alternative A would result in habitat loss and degradation in grasslands.

Adverse impacts to the mountain plover would be minimized by implementing various conservation measures and BMPs under Alternative A. Mountain plovers are often found in association with prairie dog towns because they tend to prefer nesting areas with sparse vegetation cover, and therefore are affected by management actions for white-tailed prairie dogs (see *Nongame [Mammals]*). In addition, mountain plovers show a nesting preference to areas heavily grazed by livestock (BLM 2005g). Range management practices that favor uniform grass cover of taller grasses and a lack of bare patches reduce available mountain plover habitats (BLM 2005g). Although livestock grazing management under Alternative A could increase the availability of suitable mountain plover habitat, few beneficial impacts are anticipated because the Planning Area already has an abundance of naturally sparse habitats for mountain plover nesting.

Riparian/Wetland Species – Although there are no specific management actions for special status migratory birds that use riparian areas and wetlands, other biological resource management actions—

particularly those pertaining to water and riparian/wetland areas, such as surface disturbance restrictions, livestock grazing and riparian area management, and special designations—would affect these species. While most surface-disturbing activities will not occur in riparian/wetland areas, adverse impacts, to a limited extent, may occur due to erosion and increased sedimentation in streams. Prohibiting the placement of salt, mineral, or forage supplements would limit adverse impacts from concentrated livestock to riparian/wetland areas. Refer to Section 4.4.3 *Vegetation – Riparian/Wetland Resources and* Table 4-21 for a description of other management actions and BLM-authorized activities that would impact wetlands and riparian areas and would similarly affect migratory bird habitat in these areas.

Nongame (Mammals) – Alternative A

Surface-disturbing activities, invasive species control, fire and fuels management, and management actions for biological resources may result in impacts to special status nongame mammals. Surface disturbance would have localized adverse impacts to special status nongame mammal habitats, including temporary displacement, and would fragment and degrade special status nongame mammal habitat.

It is important to note that some special status nongame mammal species, especially bats, may use more than one habitat type (e.g., caves and forests/woodlands). However, because of the diverse species in the special status nongame mammal category, the discussion below organizes these species into the following habitat guilds:

- Sagebrush and Shrubland Species: white-tailed prairie dog and black-footed ferret
- Forest and Woodland Species: Canada lynx
- Cave Species: Townsend's big-eared bat, spotted bat, and long-eared myotis

Sagebrush and Shrubland Species – Similar to the greater sage-grouse, special status nongame mammals in this category depend on sagebrush habitats or other shrubland types. Therefore, measures to protect greater sage-grouse as discussed under *Game Birds (Greater Sage-Grouse)* would generally benefit other sagebrush and shrubland species. Although precise habitat requirements may vary between certain sagebrush and shrubland species, restrictions on surface disturbance are likely to benefit the suite of species in areas where their ranges overlap. Likewise, adverse impacts to sagebrush habitats discussed for the greater sage-grouse would result in adverse impacts to these species. In the long term, actions implemented under Alternative A would benefit special status nongame mammals occupying sagebrush habitats in designated greater sage-grouse lek habitat buffers. Black-footed ferrets are associated with and depend on prairie dog colonies in the Planning Area. Due to the BLM's use of conservation measures, terms and conditions, and BMPs, measurable adverse impacts from BLM actions to prairie dog populations are not anticipated under Alternative A.

Forest and Woodland Species – Canada lynx prefer coniferous forests and riparian areas. Under Alternative A, there are no specific management actions for Canada lynx; however, management actions that protect the Canada lynx habitats and their prey (primarily snowshoe hare) may result in beneficial impacts to Canada lynx. For example, prohibition of surface disturbance within ¾ mile of active raptor nests conserves Canada lynx habitats during the TLS where these habitats overlap but would not provide long-term protection to Canada lynx. Maintenance of forest stands with dense vegetative cover (i.e., prohibiting precommercial thinning) is important to maintaining snowshoe hare populations and therefore the presence of Canada lynx in the Planning Area (USFS 2005b). Logging, forest health management, and fire and fuels management in aspen and coniferous forests, in accordance with the Lynx Conservation Assessment Strategy, may result in short-term impacts to Canada lynx habitats by

reducing large woody debris that may reduce cover, eliminate den sites, reduce kitten survival, and reduce the availability of prey species (e.g., snowshoe hare and red squirrel) (BLM 2005h; USFS 2005b). However, over the long term, treatments may improve habitat for Canada lynx and its prey species by diversifying forest structure and reducing fuel loads. Alternative A does not address old growth forest areas in the Planning Area, but ensures an appropriate level of snag retention and harvests timber in a manner that protects wildlife habitat values, minimizing adverse impacts to the Canada lynx.

Cave Species – Although bats can utilize a variety of habitats including riparian and forest habitat, cave and karst habitat and abandoned mines are of importance for most species. Bats that use caves for roosting, maternity colonies, or hibernation could be affected by surface-disturbing activities near caves, cliffs, or other rock features. Abandoned mine closures and recreational caving have been identified as the two major threats to bat habitats (Priday and Luce 1995). Alternative A allows activities in AMLs on a case-by-case basis, resulting in the second highest potential adverse impacts to bat habitat. Management that increases recreation and access to caves may result in adverse impacts to bats. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* and Section 4.1.5 *Cave and Karst Resources* for impacts to bats and their habitat. Similarly to raptors, bats are likely to be adversely affected by wind-energy development.

Nongame (Amphibians) – Alternative A

Special status amphibian species in the Planning Area are associated with riparian, wetland, woodland, and forested habitat and are susceptible to impacts from habitat degradation and fragmentation, pollution, and modified hydrology. Beneficial impacts to these species are similar to the impacts described under *Nongame (Migratory Birds)* for this alternative. The Great Basin spadefoot toad may be affected by activities in sagebrush communities, where this species occurs. Beneficial impacts to the Columbia spotted frog are similar to those described for greater sage-grouse for this alternative. Accordingly, Alternative A is likely to result in mitigated adverse impacts to special status amphibian species. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more information on impacts to amphibians.

Alternative B

Surface Disturbance – Alternative B

Estimated short- and long-term surface disturbance from BLM actions in the Planning Area (Table 4-1) would result in less loss, degradation, and fragmentation of sagebrush habitat under Alternative B, relative to Alternative A. Erosion from surface disturbance would also result in less impacts to riparian/wetland habitats under Alternative B. Surface disturbance from roads totals 1,229 acres in the short term and 615 acres in the long term under Alternative B (Appendix T), forming fewer barriers to fragment habitat than Alternative A. Reclamation requirements are more stringent under Alternative B, likely resulting in the highest degree of surface disturbance mitigation, compared to Alternative A.

Resource Uses – Alternative B

Minerals development under Alternative B would result in similar adverse impacts to special status wildlife species as under Alternative A, but to a lesser extent. Alternative B has fewer acres open to mineral development, which would retain more shrubland and grassland habitat, compared to Alternative A. Alternative B is projected to result in 502 new federal oil and gas wells that would result in fewer adverse impacts from less habitat loss and noise disturbance than Alternative A.

Alternative B places more restrictions on powerline development than Alternative A, which would reduce the potential risk of raptor electrocution. The BLM closes a portion of the Planning Area to wind-energy development (1,244,948 acres) and avoids raptor concentration areas and greater sage-grouse nesting, brood-rearing, and winter habitat. Powerline and wind-energy development under Alternative B would therefore impact special status species less than under Alternative A.

Compared to Alternative A, Alternative B closes more area to motorized vehicle use, which can disturb special status species, including threatened and endangered species habitat.

Livestock grazing under Alternative B is generally managed to meet multiple use objectives over solely livestock forage availability. Although livestock grazing would be restricted more under this alternative, this will not necessarily benefit special status species that depend on livestock grazing to increase range productivity and reduce vegetation height, such as the mountain plover. Alternative B prohibits forage supplements within ½ mile of riparian/wetland areas to minimize adverse impacts to this habitat. Special status wildlife species most likely affected by livestock grazing include greater sage-grouse, nongame mammals, migratory birds, and amphibians.

Special Designations – Alternative B

Three ACECs are expanded (Carter Mountain, Five Springs Falls, and Upper Owl Creek) and three new ACECs are designated (Chapman Bench, Clarks Fork Canyon, and Rattlesnake Mountain) with special status species values of concern under Alternative B, providing greater potential benefits to special status wildlife species than Alternative A. Alternative B manages WSR suitable waterway segments similarly to Alternative A, though places greater restrictions on resource uses and activities with proportional beneficial impacts to special status species in riparian habitat.

Resources – Alternative B

Fire and fuels management is likely to cause similar impacts to special status wildlife species across all alternatives. Under Alternative B, the BLM would use wildland fire to restore fire-adapted ecosystems and reduce hazardous fuels, likely resulting in long-term beneficial impacts to special status wildlife species in areas of higher precipitation. Due to the reliance on natural process before active restoration, achieving fire-adapted ecosystems is less likely under Alternative B. However, treatments are used in the WUI to protect structures from fire, potentially adversely affecting special status wildlife species in the short term if treatments require surface disturbance or alter vegetative cover, but benefitting them in the long term if treatments reduce the chance of catastrophic wildfire that could destroy greater expanses of habitat.

In general, Alternative B limits the expansion of resource uses, and therefore may result in less invasive species spread relative to Alternative A. Invasive species would therefore impact special status wildlife species less under Alternative B.

Forest management under Alternative B, by generally pursuing natural processes to meet forest health goals, would adversely impact special status wildlife species less than Alternative A from destroying or degrading habitat. Additionally, the BLM retains old growth forests, providing beneficial impacts to special status wildlife species, especially raptors and bats.

Grassland and shrubland management under Alternative B would provide greater potential beneficial impacts to special status wildlife species than Alternative A. Under Alternative B, the BLM manages grassland and shrubland communities to achieve or make progress towards the reference state plant community based on ESDs, and maintains and enhances important plant communities on large, contiguous blocks of land. These measures are likely to result in the greatest natural vegetation

diversity and slow the spread of invasive species, benefitting special status wildlife species, especially greater sage-grouse, nongame mammals, and migratory birds.

Alternative B provides more protection for riparian/wetland communities than Alternative A. All riparian/wetland areas are managed to achieve DPC, likely resulting in more diverse riparian/wetland habitat that will provide greater benefits to special status wildlife species.

The Absaroka Front Management Area, designated under Alternative B, provides additional habitat protection goals that would likely benefit special status wildlife species including migratory birds, raptors, bats, grizzly bears, and gray wolves that depend on upper-elevation shrub/grassland and forest habitats.

Proactive Management – Alternative B

In general, proactive management under Alternative B provides more benefits, and mitigates adverse impacts to special status wildlife species to a greater extent than Alternative A. Impacts due to proactive management, in addition to other impacts, are described in more detail under each special status wildlife species category below.

Trophy Game – Alternative B

The BLM implements, as appropriate, various measures from the existing state programmatic biological opinion for the grizzly bear to minimize adverse impacts to this species under Alternative B. Alternative B includes other measures, similar to Alternative A that may provide beneficial impacts to grizzly bear habitat. The closure of the Absaroka Front Management Area to various resource uses is also likely to result in beneficial impacts to grizzly bears by reducing activities that can potentially fragment habitat.

Alternative B closes elk and bighorn sheep crucial winter range and greater sage-grouse Key Habitat Areas to livestock grazing and prohibits domestic sheep grazing on pronghorn crucial winter range. These management actions would beneficially impact grizzly bears in areas where grazing prohibitions overlap with grizzly bear habitat by reducing the potential for conflict that may result in accidental or illegal take or WGFD removal.

Predatory Animals – Alternative B

Under Alternative B, there are no specific management actions for gray wolves; however, management actions that protect the habitat gray wolves and their prey (primarily elk) utilize may benefit gray wolves in the Planning Area. Management actions limiting human activities, ROW development such as roads, and habitat fragmentation also would benefit gray wolves. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more detail on impacts to big game.

Harvesting timber only where natural processes are unable to accomplish forest health goals would minimize short-term impacts from disturbance and displacement to gray wolves, but may result in less long-term beneficial impacts than Alternative A by limiting widespread diversification of forest stand structure. Closing timber management roads not required for existing uses would benefit gray wolves by reducing human access and habitat fragmentation.

Under Alternative B, management actions that minimize adverse impacts to gray wolves include habitat enhancement projects in sagebrush communities, aspen restoration, prohibiting livestock grazing, and seasonally prohibiting surface-disturbing activities around active raptor nests. These restrictions benefit gray wolves only where the habitats overlap. Under Alternative B, resource use restrictions in the Absaroka Front Management Area may be the most beneficial to big game, and therefore to gray wolves.

Game Birds (Greater Sage-Grouse) – Alternative B

See Table 4-23 for a summary of management actions and impacts under Alternative B specific to greater sage-grouse. A detailed discussion follows in the sections below.

Under Alternative B, estimated short- and long-term surface disturbance from BLM actions in the Planning Area would result in less loss, degradation, and fragmentation of sagebrush habitats than under Alternative A. In addition, Alternative B manages to maintain continuous blocks of native plant communities, such as sagebrush habitat. Alternative B prohibits surface-disturbing and disruptive activities (including ROWs) within 0.6 mile of occupied greater sage-grouse leks and limits anthropogenic disturbance to one location that, when combined with existing disturbances, comprises less than 5 percent of sagebrush habitat per 640-acre. Overall, Alternative B would result in less surface disturbance and habitat loss, degradation, and fragmentation and therefore less impact to greater sage-grouse than Alternative A.

Alternative B closes greater sage-grouse Key Habitat Areas (1,490,758 acres) to new mineral leasing, which would largely eliminate potential adverse impacts from oil and gas development including displacement, habitat abandonment, human presence and noise, and possible offsite impacts, including erosion, and spread of invasive, non-native plant species. Applying a NSO stipulation within 0.6 mile of occupied leks, including leks outside of Key Habitat Areas, would limit potential adverse impacts from oil and gas development (Holloran et al. 2010) to a greater extent than the CSU restriction applied within 0.25 miles of occupied leks under Alternative A. Stipulations on fluid mineral exploration and development under this alternative could reduce avoidance behavior and displacement of birds, loss of habitat, and mortality from collisions with structures or increased incidence of West Nile Virus. In addition, limiting disturbance from oil and gas wells to no more than 15 acres per 640-acre section could maintain a more contiguous, uninterrupted seasonal habitats for greater sage-grouse, thus facilitating greater habitat connectivity.

Alternative B excludes ROW development on 132,194 acres in greater sage-grouse Key Habitat Areas (Map 40; Table 4-22) year round and applies a TLS to avoid surface-disturbing and disruptive activities (including ROW development and other discretionary surface disturbing activities) in greater sage-grouse nesting and early brood-rearing habitat (310,749 acres) and within a 3-mile radius of the perimeter of occupied greater sage-grouse leks in those habitats (1,526,277 acres). Restricting ROW development in these areas would reduce the potential for the types of adverse impacts described under Alternative A (e.g., increased susceptibility to the establishment of nonnative, invasive plant species, habitat fragmentation, or increased predation potential), across these important habitats. As discussed in Alternative A, limiting disruptive activities and habitat disturbances within 3 miles of lek is recommended to maintain viable greater sage-grouse populations.

Alternative B uses wildland fire and other vegetation treatments to restore fire-adapted ecosystems in the Planning Area, and impacts on greater sage-grouse would be similar to those described under Alternative A. Establishing a natural fire regime in fire-adapted ecosystems and reducing fuel loads in the Planning Area may lower the risk of catastrophic fire in areas with sufficient native vegetation and precipitation over the long term. As discussed under Alternative A, however, short-term impacts on greater sage-grouse would occur where fires result in direct removal or alteration of habitat, injury or death from fire or smoke inhalation, or indirect effects including changes in species movement patterns and lek attendance in burned habitat. Although Alternative B would require careful coordination of proposed prescribed fires and fuels treatments with greater sage-grouse conservation objectives, but is unlikely impede the use of these tools to reduce the risk of catastrophic wildland fires. Greater reliance

on natural processes in wildland fire management could reduce disturbance from new human presence during fuels treatments, and would reduce short-term adverse impacts compared to Alternative A.

Under Alternative B, the BLM closes extensive areas to livestock grazing, including greater sage-grouse Key Habitat Areas (1,129,612 acres), which could have adverse and beneficial impacts, depending on site-specific range conditions and grazing practices. Poor livestock grazing management can have long-term, adverse impacts to greater sage-grouse by degrading habitat (WGFD and BLM 2007). Approximately 154 of the 328 grazing allotments within the Planning Area, or portions of those allotments, were identified as not meeting one or more of the Wyoming Standards for Healthy Rangelands as of the most recent assessment and 213 allotments or portions of allotments in greater sage-grouse PHMAs (similar to Key Habitat Areas) have been identified for improvements in livestock management and range conditions (Appendix P). For Key Habitat Areas in which range conditions are not meeting the Wyoming Standards for Healthy Rangelands and livestock grazing is the cause, closing these areas may benefit greater sage-grouse by improving habitat conditions over long time periods (40 years or more) (Crawford et al. 2004). Within Key Habitat Areas, these closures would eliminate the potential for adverse impacts to greater sage-grouse due to loss of herbaceous cover from overgrazing, invasive weed spread by livestock, degradation of unfenced riparian areas and water sources from concentrated grazing and trampling, or drowning hazards posed by stock watering features.

On Wyoming big sagebrush sites with dense sagebrush and an understory of annual grasses, reductions in livestock grazing may hasten further habitat degradation if ungrazed fuel loads increase the chance of wildfires that kill sagebrush over large areas (Crawford et al. 2004). Appropriate grazing intensity and duration has been shown to maintain suitable greater sage-grouse habitat (WGFD and BLM 2007) and in some cases, light-to-moderate livestock grazing may improve greater sage-grouse habitat by increasing herbaceous vegetation in arid-to-semiarid areas (Holechek et al. 2006). Eliminating livestock grazing in areas where grazing has improved habitat conditions for greater-sage grouse could have adverse impacts.

The management of range improvements and supplements would result in similar impacts to those described under Alternative A. Like Alternative A, locating new fences in a manner that minimizes disturbance to greater sage-grouse habitat and increasing the visibility of existing fences would be beneficial to greater sage-grouse. Additional restrictions on the placement of supplements under Alternative B would reduce adverse impacts from concentrated grazing compared to Alternative A. Alternative B includes a larger supplement placement buffer (1/2 mile) around water, wetlands, riparian areas, reclaimed or reforested areas, or other areas determined by the authorized officer than does alternative A, reducing the potential for adverse impacts to soils and habitats in these areas. Impacts from the placement of water developments and other range improvement projects would be similar to those described under Alternative A.

The effects of wild horse grazing in HMAs would be similar to those under Alternative A.

Special designations under Alternative B would provide additional beneficial impacts to greater sage-grouse through the application of resource use restrictions over a larger area than under Alternative A. ACECs under Alternative B encompass 96,272 acres of greater sage-grouse Key Habitat Areas (Table 4-22), which would restrict resource uses and activities that could adversely impact greater sage-grouse.

Travel management under Alternative B would have similar adverse impacts to those described under Alternative A, though to a lesser extent due to additional restrictions. Alternative B limits travel in greater sage-grouse Key Habitat Areas to designated roads and trails with a seasonal closure during sensitive breeding and early brood-rearing periods (February 1 to July 31). This restriction would limit the potential for motorized vehicle related adverse impacts during periods when birds could be sensitive

to human disruptions until travel management is aligned to greater sage-grouse conservation objectives through subsequent planning processes. Managing new road construction in and adjacent to greater sage-grouse habitat consistent with restrictions on surface-disturbing and disruptive activities would limit the creation of new roads near occupied leks, reducing the potential for new fragmentation, disruption, and direct habitat loss in these areas.

Managing to achieve or make progress towards reference state plant communities based on site ESD, and requiring that the appropriate functional structural plant groups be present would provide more comprehensive targets for and measures of vegetation treatment success compared to management under Alternative A. The use of ESDs in designing vegetation treatments in sage-grouse habitat would help to maintain vegetation health, soil stability, and productivity over the long-term, as well as reduce adverse impacts from the introduction and spread of invasive plant species that could alter or degrade the native landscape and cause greater sage-grouse to move from high quality habitat to areas of lower quality, less desirable habitat. Alternative B requires the treatment of at least 200 acres of sagebrush communities annually, which would ensure continued efforts to make progress toward ESDs in greater sage-grouse habitat over the life of the plan.

The management of conifer encroachment in sagebrush under Alternative B would be similar to management under Alternative A, and impacts would be similar to those described under that alternative. The greater reliance on natural process to manage forest and other habitats under this alternative could result in slower progress on addressing conifer encroachment under this alternative, though, conversely, the use of natural processes would also limit disruption due to human presence during treatment to a greater extent than management under Alternative A.

Although surface disturbance results in short-term habitat loss and damage, the reclamation requirements of Alternative B help maintain long-term habitat quality in all habitat types, including sagebrush. Interim and/or final reclamation of surface disturbance under Alternative B requires 50 percent vegetative cover within three growing seasons and 80 percent cover within 5 years. The BLM requires development of an appropriate reclamation plan before authorization of any surface-disturbing activity. In addition to requiring topsoil salvage and segregation for all surface-disturbing activities, Alternative B requires the reestablishment of healthy native plant communities based on preexisting composition in the area. These actions are anticipated to increase reclamation success and minimize the establishment of invasive weeds in comparison to Alternative A, resulting in fewer adverse impacts to greater sage-grouse habitats.

Limiting new sources of noise to levels of 10 dBA above ambient noise at the perimeter of leks from 6 PM to 8 AM during initiation of breeding would reduce adverse impacts to greater sage-grouse from noise generated by oil and gas facilities or other development.

Nongame (Raptors) – Alternative B

Surface-disturbing activities, renewable energy development, invasive species control, motorized vehicle use, livestock grazing (Johnson and Horn 2008; Torre et al. 2007; Jones 2000), and management actions for biological resources would adversely impact raptors less under Alternative B than under Alternative A. Compared to Alternative A, restrictions around raptor nests are more extensive under Alternative B and TLS are species-specific, resulting in fewer direct impacts to nesting raptors. Additionally, the BLM applies a seasonal 2-mile buffer to active ferruginous hawk nests and a year-round CSU stipulation to protect all raptor nest sites. Alternative B protects more BLM-administered surface surrounding raptor nests compared to Alternative A, resulting in greater beneficial impacts to special status raptor species. Alternative B is projected to result in fewer acres of surface disturbance and therefore will have less adverse impact on special status raptor terrestrial foraging habitat.

Alternative B would place more restrictions on powerline development than Alternative A, which would reduce the potential for adverse impacts to raptors due to electrocution. Wind-energy development is avoided in raptor concentration areas, and approximately 1,244,948 acres are renewable energy exclusion areas under Alternative B, thereby decreasing the potential to fragment habitats and directly impact raptors from collisions or displacement relative to Alternative A. The BLM prohibits clear cutting under Alternative B, and uses salvage operations, including appropriate levels of snag retention, to improve wildlife habitat. These actions would result in beneficial impacts by protecting and enhancing more habitat for those raptors that prefer closed canopy habitats, compared to Alternative A.

Alternative B would continue to improve rangeland productivity and slow the spread of invasive species to a greater extent than Alternative A. Overall, the restrictions to surface-disturbing activities, wind-energy development, and livestock grazing and proactive management to maintain native vegetation under Alternative B would protect more raptor habitats compared to Alternative A.

Allowing surface-disturbing activities in riparian/wetland areas would adversely impact bald eagles through displacement and habitat loss. Recreational activities would cause impacts similar to those under Alternative A for bald eagles, but to a lesser extent. Maintaining current facilities and not providing campsites at Wardel and Harrington reservoirs would cause fewer adverse impacts to bald eagles by limiting human activity in these areas. Impacts to bald eagles in the Bighorn River SRMA are likely to be less under Alternative B than under Alternative A, because managing the area to provide a "moderate" level of recreation experience would involve less intensive forms of recreation and less human activity.

Closing more acres to livestock grazing under Alternative B (1,984,211 acres) would result in less potential adverse impact to bald eagles from riparian habitat degradation than under Alternative A.

Nongame (Migratory Birds) – Alternative B

Under Alternative B, short- and long-term surface disturbance are anticipated to be less; therefore, associated adverse impacts to breeding and nesting habitats for migratory birds are anticipated to be less than under Alternative A. The impacts to migratory birds from wind-energy development under Alternative B would also be less than under Alternative A.

Sagebrush and Shrubland Species – Alternative B applies larger buffers around greater sage-grouse leks and in nesting or early brood-rearing habitats to conserve sagebrush habitat than under Alternative A (see Game Birds). Alternative B would result in less surface disturbance that may result in habitat loss and has more stringent requirements for reclamation, which would reduce impacts to migratory birds that depend on sagebrush and shrubland habitats relative to Alternative A.

Grassland Species – Actions in grassland habitat, such as surface-disturbing activities, reclamation, invasive species control, and livestock and wildlife grazing impact special status migratory bird species. BLM actions under Alternative B, including designation of the Chapman Bench ACEC, would result in less adverse impact to grassland habitat and would protect more grassland habitat from fragmentation than under Alternative A. Management actions for white-tailed prairie dogs (see *Nongame [Mammals]*) may affect the mountain plover and long-billed curlew, as these species nest in areas with sparse vegetation. Greater restrictions on livestock grazing under Alternative B may result in adverse impacts to mountain plover by reducing available mountain plover habitat (i.e., heavily grazed areas and areas with bare patches); however, managing areas to create preferred habitat for the mountain plover, would likely provide a net benefit to this species.

Riparian/Wetland Species – Although there are no specific management actions for special status migratory birds that use riparian areas and wetlands, other biological resource management actions—

particularly those pertaining to water and riparian/wetland areas, such as surface disturbance restrictions, livestock grazing and riparian area management, and special designations—would affect these species. Overall, restrictions on surface disturbance, management of invasive species and livestock grazing, and managing riparian/wetland areas to achieve DPC under Alternative B would protect and enhance more riparian/wetland habitat and benefit special status migratory birds in the Planning Area more than under Alternative A.

Nongame (Mammals) – Alternative B

Surface-disturbing activities, invasive species control, fire and fuels management, livestock grazing management, and management actions for biological resources under Alternative B would result in less adverse impacts to special status nongame mammals than under Alternative A.

Sagebrush and Shrubland Species – Sagebrush and shrubland special status nongame mammal species would generally benefit from management actions limiting habitat fragmentation and surface disturbance in sagebrush and shrubland communities. Measures to protect and reduce potentially adverse impacts to greater sage-grouse, as discussed under *Game Birds*, benefit special status sagebrush and shrubland nongame mammal species. Decreased surface disturbance and less habitat fragmentation under Alternative B would limit adverse impacts to special status nongame mammal species more than Alternative A. In addition, an NSO restriction placed on prairie dog colonies suitable for black-footed ferret reintroduction and the Sage Creek Prairie Dog Town would benefit both species. Alternative B provides more overall beneficial impacts to these species compared to Alternative A.

Forest and Woodland Species – Under Alternative B, there are no specific management actions for Canada lynx; however, management actions that protect the habitats Canada lynx and their prey (primarily snowshoe hare) utilize are anticipated to result in beneficial impacts to Canada lynx. Under Alternative B, fewer short-term adverse impacts to Canada lynx would result from forest treatments; however, less stand diversification over the long term may result in less beneficial impacts to Canada lynx habitat and the habitats of its prey species. Prohibiting clear-cutting and precommercial thinning, except for fuels treatments, retains more woody debris than Alternative A to provide cover and den sites and enhance the availability of prey species. Alternative B retains old growth forest areas and, when possible, retains connectivity of existing or potential old growth areas, benefiting Canada lynx more than Alternative A. Alternative B would result in greater short-term beneficial impacts to Canada lynx habitats than Alternative A due to greater restrictions on surface-disturbing activities, but long-term habitat improvement, especially from fire and fuels management to prevent landscape-scale fires, may be limited.

Cave Species – Bats using caves for roosting, maternity colonies, or hibernation may be affected by surface-disturbing activities near caves, cliffs, or other rock features. The BLM closes caves during critical periods for bats and prohibits activities within ¼ mile of AML sites under Alternative B, providing more beneficial impacts than Alternative A. As renewable energy development is excluded in a large area, the potential impacts from wind-energy development to bats are less under Alternative B than Alternative A.

Nongame (Amphibians) – Alternative B

Potential impacts to special status amphibians are correlated with impacts to riparian/wetland habitats. The adverse impacts under Alternative B would be similar to those described for special status migratory birds that use riparian/wetland habitats and less than those under Alternative A. Potential adverse impacts to the Great Basin spadefoot toad would be proportional to impacts to sagebrush habitats and are anticipated to be similar to those described for special status migratory birds and greater sage-

grouse. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more information on impacts to amphibians.

Alternative C

Surface Disturbance – Alternative C

Under Alternative C, estimated short- and long-term surface disturbance from BLM actions in the Planning Area (Table 4-1) would result in the greatest loss, degradation, and fragmentation of sagebrush habitat compared to the other alternatives. Erosion from surface disturbance would cause the greatest impact to riparian/wetland habitats under Alternative C. Surface disturbance from roads totals 4,638 acres in the short term and 2,319 acres in the long term under Alternative C, potentially forming the most barriers to fragment habitat (Appendix T).

Resource Uses – Alternative C

Minerals development under Alternative C would result in similar adverse impacts to special status species as under Alternative A, but to a greater extent. Alternative C has the most acres open to mineral development, resulting in the greatest potential loss of special status wildlife species habitat, compared to the other alternatives. Alternative C is projected to result in 1,304 new federal oil and gas wells that would result in more adverse impacts from habitat loss and noise disturbance than Alternative A.

Alternative C would have the most powerline development, resulting in the greatest potential risk for raptor electrocution. The BLM closes a limited portion of the Planning Area to wind-energy development, and allows projects in special status raptor species and greater sage-grouse habitat on a case-by-case basis. The projected impact of wind-energy development to special status wildlife species would be less than Alternative A, but more than alternatives B and D.

Alternative C closes the least amount of land to motorized vehicle use and does not close threatened and endangered species habitat to this resource use. Alternative C is likely to result in the greatest disturbance of special status wildlife species from motorized vehicle use.

The BLM allows livestock grazing in the same areas under Alternative C as under Alternative A, but manages to optimize commodity production while meeting rangeland health standards, not to provide for the enhancement of other resource values. Livestock grazing is restricted the least under this alternative and is more likely to concentrate in riparian/wetland areas, causing the greatest impact to riparian/wetland special status wildlife species. Wild horse grazing in HMAs would also have similar adverse effects to Alternative A, as horses also congregate near water, adversely affecting riparian/wetland special status wildlife species.

Special Designations – Alternative C

Only two ACECs are designated under Alternative C and this alternative does not recommend any WSR eligible waterway segments as suitable for inclusion in the NWSRS and releases these waterways to other resource uses, resulting in no beneficial impacts to special status wildlife species.

Resources – Alternative C

Under Alternative C, the BLM uses wildland fire to restore fire-adapted ecosystems and reduce hazardous fuels, but also to enhance forage for commodity production, potentially benefitting special status wildlife species less than the other alternatives when restoration objectives conflict. However, treatments are used across the Planning Area to restore vegetative diversity and reduce the risk of

unnatural fire, providing the greatest potential benefit to special status wildlife species from fire and fuels management.

In general, Alternative C allows for the greatest expansion of resource uses, and therefore would result in the greatest spread of invasive species, relative to the other alternatives. The impacts to special status wildlife species from invasive species would be the greatest under Alternative C.

Forest management under Alternative C is similar to Alternative A, but timber harvesting is performed with economic objectives as the primary concern with less regard for wildlife habitat values. The BLM allows larger clear cut areas with the associated adverse impacts described under Alternative A, but old growth forests are retained under Alternative C, directly benefitting Canada lynx and special status raptor and bat species. Although the impacts from forest management actions vary, in general, forest management under Alternative C would provide some beneficial impacts to special status wildlife species from old growth stand retention, but would also result in the greatest adverse impacts to special status wildlife species from timber harvest practices with less regard for wildlife habitat values.

Grassland and shrubland management under Alternative C would provide more beneficial impacts to special status wildlife species than Alternative A, but less than alternatives B and D. Under Alternative C, the BLM manages grassland and shrubland communities toward meeting the *Wyoming Standards for Healthy Rangelands* (Appendix N) with appropriate functional and structural plant groups. These measures are likely to result in a modest improvement in vegetation diversity, but are unlikely to slow the spread of invasive species. Reclamation requirements are more stringent than Alternative A, but less than alternatives B and D. Due to the larger amount of anticipated surface disturbance and invasive species spread under Alternative C, grassland and shrubland communities are likely to be lost or degraded the most under this alternative, affecting special status wildlife species proportionately.

Alternative C provides riparian/wetland communities the least protection compared to other alternatives. The BLM manages all riparian/wetland areas toward meeting PFC, but only prioritizes those in a nonfunctioning condition or with a downward trend. Alternative C is likely to result in the greatest amount of degraded riparian/wetland habitat.

Proactive Management – Alternative C

In general, proactive management under Alternative C provides fewer benefits and mitigates adverse impacts to special status wildlife species to a lesser extent than alternatives A, B, and D. Impacts due to proactive management, and other impacts, are described in detail under each special status wildlife species category below.

Trophy Game – Alternative C

Alternative C has the fewest seasonal closures and restrictions of big game winter ranges and migration corridors and the greatest potential for habitat fragmentation and disturbance to wildlife by exempting Oil and Gas Management Areas and ROW corridors from seasonal wildlife stipulations. Adverse impacts from livestock grazing under Alternative C would be similar to those under Alternative A, but to a greater extent from allowing domestic sheep grazing in more areas. Overall, adverse impacts to the grizzly bear are anticipated to be the greatest under Alternative C.

Predatory Animals – Alternative C

Under Alternative C, there are no specific management actions for gray wolves; however, management actions that protect the habitats gray wolves and their prey (primarily elk) utilize would benefit gray wolves in the Planning Area. Management actions limiting human activities, ROW development such as

roads, and habitat fragmentation also would benefit gray wolves. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more detail on impacts to big game.

Allowing the most timber harvesting (e.g., clear cutting up to 100 acres), mechanical fuels treatments, and prescribed burns under Alternative C would result in the greatest short-term adverse impacts to gray wolves from disturbance and displacement and less long-term beneficial impacts than under Alternative A from timber harvesting that does not protect habitat values. Additionally, allowing timber management roads to remain open for recreational use would adversely impact gray wolves by allowing more human access and potential disturbance, illegal hunting, and habitat fragmentation.

Under Alternative C, seasonal buffers prohibiting surface disturbance around active raptor nests are smaller in size than under alternatives A, B, and D. Alternative C results in the greatest amount of road development (2,319 acres of long-term disturbance) causing greater habitat fragmentation and risk of vehicle collisions than the other alternatives (Appendix T). Alternative C implements the same seasonal restrictions on big game crucial winter range with regards to surface disturbance, but exempts Oil and Gas Management Areas and ROW corridors and opens the Absaroka Front Management Area to mineral, renewable energy, and ROW developments, and motorized vehicle use. Based on more surface disturbance, more potential habitat fragmentation from roads, and a larger area open to cross-country motorized travel, Alternative C results in the fewest beneficial impacts to gray wolves, compared to the other alternatives.

Game Birds (Greater Sage-Grouse) – Alternative C

See Table 4-23 for a summary of management actions and impacts under Alternative C specific to greater sage-grouse. A detailed discussion follows in the sections below.

Estimated short- and long-term surface disturbance from BLM actions under Alternative C are greater than alternatives A, B, and D (Table 4-1), resulting in greater potential for loss, degradation, and fragmentation of sagebrush habitats. However, because Alternative C includes buffers around occupied leks and in nesting and early brood-rearing habitats similar to those under Alternative A, the potential for certain direct adverse impacts to greater sage-grouse and their habitats would be similar to that described under Alternative A. As under Alternative A, Alternative C does not include specific management to preserve large contiguous blocks of native vegetation communities, and therefore landscape-level adverse impacts to sagebrush habitat such as fragmentation and the loss of connectivity between leks and seasonal habitats could occur under this alternative.

Leasable mineral management under Alternative C would result in impacts similar to those described under Alternative A, except that Alternative C would waive certain timing limitations. Under Alternative C, Oil and Gas Management Areas and ROW corridors are exempt from discretionary wildlife timing limitations, which could result in adverse impacts to greater sage-grouse leks in these areas if development occurs during lekking, nesting, or other sensitive time periods. As a result, Alternative C could result in additional stress and displacement of birds into suboptimal habitats compared to Alternative A.

Depending on the placement of the development and supporting facilities, managing some areas as renewable energy exclusion areas (148,416 acres), may result in a reduction in adverse impacts compared to Alternative A. However, Alternative C specifically allows wind energy project in greater sage-grouse seasonal habitats, which could result in additional adverse impacts to greater sage-grouse through large-scale disturbance and disruptive activity during construction and ongoing adverse impacts from noise and habitat loss associated with wind turbines and facilities. Alternative C may therefore result in more adverse impacts to greater sage-grouse from renewable energy development in areas

outside of exclusion areas than Alternative A. Restrictions on the location of ROWs under Alternative C would result in impacts similar to management under Alternative A.

Wildland fire and fuels treatments under Alternative C are similar to those under Alternative A, and would result in similar short-term adverse and long-term beneficial impact to those described under that alternative.

Alternative C manages livestock grazing similar to Alternative A, and impacts to greater sage-grouse would generally be consistent with impacts under that alternative. However, because the BLM manages livestock grazing to optimize commodity production while meeting the Wyoming Standards for Healthy Rangelands, not to provide for the enhancement of other resources such as greater sage-grouse habitat, the extent of the beneficial impacts described under Alternative A could be reduced. In addition, Alternative C requires less stringent monitoring of rangeland conditions than management under Alternative A, or any of the other alternatives. Less frequent feedback on habitat conditions where livestock grazing and greater sage-grouse habitat overlap would be less effective in identifying areas in need of improvement and could delay the implementation of corrective actions. Compared to the other alternatives, Alternative C would increase the potential for disparities between habitat objectives and actual rangeland conditions, potentially reducing cover and forage for greater sage-grouse.

The management of range improvements and supplements under Alternative C is focused on achieving optimal conditions for livestock grazing and would limit the potential for beneficial impacts to greater sage-grouse compared to the other alternatives. As a result, the placement of these items may result in grazing patterns that reduce cover and forage in important greater sage-grouse habitats. The management of hazard fences under Alternative C is the same as under Alternative A, and beneficial impacts from reduced incidence of collision or entanglement would be the same as described under that alternative.

The effects of wild horse grazing in HMAs would be similar to those under Alternative A.

Special designations under Alternative C would provide fewer beneficial impacts to greater sage-grouse than the other alternatives. ACECs designated under this alternative encompass the least area of greater sage-grouse Key Habitat Areas (Table 4-22).

Travel management under Alternative C is generally consistent with Alternative A, and impacts would be similar to those described under that alternative. However, Alternative C could increase the potential for degradation of greater sage-grouse habitats in areas exempted from discretionary seasonal wildlife stipulations.

Management of vegetation communities would result in similar effects to those described under Alternative B. However, because Alternative C does not specifically manage sagebrush communities toward ESDs or establish annual acreage requirements for vegetation treatments in sagebrush habitat, the beneficial impacts described under Alternative B from these actions would not occur.

Managing conifer encroachment to enhance livestock grazing may reduce the beneficial impacts to greater sage-grouse anticipated to occur under alternatives A and B if livestock forage requirements and greater sage-grouse habitat requirements do not align. Management of conifer encroachment to maintain or restore rangeland under Alternative C may therefore result in less suitable habitat for greater sage-grouse than management under the other alternatives.

Alternative C requires the establishment of 30 percent desired vegetative cover within three growing seasons following disturbance, but has no other specific reclamation requirements unless required on a case-by-case basis through a site-specific reclamation plan. Alternative C applies the same requirements as Alternative A to establish vegetative cover in disturbed areas, but does not require revegetation with

native plant species; instead, the BLM would reestablish plant communities to increase commodity production or to meet other resource objectives. Alternative C, because it does not require seeding native species, would result in a reduced potential for beneficial impacts to greater sage-grouse from native habitat recovery. Overall, because surface disturbance and habitat loss, degradation, and fragmentation are greater than under the other alternatives and the reclamation requirements are comparable to Alternative A and less stringent than Alternative B, the associated adverse impacts to greater sage-grouse habitats from these activities would likely be greater than under Alternative C.

Limiting noise sources to 10 dBA above natural, ambient noise during the greater sage-grouse breeding season would result in impacts similar to those under Alternative B, but to a lesser extent. Overall, proactive management actions under Alternative C would limit adverse impacts to the greater sage-grouse less than the other alternatives.

Nongame (Raptors) – Alternative C

Surface-disturbing activities, fire and fuels management, invasive species control, motorized vehicle use, livestock grazing (Johnson and Horn 2008; Torre et al. 2007; Jones 2000), and management actions for biological resources would impact special status raptors more under Alternative C than under alternatives A, B, or D. Under Alternative C, restrictions around raptor nests (47,651 acres) are less extensive than the other alternatives. Though TLS are species specific as under Alternative B, the reduced buffer distance is likely to result in the greatest disturbance to raptor nests under Alternative C. Alternative C is projected to result in more surface disturbance than the other alternatives and, therefore, will have a greater adverse impact on bald eagle terrestrial foraging habitat.

The BLM projects the most powerline development under Alternative C, resulting in the greatest potential adverse impact to raptors from electrocution. The BLM allows wind-energy development in raptor concentration areas on a case-by-case basis, which may result in greater adverse impacts to raptors than alternatives B and D, but less than Alternative A. The BLM allows clear cuts up to 100 acres under this alternative, which would result in a greater adverse impact to raptors that prefer closed canopy habitat than under Alternative A. Forest salvage operations are performed where economically feasible without an appropriate level of snag retention, potentially adversely affecting raptors by degrading habitat; however, because Alternative C retains old growth forests, greater beneficial impacts would result under this alternative than under Alternative A.

Management actions for invasive species control under Alternative C would result in similar special status raptor habitat quality impacts as under Alternative A. Management actions for fire management under Alternative C may, more than the other alternatives in the long term, reduce the potential for catastrophic fire that would adversely impact special status raptor species habitat. Based on these actions, Alternative C would result in greater adverse impacts to special status raptor species habitats than the other alternatives.

Alternative C is anticipated to improve rangeland productivity primarily for livestock grazing, with less area closed to livestock grazing and less forage available for wildlife. Livestock grazing has been shown to reduce raptor prey in arid ecosystems and grasslands (Johnson and Horn 2008; Torre et al. 2007; Jones 2000). Livestock grazing management under Alternative C would result in similar adverse impacts to those under Alternative A, but to a greater extent.

Impacts from recreational use to bald eagles under Alternative C would be similar to Alternative A, but to a lesser extent. Managing lands along the Bighorn River for wildlife habitat, river health, and wildlife resources with less emphasis on recreation would result in fewer adverse impacts to bald eagles from human activity.

Nongame (Migratory Birds) – Alternative C

Under Alternative C, short- and long-term surface disturbance would be the greatest, resulting in the greatest adverse impacts to breeding and nesting habitats for special status migratory birds, compared to the other alternatives. The impacts from wind-energy development under Alternative C are likely to be similar to Alternative A, as projected development is the same across all alternatives and Alternative C manages the least acreage (148,416 acres) as renewable energy exclusion areas, compared to Alternative B.

Sagebrush and Shrubland Species – Measures that adversely affect the greater sage-grouse under Alternative C, as discussed under *Game Birds*, would result in similar impacts to other sagebrush and shrubland species. Alternative C would result in the greatest adverse impacts to these species.

Grassland Species – Actions such as surface-disturbing activities, reclamation, invasive species control, and wild horse and livestock grazing in grassland habitats would affect grassland special status migratory bird species. Alternative C would result in more fragmentation of grassland habitat compared to the other alternatives. Protective measures for the mountain plover are similar to Alternative B, but the larger amount of surface disturbance, especially the disturbance allowed in all prairie dog towns, may result in the greatest adverse impacts to nesting habitat for this species and the long-billed curlew. Although fewer restrictions on livestock grazing under Alternative A could increase the availability of suitable mountain plover habitat similar to Alternative A, few beneficial impacts are anticipated because the Planning Area already contains an abundance of naturally sparse habitats for mountain plover nesting.

Riparian/Wetland Species – Although no specific management actions for special status migratory birds utilizing riparian/wetland areas are identified under Alternative C, other biological resource management actions, particularly those pertaining to water and riparian/wetland habitats, would affect these species. Under Alternative C, actively managing less area for riparian habitat enhancement, allowing surface-disturbing activities in riparian/wetland areas on a case-by-case basis, and allowing the placement of forage supplements to maximize livestock use, regardless of proximity to riparian/wetland areas would result in the most adverse impacts to special status migratory birds that prefer these habitats.

Nongame (Mammals) – Alternative C

Surface-disturbing activities, invasive species control, fire and fuels management, livestock grazing management, and management actions for biological resources would impact special status nongame mammals. Long-term surface disturbance under Alternative C is the greatest compared to all alternatives, likely resulting in proportional adverse impacts to these species.

Sagebrush and Shrubland Species – Measures that adversely affect the greater sage-grouse under Alternative C, as discussed under *Game Birds*, would result in similar impacts to special status nongame mammals in sagebrush and shrubland communities. Alternative C would result in the greatest adverse impacts to sagebrush and shrubland nongame mammals from surface disturbance and livestock grazing and has the fewest measures to mitigate the adverse impacts of surface-disturbing activities to prairie dogs and the associated mountain plover habitat. Although more active fuels treatments to prevent large wildfires may provide a long-term benefit to sagebrush and shrubland nongame mammals, the amount of habitat destroyed from long-term surface disturbance is likely to outweigh this benefit.

Forest and Woodland Species – Under Alternative C, there are no specific management actions for Canada lynx; however, management actions that protect the habitats Canada lynx and their prey (primarily snowshoe hare) utilize would result in beneficial impacts to Canada lynx. Under Alternative C,

short-term impacts from silviculture and fuels treatments, in accordance with the Lynx Conservation Assessment Strategy, may temporarily result in impacts to Canada lynx; however, over the long term these treatments may improve Canada lynx habitat and the habitats of its prey species. Precommercial thinning and clear-cutting up to 100 acres would retain less woody debris than Alternative A, resulting in similar adverse impacts, but to a greater extent. However, retaining old growth forests and adopting connectivity of these areas where feasible would result in similar beneficial impacts to those under Alternative B. Smaller buffer areas around raptor nests and allowing surface-disturbing activities in riparian/wetland areas would result in more adverse impacts to Canada lynx from habitat destruction and potential disturbance. Overall, Alternative C would result in more adverse impacts to Canada lynx habitats than Alternative A due to less restrictions on surface-disturbing activities and more intensive timber harvesting methods.

Cave Species – Surface-disturbing activities near caves, cliffs, or other rock features may impact bats using caves for roosting, maternity colonies, or hibernation. Alternative C manages caves for recreational use, allows activities in AML areas, and does not close caves during critical periods for bats, resulting in the greatest potential adverse impact to bat species. Impacts to bats from wind-energy development under Alternative C would be similar to those under Alternative A.

Nongame (Amphibians) – Alternative C

Potential impacts to special status amphibian species would be correlated with impacts to riparian/wetland habitats. The adverse impacts under Alternative C are similar to those described for special status migratory birds that use riparian/wetland habitats and greater than under alternatives A, B, and D. Potential adverse impacts to the Great Basin spadefoot toad are correlated with impacts to sagebrush habitats and are anticipated to be similar to those described for special status migratory birds and greater sage-grouse; these impacts would be greater under Alternative C than under the other alternatives. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more information on impacts to amphibians.

Alternative D

Surface Disturbance – Alternative D

Estimated short- and long-term surface disturbance from BLM actions in the Planning Area (Table 4-1) under Alternative D would result in similar loss, degradation, and fragmentation of sagebrush habitat as under Alternative A. However, measures to limit erosion and reclaim and restore habitat implemented under Alternative D are likely to mitigate adverse impacts from surface disturbance more than under Alternative A.

Resource Uses – Alternative D

Minerals development under Alternative D would result in similar adverse impacts to special status wildlife species as under Alternative A, but to a lesser extent. Alternative D has the second most area available to locatable minerals entry, but the second least area open to oil and gas development, with more area closed than alternatives A and C in sagebrush habitat to limit impacts to greater sage-grouse. Alternative D is projected to result in 1,143 new federal wells that would impact special status wildlife species from habitat loss and noise disturbance more than Alternative B, but less than alternatives A and C.

The BLM projects that Alternative D would result in the same amount of powerline development as Alternative A with similar potential adverse impacts to raptors. Impacts from ROW and wind-energy

development under Alternative D would result in more adverse impacts to special status wildlife species than under Alternative B, but less than under Alternative A.

Alternative D closes a similar amount of acreage as Alternative A to motorized vehicle use, and limits motorized vehicle use to designated roads and trails in the second-largest area, including essential and recovery habitat for threatened and endangered species. Adverse impacts from motorized vehicle use under Alternative D would be greater than under Alternative B, but less than under alternatives A and C.

Livestock grazing management under Alternative D would result in impacts similar to those under Alternative A. However, livestock grazing management under Alternative D may provide some benefits because the BLM uses livestock grazing management in certain areas, such as special status wildlife species habitat, to maintain or improve resource conditions.

Special Designations – Alternative D

Special designations under Alternative D would result in similar beneficial impacts as those under Alternative B, but to a lesser extent. Alternative D designates less area as ACECs, does not recommend any WSR eligible waterway segments as suitable for inclusion in the NWSRS and implements fewer restrictions on resource uses and activities to protect special status wildlife species habitat in these areas.

Resources – Alternative D

Impacts to special status wildlife species from fire and fuels management and forests, woodlands, and forest products management under Alternative D would be similar to those under Alternative A, except that by allowing larger areas to be clear cut under Alternative D, there would be more habitat loss for special status wildlife species that prefer closed canopies, such as certain raptors and Canada lynx. However, Alternative D includes management actions to retain old-growth forests that would benefit these species more than Alternative A.

Beneficial impacts to special status wildlife species from grassland and shrubland community management under Alternative D would be similar to those under Alternative B, although to a lesser extent. The BLM manages grassland and shrubland communities for a higher plant community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable, resulting in similar but fewer beneficial impacts to special status wildlife species habitat than Alternative B. However, Alternative D would treat more area for invasive species than Alternative B, providing greater long-term beneficial impact by preventing the spread of invasive species that may degrade special status wildlife species habitat. Livestock flushing practices would result in impacts to grassland and shrubland communities similar to those under Alternative A.

The management of riparian/wetland resources under Alternative D would result in similar beneficial impacts as those under Alternative C, but to a greater extent. Habitat would improve, but additional management would be necessary to ensure that habitat meets life history requirements for various special status wildlife species. Alternative D applies more restrictions to surface-disturbing activities near riparian/wetland areas than Alternative C, limiting adverse impacts from surface disturbance. Overall, beneficial impacts to riparian/wetland habitat for special status wildlife species under Alternative D would be greater than under alternatives A and C, but less than under Alternative B.

Proactive Management – Alternative D

In general, proactive management actions under Alternative D provide more benefits and mitigate adverse impacts to special status wildlife species to a greater extent than under alternatives A and C, but

less than under Alternative B. Impacts due to proactive management and other impacts are described in detail under each special status wildlife species category below.

Trophy Game – Alternative D

Alternative D exempts Oil and Gas Management Areas from discretionary big game seasonal stipulations, but applies more restrictions and seasonal closures in big game habitat, around active raptor nests, and in greater sage-grouse PHMAs than alternatives A and C that would limit adverse impacts to grizzly bear. Impacts from minerals development and new road construction under Alternative D would be less than those under Alternative A because of the additional restrictions applied to the Absaroka Front (253,112) and Big Horn Front (379,308) MLP analysis areas, which include CSU stipulations that limit the location, timing, and amount of oil and gas-related surface disturbances to protect big game.

Predatory Animals – Alternative D

Under Alternative D, there are no specific management actions for gray wolves; however, management actions that protect the habitats gray wolves and their prey (primarily elk) utilize would benefit gray wolves in the Planning Area. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more detail on impacts to big game. Management actions limiting human activities, ROW development such as roads, and habitat fragmentation under Alternative D would benefit gray wolves more than under alternatives A and C, but less than under Alternative B. Forests and woodlands management under Alternative D would result in impacts to gray wolves similar to those under Alternative A. Habitat enhancement in sagebrush and aspen habitats under Alternative D would result in limited beneficial impacts to gray wolves, similar to Alternative C.

Game Birds (Greater Sage-Grouse) – Alternative D

See Table 4-23 for a summary of management actions and impacts under Alternative D specific to greater sage-grouse. A detailed discussion follows in the sections below.

Estimated short- and long-term surface disturbance from BLM actions under Alternative D are similar to Alternative A, but oil and gas leasing in sagebrush habitat would be subject to greater restrictions (Table 4-21) and more closures in greater sage-grouse PHMAs (Table 4-22). Alternative D prohibits surface-disturbing and disruptive activities within 0.6-mile of occupied sage-grouse leks inside PHMAs and within a ¼ mile of occupied leks outside of PHMAs. Alternative D also applies an overall (cumulative) limit on the allowable density of disturbance to 5 percent of a proposed project's DDCT analysis area. Alternative D also applies TLSs to prohibit or restrict surface-disturbing and/or disruptive activities in and around occupied leks and early brood rearing and nesting habitat from March 15 to June 30. This management could prevent stress from noise and human presence during breeding, nesting, and early brood-rearing. These TLSs and their impacts would be similar to those under Alternative B, though they would be applied over a shorter period of time. Overall, resource use and activity restrictions under Alternative D would minimize impacts to greater sage-grouse in PHMAs more than alternatives A and C, but less than Alternative B. Outside of PHMAs, restrictions on resource uses and activities would result in similar beneficial impacts as under Alternative B, although to a lesser extent due to the decreased size of protective lek buffers.

Impacts to greater sage-grouse from mineral leasing under Alternative D would generally be more adverse than under Alternative B, but less adverse than under Alternative A. The Proposed RMP manages PHMAs as open to mineral leasing, but applies a NSO stipulation within 0.6 miles of occupied sage-grouse leks in PHMAs. In comparison, Alternative B closes all greater sage-grouse priority habitat to mineral leasing and applies larger protective buffers outside of priority habitat (0.6 mile versus 0.25

mile). Limiting energy or mining facilities to one location per 640 acres would have similar impacts as the requirement under Alternative B that oil and gas wells disturb no more than 15 acres within a 640-acre section by maintaining more contiguous, uninterrupted habitat within PHMAs, avoiding barriers to greater sage-grouse movement between habitat areas, and limiting human presence and other disruptive activities. Alternative D applies a cumulative five percent limit on disturbance from oil and gas development, which would result in similar impacts to those under Alternative B.

Alternative D manages PHMAs as avoidance areas for wind-energy and ROW development, which would provide similar protections to greater sage-grouse habitat as Alternative B. Alternative D manages the most area as wind-energy avoidance areas and the second-most area as wind-energy exclusion areas, potentially limiting adverse impacts to greater sage-grouse to a greater extent than alternatives A and C, but to a lesser extent than Alternative B. Because Alternative D allows the case-by-case placement of high profile structures in greater sage-grouse nesting habitat, management under this alternative could increase the potential for overhead predation from raptors or other predatory birds, or avoidance behavior of adjacent nesting habitat by greater sage-grouse. The application of TLSs, inside and outside of PHMAs, and a surface disturbance and disruption prohibition within 0.6 miles of occupied leks inside PHMAs would limit the potential for adverse disruption to greater sage-grouse during sensitive winter and lekking periods. Avoiding ROW authorizations in PHMAs and requiring co-location of new major overhead powerlines with 0.5 miles of existing 115 kV or greater powerlines or within designated corridors would also reduce the potential for adverse impacts by applying stipulations that ensure that the proposed development aligns with greater sage-grouse conservation objectives and confining development to less suitable habitat. More broadly, density limitations and other protective measures (such as consolidation of facilities and transmission) could reduce the impacts to greater sage-grouse from habitat loss, disturbance, fragmentation, predation, that result of linear and renewable energy development.

Fire and fuels management and potential adverse and beneficial impacts would be similar to those described under Alternative A.

Livestock grazing management would result in impacts similar to Alternative A, but would increase the potential for loss of herbaceous cover due to overgrazing, invasive species spread, and loss or degradation of water sources compared to Alternative B, which closes all priority habitat to livestock grazing. Unlike under the other alternatives, the prioritization of allotments within PHMAs for field checks would help ensure compliance with the terms and conditions of grazing permits in greater sage-grouse habitat. These checks could further reduce the potential for adverse impacts from livestock grazing to greater sage-grouse through early identification of potential issues in important habitat, allowing the BLM sufficient time to take corrective action where needed. In areas where livestock grazing is adversely affecting habitat or causing disruptions, considering whether public lands in voluntarily relinquished or abandoned permits or leases should remain available for livestock grazing or be used to support greater sage-grouse or other resource management objectives could allow the BLM to reduce adverse impacts to greater sage-grouse by eliminate future livestock grazing.

Impacts from managing range improvements would be similar to those described under Alternative A. Like Alternative A, modification of hazard fences and construction of new fences in accordance with the BLM Fencing Handbook would decrease the chances of entanglement and could prevent harm to greater sage-grouse. In addition, evaluating identified existing and new fences using other current and future updated guidance could allow the BLM to adapt management of potentially adverse fences on the landscape using the most recent science and approaches.

The effects of wild horse grazing in HMAs would be similar to those under Alternative A.

Lands and realty management under Alternative D would retain PHMAs and GHMAs under federal management unless disposal of these lands is shown to be consistent with greater sage-grouse conservation objectives, which would benefit the species by maintaining federal decision-making authority for mitigation or restrictions on surface-disturbing and disruptive activities. Though all alternatives would manage land tenure adjustments with a goal of preserving important resource values (including potentially greater sage-grouse habitats), managing specifically to maintain or provide a net conservation gain under this alternative could provide additional beneficial impacts compared to alternatives A, B, and C.

Special designations under Alternative D would protect the fourth-most area in greater sage-grouse PHMAs, providing more beneficial impacts to greater sage-grouse than alternatives A and C, but less than alternatives B, and E and F (which include greater sage-grouse focused ACECs).

Travel management under Alternative D would be the same as under Alternative C, and impacts would be the same as described under that alternative. However, because Alternative D avoids development of new roads near occupied leks, the potential for adverse effects to greater sage-grouse from future road construction or use would be reduced under this alternative. Road construction can create barriers to movement, fragmentation of habitat, and overall habitat loss. Vegetation loss, erosion, and the spread of invasive, non-native plant species may also occur during or following road construction. Human presence and vehicles may force special status species away from desired habitat to lower quality, less desirable habitat. Collisions with vehicles may also occur when roads are constructed within wildlife habitat. Road corridors are desirable areas for predatory animals, but these areas may be avoided by prey species which may move to less desirable habitat to avoid predation.

Impacts to greater sage-grouse habitat from vegetation treatments and management would be similar to under Alternative C. Impacts to habitat from managing for appropriate functional structural plant groups would be the same as Alternative C, though the direction to potentially manage some areas for a higher plant community state or phase to meet management objectives could allow additional site-specific adjustments to management regimes that would increase cover or other important habitat functions for greater sage-grouse. Alternative D management would limit reductions in sagebrush cover by avoiding treatments that reduce cover below 15 percent.

The management of conifer encroachment in sagebrush under Alternative D would be similar to management under alternatives A and B, but potentially more beneficial because Alternative D manages areas treated for conifer encroachment to toward comprehensive vegetation community goals, as determined through a site's ESD, that include a broader range of habitat suitability factors that could benefit greater sage-grouse.

Where surface disturbances in greater sage-grouse habitat do occur, application of the *Wyoming BLM Reclamation Policy* would establish similar reclamation requirements as Alternative A. In addition, requiring that interim and final reclamation begin at the earliest feasible time, and that successful final reclamation achieve a desired vegetative cover equal to or better than predisturbance site conditions could further reduce adverse impacts from surface disturbances compared to Alternative A and Alternative B. While initial disturbance would result in habitat loss, some sagebrush habitat could be restored over the long term; although some areas of habitat, such as greater sage-grouse winter habitat, could be difficult to restore to original conditions due to the composition and size of sagebrush in these areas. Surface disturbance may also provide opportunities for invasive plant species (e.g., cheatgrass) to establish, making it difficult to restore sagebrush habitat with native species in some areas.

Alternative D is unique from the other alternatives in its requirement that the BLM engage in collaborative management to develop appropriate conservation objectives, determine whether a causal

relationship exists between improper grazing and greater sage-grouse conservation objectives, and identify appropriate actions to achieve conservation objectives. This action could foster wider support for greater sage-grouse management strategies implemented by the BLM and result in the development of more effective conservation measures. Alternative D also monitors greater sage-grouse populations and habitat in relation to specific adaptive management triggers. Tripping identified hard and soft triggers, which are based on metrics such as the number of active leks and acres of available habitat, would prompt the BLM to investigate causal factors and adjust current management in order to continue meeting greater sage-grouse conservation objectives. Existing activities and authorizations with the potential to adversely impact greater sage-grouse may be curtailed or deferred during this time, as allowed by law.

Limiting noise sources to 10 dBA above natural, ambient noise during the greater sage-grouse breeding season would result in impacts similar to those under Alternative B, but to a greater extent because Alternative D extends the time period of the restriction.

Nongame (Raptors) – Alternative D

Surface-disturbing activities, fire and fuels management, invasive species spread, and livestock grazing (Johnson and Horn 2008; Torre et al. 2007; Jones 2000) under Alternative D would impact special status raptors more than under Alternative B, but less than under alternatives A and C. Seasonal restrictions on surface-disturbing activities around active raptor nests are species-specific in timing and more extensive than Alternative C. Alternative D also applies a year-round CSU stipulation with similar beneficial impacts as under Alternative B. Alternative D is projected to result in more surface disturbance than alternatives A and B, with impacts to special status raptor terrestrial foraging habitat similar to Alternative A.

Powerline and wind-energy development under Alternative D would result in similar adverse impacts to those under Alternative A, although to a greater extent, as Alternative D manages more land as ROW exclusion or avoidance areas.

Impacts to raptor terrestrial foraging areas from surface disturbance, fire and fuels management, invasive species control, and livestock grazing would be similar to impacts under Alternative A. Vegetation management in these habitats (managing some areas for a higher or lower plant community state or phase (based on state and transition models in ESDs) would result in more beneficial impacts than alternatives A and C, but less than Alternative B.

Riparian/wetland resources management and restrictions on surface-disturbing activities in these areas under Alternative D would result in less adverse impacts to bald eagles than under alternatives A and C, but greater than under Alternative B. Recreational development at Wardel and Harrington reservoirs under Alternative D result in impacts similar to those under Alternative A. Impacts from recreational use in the Bighorn River area would be similar to those under Alternative B, although to a lesser extent because under Alternative D, the BLM would manage the Bighorn River ERMA in the CYFO for resource protection, among other objectives, with less emphasis on recreation.

Nongame (Migratory Birds) – Alternative D

Projected short- and long-term surface disturbance under Alternative D would result in similar adverse impacts to migratory birds as those under Alternative A. Impacts to migratory birds from wind-energy development would be greater than Alternative B, but less than alternatives A and C.

Sagebrush and Shrubland Species – Measures to protect and reduce potentially adverse impacts to greater sage-grouse, as discussed under *Game Birds*, benefit special status sagebrush and shrubland species. In general, Alternative D places the second-most restrictions on mineral development in

sagebrush habitat and has the second-most stringent requirements for reclamation, resulting in the second-least adverse impact to migratory birds that depend on sagebrush and shrubland habitats.

Grassland Species – Management actions to limit habitat fragmentation in grasslands under Alternative D would result in impacts similar to those under Alternative B. Livestock grazing management would result in similar impacts to mountain plover as described under Alternative A. Potentially managing grassland and shrubland communities to provide preferred habitat for species such as mountain plover and long-billed curlew would result in similar beneficial impacts to Alternative B. Restrictions on surface-disturbing activities and mineral development in the Chapman Bench Management Area would result in similar beneficial impacts to those under Alternative B, but to a lesser extent.

Riparian/Wetland Species – Biological resource management actions pertaining to water and riparian/wetland habitats would affect special status migratory bird species in these areas. Impacts from riparian/wetland resources management under Alternative D would be similar to those under Alternative C. Under Alternative D, impacts from surface-disturbing activities and livestock grazing would be less than under Alternative C, but similar to Alternative A.

Nongame (Mammals) – Alternative D

Surface-disturbing activities, invasive species control, fire and fuels management, livestock grazing management, and management actions for biological resources would impact special status nongame mammals. Long-term surface disturbance under Alternative D would result in similar adverse impacts as those under Alternative A.

Sagebrush and Shrubland Species – Measures that adversely affect the greater sage-grouse under Alternative C, as discussed under *Game Birds*, would have similar impacts to special status nongame mammals in sagebrush and shrubland communities. Minerals development under Alternative D, based on restrictions applied in sagebrush habitat (Table 4-21) would result in more adverse impacts than under Alternative B, but less than under alternatives A and C. Fire and fuels management under Alternative D would result in impacts similar to those under Alternative A. Conservation measures, terms and conditions, and BMPs would minimize impacts to prairie dogs similarly to Alternative A. Measures to limit habitat fragmentation and NSO restrictions on prairie dog colonies suitable for black-footed ferret reintroduction would limit adverse impacts to these species similarly to Alternative B.

Forest and Woodland Species – Under Alternative D, there are no specific management actions for Canada lynx; however, restrictions on surface-disturbing activities around active raptor nests would result in greater beneficial impacts than under alternatives A and C, due to a year-round CSU stipulation, but less than under Alternative B. Silviculture treatments and fire and fuels management practices under Alternative D would result in similar adverse impacts to those under Alternative A, but to a greater extent by allowing larger clear cuts and precommercial thinning. However, Alternative D does retain old growth forests, which would benefit Canada lynx similarly to alternatives B and C.

Cave Species – Alternative D closes caves during critical bat periods and allows activities in AML areas if the impacts can be avoided or mitigated, limiting adverse impacts to special status bat species similarly to Alternative B, but to a lesser degree. Alternative D manages caves in accordance with the decontamination protocol under BLM IM 2010-181 or the National White Nose Syndrome protocol. This action would limit the potential for adverse impacts to special status bat species from White Nose Syndrome and is unique to Alternative D.

Nongame (Amphibians) – Alternative D

Potential impacts to special status amphibians are correlated with impacts to riparian/wetland habitats. Adverse impacts under Alternative D would be less than those under alternatives A and C, but more

than those under Alternative B. Impacts to the Great Basin spadefoot toad are proportional to impacts to sagebrush habitat, which would be less than those under alternatives A and C, but more than those under Alternative B. See Section 4.4.6 *Fish and Wildlife Resources – Wildlife* for more information on impacts to amphibians.

Alternative E

Surface Disturbance – Alternative E

Estimated short- and long-term surface disturbance from BLM actions in the Planning Area (Table 4-1) would result in the least loss, degradation, and fragmentation of sagebrush habitat under Alternative E. Surface disturbances under this alternative would be the same as Alternative B, except in the Greater Sage-Grouse Key Habitat Areas ACEC, where fewer acres of surface disturbance would result from mineral development, renewable energy development, and ROW development. Surface disturbance from roads would total 1,229 acres in the short term and 614 acres in the long term under Alternative E (Appendix T), forming fewer barriers to fragment habitat than Alternative A, and slightly less than Alternative B. Similar to Alternative B, reclamation requirements under Alternative E would likely mitigate surface disturbance to a greater degree than the other alternatives.

Resource Uses – Alternative E

Impacts to special status wildlife species from minerals development would generally be the same as Alternative B, except in the Greater Sage-Grouse Key Habitat Areas ACEC, which would be withdrawn from locatable mineral entry and closed to mineral materials disposal under Alternative E. Alternative E would also include management that limits disturbances to one per 640 acres and 3 percent or less of the greater sage-grouse Key Habitat Areas in this ACEC, compared to a larger allowable disturbance of 5 percent under Alternative B. Alternative E would therefore result in the least adverse impacts to wildlife from minerals development relative to the other alternatives. Similar to Alternative B, Alternative E is projected to result in 2,680 new federal oil and gas wells that would result in fewer adverse impacts from less habitat loss and noise disturbance than alternatives A and B.

Alternative E would close the greatest portion of the Planning Area to wind-energy development (1,945,204 acres) and ROW development (1,322,879 acres) of any alternative, resulting in the least potential risk of raptor electrocution and the least adverse impacts to greater sage-grouse nesting, brood-rearing, and winter habitat. Powerline and wind-energy development would therefore impact special status species the least under Alternative E.

Impacts resulting from travel management under Alternative E would be the same as Alternative B and would benefit special status wildlife species by placing the most limitations on and closures to motorized vehicle use of any alternative.

Special Designations – Alternative E

The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative E would result in additional protections to special status species wildlife in comparison to the other alternatives. Specifically, the closure of the proposed Greater Sage-Grouse Key Habitat Areas ACEC to mineral materials disposal, renewable energy development, ROW development, and the withdrawal from locatable mineral entry would result in the greatest beneficial impacts to special status wildlife species compared to the other alternatives. Other impacts to special status wildlife species from special designations outside of the Greater Sage-Grouse Key Habitat Areas ACEC would be same as Alternative B.

Resources – Alternative E

The BLM would use similar wildland fire and other vegetation treatments to restore fire-adapted ecosystems and to reduce hazardous fuels as Alternative B; however, treatments would be designed and implemented with a greater emphasis on protection of sagebrush ecosystems within the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Management of these areas would be beneficial to sage-grouse and other sagebrush obligate species. However, the build-up of fuels from fire management activities under Alternative E also increases the potential for long-term adverse impacts on special status wildlife species resulting from catastrophic fire.

Impacts from invasive species would be the same as Alternative B, except in the proposed Greater Sage-Grouse Key Habitat Areas ACEC, where additional protections against the spread of invasive species would result from reduced surface disturbance and the emphasis on restoring and maintaining native sagebrush ecosystems. Conversely, restrictions on herbicide applications in the Greater Sage-Grouse Key Habitat Areas ACEC could reduce the ability to control infestations, which would have an adverse impact on special status wildlife species.

Surface disturbance limitations under Alternative E would augment protective measures for forest/woodland, grassland/shrubland, and riparian/wetland communities where these areas overlap the proposed Greater Sage-Grouse Key Habitat Areas ACEC, decreasing adverse impacts to special status wildlife species that use these habitats.

Proactive Management – Alternative E

Management for special status wildlife species under Alternative E is generally the same as Alternative B (Map 40), and the beneficial impacts would be the same as Alternative B. However, Alternative E would result in the greatest overall beneficial impacts to greater sage-grouse and other special status wildlife species when compared against the other alternatives due to additional management actions limiting impacts from resource uses within the Greater Sage-Grouse Key Habitat Areas ACEC. Oil and gas leases occur on approximately 26 percent (316,110 acres) of the Greater Sage-Grouse Key Habitat Areas ACEC. Under all alternatives, the BLM would not violate the lease rights, but would apply restrictions, including NSO to protect important habitats. Alternative E expounds upon this by imposing an NSO condition of approval within the Greater Sage-Grouse Key Habitat Areas ACEC.

Indirect beneficial impacts would occur where this ACEC overlaps the ranges of special status wildlife species, as discussed in detail below.

Trophy Game – Alternative E

Impacts to grizzly bears would be similar to Alternative B, but with fewer adverse impacts where forest and woodland areas are subject to protective actions associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Predatory Animals – Alternative E

Impacts to gray wolves would be similar to Alternative B, but with fewer adverse impacts where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Game Birds (Greater Sage-Grouse) – Alternative E

See Table 4-23 for a summary of management actions and impacts under Alternative E specific to greater sage-grouse. A detailed discussion follows in the sections below.

Under Alternative E, estimated short- and long-term surface disturbance from BLM actions in the Planning Area would result in the least amount of loss, degradation, and fragmentation of sagebrush habitat of any alternative due to the relative size and additional surface-disturbance limitations associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Prohibitions on surface-disturbing and disruptive activities (including ROWs) are more restrictive than under Alternative B, and this alternative would generally result in less surface disturbance and habitat loss, degradation, and fragmentation of greater sage-grouse habitat than management under any other alternative. Managing disturbance within greater sage-grouse Key Habitat Areas to not exceed one location per 640 acres and cover less than 3 percent of priority greater sage-grouse habitat would result in the least potential for greater sage-grouse habitat fragmentation of any alternative.

Impacts to greater sage-grouse from mineral leasing would be the same as Alternative B; however, because Alternative C withdraws the Greater Sage-Grouse Key Habitat Areas ACEC to locatable mineral entry and closes it to mineral materials disposal, overall adverse impacts from all mineral development would likely be reduced under this alternative.

Managing greater sage-grouse Key Habitat Areas as ROW and renewable energy exclusion areas (Table 4-22) under Alternative E would reduce the potential for adverse impacts to greater sage-grouse to a greater extent than any other alternative. Outside of Key Habitat Areas, management and impacts would be the same as under Alternative B.

Alternative E management of wildland fire and fuels treatment is similar to management under Alternative B, and focuses on restoring fire-adapted ecosystems and reducing hazardous fuels, which would result in long-term beneficial impacts to greater sage-grouse. However, unlike the other alternatives, treatments would be designed and implemented with a focus on the protection of sagebrush in Key Habitat Areas. As a result of this focus, Alternative E management would prioritize the creation and maintenance of greater sage-grouse cover and forage over meeting other resource objectives, increasing the quality of greater sage-grouse habitat over the long term.

Closing Key Habitat Areas to livestock grazing would result in similar adverse and beneficial impacts as described under Alternative B. Unlike management under Alternative B, Alternative E allows the use of livestock grazing as a management tool to address certain goals (such as the reduction of fine fuels), which could help achieve some of the potential beneficial effects of livestock grazing in the closed Key Habitat Areas.

The management of range improvement and supplements would be similar to management under Alternative B, but would include additional restrictions in Key Habitat Areas to ensure compatibility of the placement and/or design of supplement, fences, and other range improvements with greater sage-grouse conservation objectives. Evaluating existing structural range improvements and supplements to ensure that potential adverse impacts to greater sage-grouse are mitigated and additional monitoring requirements to ensure range improvements do not contribute to the proliferation of invasive species would result in additional beneficial impacts beyond those achieved by Alternative B or the other alternatives.

The effects of wild horse grazing in HMAs would be similar to those under Alternative A.

Alternative E specifically retains all lands in the proposed Greater Sage-Grouse Key Habitat Areas ACEC, providing additional protection for these areas from disposal out of federal management.

Alternative E includes the largest area of special designations of any alternative, and would provide the greatest benefit due to the additional restrictions on activities that could adversely affect greater sage-

grouse in these locations. In addition, this alternative designates the 1,232,583 acre Greater Sage-Grouse Key Habitat Areas ACEC (Table 4-22) specifically to protect greater sage-grouse.

Travel management under Alternative E would result in impacts similar to those under Alternative B. Additional restrictions on the placement of new roads, including the prohibition of new road construction within 4 miles of occupied greater sage-grouse leks, and a requirement that project proponents use existing routes to access valid existing rights to the extent possible, would further limit the potential for adverse impacts from surface disturbance associated with new roads and increased human disruption from their use.

Alternative E requires that Special Recreation Permits in the proposed Greater Sage-Grouse Key Habitat Areas ACEC have neutral or beneficial effects to greater sage-grouse habitat, which would reduce the potential for disruptive activities in these areas.

Impacts from vegetation management would be similar to those described under alternatives A, B, and D, except that Alternative E places greater focus on greater sage-grouse habitat restoration and improvement. Prioritizing treatments that improve greater sage-grouse habitat and managing projects to meet defined sage-grouse habitat parameters would result in greater beneficial impacts than management under the other alternatives. Additional requirements, such as the use of native seeds and management toward the restoration of native (or desirable) plant communities to ESD reference states could result in further habitat enhancements. Alternative E also restricts activities that facilitate the spread of invasive, nonnative plant species in greater sage-grouse habitat though requirements for livestock flushing and vehicle washing.

Alternative E manages conifer encroachment and invasive plant species the same as Alternative B, and impacts would be the same as described under that alternative.

Limitations on new sources of noise would be the same as described under Alternative B.

Alternative E includes the development of a statewide adaptive management plan for greater sage-grouse that identifies monitoring requirements and specific adaptive management triggers. Alternative E would likely result in similar beneficial impacts as the adaptive management strategy articulated under Alternative D by supporting population management objectives for greater sage-grouse set by the State of Wyoming (State of Wyoming Office of the Governor, EO 2011-5).

Nongame (Raptors) – Alternative E

Impacts to special status raptor species would be the same as Alternative B, except where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Nongame (Migratory Birds) – Alternative E

Impacts to special status migratory bird species would be the same as Alternative B, except where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Nongame (Mammals) – Alternative E

Impacts to special status mammals would be the same as Alternative B, except where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Nongame (Amphibians) – Alternative E

Impacts to special status amphibians would be the same as Alternative B, except where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse Key Habitat Areas ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Alternative F

Surface Disturbance – Alternative F

Alternative F would result in 137,064 acres of short-term and 17,663 acres of long-term surface disturbance. Impacts to wildlife from surface disturbance under Alternative F are projected to be greater than under alternatives A, B, and E, but less than under alternatives C and D. Similar to Alternative D, greater erosion prevention measures and reclamation requirements under Alternative F may mitigate impacts to wildlife habitat to a greater extent than Alternative A.

Resource Uses – Alternative F

Resource uses under Alternative F would result in fewer adverse impacts to wildlife habitat than Alternative D and slightly greater impacts than Alternative A. Like Alternative D, Alternative F applies a NSO stipulation within 0.6 mile of occupied greater sage-grouse leks within PHMAs. However, Alternative F limits surface disturbances to one per 640 acres and 3 percent or less of the Wyoming Density and Disturbance Calculation Tool (DDCT) analysis area, compared to 5 percent under Alternative D, which would afford greater protection for greater sage-grouse and other special status wildlife species that use habitats within the ACEC. Overall, fewer new federal wells are anticipated under Alternative F than alternatives A, C, and D, but more than alternatives B and E, with proportional adverse impacts to special status species.

Powerline development would be similar to alternatives A and D, but with additional restrictions within the proposed Greater Sage-Grouse PHMAs ACEC that would impose seasonal restrictions on powerline development, encourage the use of buried lines, and consider upgrades to enhance sage-grouse habitat security.

Alternative F would also limit motorized vehicle use to designated roads and trails and exclude renewable energy development over a greater area than Alternative D, resulting in fewer adverse impacts than alternatives A, C, and D, but more than alternatives B and E. Impacts from livestock grazing management would be the same as Alternative D across much of the Planning Area, but would incorporate greater sage-grouse habitat objectives within the proposed Greater Sage-Grouse PHMAs ACEC that would result in beneficial impacts to greater sage-grouse and other special status species that use sagebrush habitats.

Special Designations – Alternative F

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land in the Greater Sage-Grouse PHMAs ACEC. The additional restrictions (discussed under Resource Uses and Resources) on surface disturbance, oil and gas leasing, motorized vehicle use, and renewable energy development in the proposed Greater Sage-Grouse PHMAs ACEC would result in fewer adverse impacts to wildlife habitat than Alternative D. Beneficial impacts would be similar to Alternative E, but to a lesser extent due to the designation of less area as ACECs and fewer restrictions on resource uses and activities in special designation areas to protect special status wildlife species habitat and WSR eligible waterway segments.

Resources – Alternative F

Impacts to special status wildlife species from management actions to protect resources would be generally the same as Alternative D, except in the proposed Greater Sage-Grouse PHMAs ACEC, where specific management actions for habitat restoration, invasive species management, fire and fuels management, and livestock grazing that prioritize the protection of greater sage-grouse populations and sagebrush habitat would apply (Map 43). Therefore, management actions within these areas are likely to be more beneficial for sage-grouse and other special status wildlife species that use sagebrush habitats than under Alternative D.

Surface disturbance limitations under Alternative F would lower the potential for disturbance in forest/woodland, grassland/shrubland, and riparian/wetland communities where these areas overlap the proposed Greater Sage-Grouse PHMAs ACEC, decreasing adverse impacts to special status wildlife species that use these habitat areas.

Proactive Management – Alternative F

In general, proactive management actions under Alternative F (Map 43) provide more benefits and mitigate adverse impacts to special status wildlife species to a greater extent than alternatives A and C; slightly more than Alternative D due to the designation of the Greater-Sage Grouse PHMAs ACEC; and less than alternatives B and E. Oil and gas leases occur on approximately 50 percent (554,048 acres) of the Greater Sage-Grouse PHMAs ACEC. Under all alternatives, the BLM would not violate the lease rights, but would apply restrictions, including NSO conditions of approval to protect important habitats. Impacts due to proactive management and other impacts are described in detail under each special status wildlife species category below.

Trophy Game – Alternative F

Impacts to grizzly bears would be similar to Alternative D, but with fewer adverse impacts where forest and woodland areas are subject to protective actions associated with the proposed Greater Sage-Grouse PHMAs ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Predatory Animals – Alternative F

Impacts to gray wolves would be similar to Alternative D, but with fewer adverse impacts where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse PHMAs ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Game Birds (Greater Sage-Grouse) – Alternative F

See Table 4-23 for a summary of management actions and impacts under Alternative F specific to greater sage-grouse. A detailed discussion follows in the sections below.

Estimated short- and long-term surface disturbance from BLM actions under Alternative F are similar to alternatives A and D, but with greater restrictions on oil and gas development in sagebrush habitat (Table 4-21). Overall, Alternative F management would result in greater beneficial and reduced adverse impacts to greater sage-grouse than would management under alternatives A or C, similar impacts to alternatives B and D, and fewer beneficial impacts and greater adverse impacts than management under Alternative E.

Adverse impacts to greater sage-grouse from mineral leasing under Alternative F would be reduced compared to Alternative A and similar to under Alternative D. This alternative closes more than twice the amount of federal mineral estate to oil and gas leasing as Alternative D, but applies similar NSO restrictions, and limits surface disturbances from oil and gas to one location per 640 acres. However,

Alternative F includes additional constraints on oil and gas development, including a lower threshold of allowable cumulative surface disturbance in PHMAs (3 percent here versus 5 percent under Alternative D) and requirements to unitize leases and consider development on a larger scale, such as through the use of Master Development Plans. Unlike the greater sage-grouse focused ACEC under Alternative E, the Greater Sage-Grouse PHMAs ACEC would not preclude mineral development, resulting in greater potential for adverse impacts to greater sage-grouse and their habitats within PHMAs.

Adverse impacts to greater sage-grouse from ROW and renewable energy management would be similar to Alternative E, but to a greater extent because Alternative F includes fewer ROW exclusion areas in greater sage-grouse habitat. Compared to alternatives A, C, and D, management under Alternative F is anticipated to reduce the potential for new ROW development in greater sage-grouse habitat, and thus reduce the potential for adverse impacts compared to those alternatives. Alternative F generally manages PHMAs as avoidance areas for renewable energy and ROW development, which may necessitate the application of project design or mitigation features that would limit adverse impacts to greater sage-grouse. Although surface disturbance from ROW and renewable energy development would still result in adverse impacts from increased habitat fragmentation, habitat degradation, and disruption under this alternative, Alternative F includes a number of additional constraints in PHMAs that would help limit these effects (e.g., requirements to remove, bury, or modify existing powerlines and the application of TLSs to transmission line construction).

Alternative F management of wildland fire and fuels treatment is similar to management under Alternative D, and focuses on restoring fire-adapted ecosystems and reducing hazardous fuels. Overall, lower fuel loads and a return to natural wildland fire return internal would result in long-term beneficial impacts to greater sage-grouse. However, as under Alternative E, Alternative F implements wildland fire and fuels management with a focus on protecting existing sagebrush ecosystems in PHMAs.

Alternative F manages livestock grazing similar to Alternative D, and impacts would be similar to those described under that alternative. In addition, Alternative F includes additional restrictions in PHMAs to ensure that livestock use does not affect greater sage-grouse habitat quality. These measures include temporarily excluding livestock grazing in areas recovering from fire and incorporating greater sage-grouse habitat objectives and management considerations into all BLM grazing allotment management plans. Implementation of these additional restrictions would reduce the potential for livestock grazing in PHMAs to impede greater sage-grouse habitat recovery or adversely affect habitat quality.

The effects of wild horse grazing in HMAs would be similar to those under Alternative A.

Lands and realty management under Alternative F is the same as under Alternative D, and impacts would be the same as under that alternative.

Alternative F includes the second largest area of special designations of any alternative, and would provide the similar benefits to greater sage-grouse as Alternative E from the additional, restrictive management applied in these locations. Like under Alternative E, this alternative includes an ACEC specifically to protect greater sage-grouse, the 1,116,698 acre Greater Sage-Grouse PHMAs ACEC (Table 4-22). However, the Greater Sage-Grouse PHMAs ACEC includes fewer exclusions and closures to resource uses than does the greater sage-grouse focused ACEC under Alternative E, which would limit the potential for adverse impact reduction compared to that alternative.

Travel management under Alternative F is the same as under Alternative D, and impacts would be the same as under that alternative. Similar to Alternative D, this alternative restricts the placement of new roads in and around certain greater sage-grouse habitat (1.9 miles from the perimeter of occupied sage-grouse leks inside core areas). Like Alternative E, this alternative requires that project proponents

use existing routes where possible to access valid existing rights as methods to limit potential adverse impacts from surface disturbance associated with new roads and increased human disruption from their use.

Similar to Alternative E, Alternative F requires that Special Recreation Permits issued in the proposed Greater Sage-Grouse PHMAs ACEC have neutral or beneficial effects to greater sage-grouse habitat, which would reduce the potential for disruptive activities in these areas.

Impacts from vegetation management would be similar to those described under alternatives A, B, and D, except that Alternative F emphasizes habitat restoration and improvements that would specifically benefit greater sage-grouse. Prioritizing projects that improve greater sage-grouse habitat and managing toward defined greater sage-grouse habitat parameters would improve habitat conditions in comparison to those alternatives. Additional requirements, such as the use of native seeds and management toward the restoration of native (or desirable) plant communities, could also enhance habitat for greater sage-grouse.

Alternative F manages conifer encroachment the same as Alternative A, and impacts would be the same as described under that alternative.

Alternative F invasive plant species management is similar to management under Alternative D, but incorporates additional beneficial management actions in the Greater Sage-Grouse PHMAs ACEC, such as requirements to restore habitat to a higher community state or phase and conduct post-treatment monitoring and control requirements for invasive vegetation. Alternative F invasive plant species management in PHMAs is similar to Alternative E's management for Key Habitat Areas, and beneficial impacts from focusing on the maintenance of sagebrush ecosystems would be similar to those described under that alternative.

Limitations on new sources of noise would be the same as described under Alternative D, and impacts would be the same as described under that alternative.

Like Alternative E, proactive management under Alternative F includes the development of a statewide adaptive management plan for greater sage-grouse. The use of adaptive management plans would result in beneficial impacts to greater sage-grouse by aligning and frequently recalibrating BLM management strategies to support population management objectives for greater sage-grouse developed by the State of Wyoming (State of Wyoming Office of the Governor, EO 2011-5).

Nongame (Raptors) – Alternative F

Impacts to special status raptor species would be similar to Alternative D, but with fewer adverse impacts where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse PHMAs ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Nongame (Migratory Birds) – Alternative F

Impacts to special status migratory bird species would be similar to Alternative D, but with fewer adverse impacts where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse PHMAs ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Nongame (Mammals) – Alternative F

Impacts to special status mammals would be similar to Alternative D, but with fewer adverse impacts where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse PHMAs ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

Nongame (Amphibians) – Alternative F

Impacts to special status amphibians would be similar to Alternative D, but with fewer adverse impacts where habitats are subject to protective actions associated with the proposed Greater Sage-Grouse PHMAs ACEC, as discussed in Section 4.4.6 *Fish and Wildlife Resources – Wildlife*.

4.4.10 Wild Horses

Wild horses are managed for self-sustaining populations of healthy, free-roaming animals in balance with other uses and the productive capacity of their habitat. Management of wild horses is performed consistent with the Wild Free Roaming Horses and Burros Act of 1971, multiple use objectives in the FLPMA, and conformance with the *Wyoming Standards for Healthy Rangelands* (Appendix N), and in compliance with relevant court orders and agreements.

Adverse impacts to wild horses include management that reduces vegetation for forage, the availability of water, or other habitat components necessary to maintain the health of horses and the initial appropriate management level in HMAs. Beneficial impacts to wild horses result from management that increases the health, forage, genetic variability, and movement of wild horses in HMAs.

Direct impacts to wild horses result from management that affects their health, forage, and free-roaming nature. Actions that alter wild horse habitat in HMAs, such as surface disturbance that reduces forage in the short term, would result in direct impacts. Indirect impacts to wild horses may result from the construction of fences and activities that increase the competition for resources among wild horses, livestock, and wildlife in the long term, such as increased resource uses and land tenure adjustments or other management actions that subsequently alter the health, forage, and free-roaming character of wild horses.

Because appropriate management levels are typically set at levels that leave forage available for livestock and wildlife, wild horse populations are impacted most directly through gathers and fertility controls rather than reductions in forage availability (National Resource Council 2013). However, decreases in forage availability due to surface-disturbing activities in HMAs without a corresponding increase in reclamation or restoration of forage in another area, could indirectly impact wild horses by necessitating adjustments in the appropriate management level to compensate for the overall decline in forage availability.

4.4.10.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- The number of wild horses would increase by about 15 percent annually and be maintained by periodic removals, based on the estimated population increase for the McCullough Peaks HMA (BLM 2008a).
- Wild horse removals (gathers) would occur about every 3 to 5 years in each HMA.

- Maintenance of wild horse populations at initial appropriate management levels in existing HMAs would be accomplished through removals and selected application of other population control practices.
- Wild horse gathers would use existing trap locations for the most part.
- Conducting wild horse gathers in the fall, when temperatures are lower, would reduce stress on the animals; however, summer gathers scheduled during the cooler morning hours would also limit such stress.

4.4.10.2 Summary of Impacts by Alternative

Adverse impacts to wild horses primarily result from management that reduces the forage, health, and free-roaming nature of wild horses. The expansion of the McCullough Peaks Herd Management Area (HMA) under alternatives B, E, D, and F would result in beneficial impacts to wild horses by adjusting the HMA boundary to more accurately correspond to the range the resident herd uses, rather than continued attempts to recapture and move horses that venture outside of the existing HMA boundary. No changes would be made to the Fifteenmile HMA. Alternatives B and E, and to a lesser extent alternatives D and F, implement proactive management and constrain resource uses and disruptions (e.g., restrictions on organized special recreation permits [SRPs] in HMAs) in ways beneficial to wild horse forage and health. Limitations on surface disturbance and resource uses within proposed greater sage-grouse ACECs under alternatives E and F would augment protective management actions applied within the HMAs and provide additional protection for wild horses where these areas overlap. Alternatives A and C would result in similar impacts to wild horses, with the implementation of Alternative C causing more adverse impacts to wild horses than Alternative A, especially in the short term. Under all alternatives, wild horse populations may be brought into balance with available habitat and resources needed to sustain genetically viable herds.

4.4.10.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

The types of potential impacts to wild horses under the various alternatives are similar. However, the extent and intensity of impacts would vary by alternative. Therefore, discussions for individual alternatives describe impacts to wild horses from surface-disturbing activities, minerals development, ROW development, motorized vehicle use, recreation, livestock grazing, special designations, fire and fuels management, and proactive management actions.

Managing HMAs to be consistent with the *Wyoming Standards for Healthy Rangelands* (Appendix N) results in adverse and beneficial long-term impacts to wild horses. Fencing to improve livestock grazing distribution would affect the movement of wild horses and would affect their overall free-roaming nature. Water developments may improve the distribution of wild horses in each HMA. Conformance with the *Wyoming Standards for Healthy Rangelands* in upland areas would result in improved plant vigor, production, and diversity of species available as forage, which would result in beneficial impacts to wild horses.

Increased incidence of drought and associated increases in wildfire and reductions in the availability of water from climate change may result in long-term adverse impacts to wild horses. See the climate change section at the end of this chapter for more information regarding potential impacts from climate change.

Management that decreases adverse impacts to water quality, watersheds, and soils, such as avoiding or prohibiting surface disturbance near water or on slopes, maintaining watershed improvement projects, and using BMPs to reduce runoff, soil erosion, and sediment yield to retain water on landscapes would result in long-term benefits to wild horses. Management of resources that enhance habitat and forage production would contribute to habitat health and the overall health of horses.

Under all alternatives, the following Herd Areas would not be managed for wild horses: Sand Draw (15,302 acres), Zimmerman Springs (12,277 acres), Alkali Spring Creek (5,183 acres), Foster Gulch (141,300 acres), and North Shoshone (22,626 acres). Analysis for the previous RMPs determined that managing wild horses in these Herd Areas resulted in management issues or conflicts that were most appropriately resolved by the removal of wild horses. These decisions and findings remain valid because the resource conditions have not changed; therefore, the continued exclusion of wild horses from these areas results in beneficial impacts to wild horse management.

Managing the initial appropriate management level of wild horses in the Fifteenmile HMA (70 to 160 breeding adults) and the McCullough Peaks HMA (70 to 140 breeding adults) to be adjusted as necessary based upon monitoring would result in beneficial long-term impacts to wild horses from maintaining genetic viability in the HMAs. Allowing free movement of herds in HMAs would further increase the genetic viability of wild horse populations in HMAs. Employing selective removal criteria in accordance with current national policies during periodic gathers to increase the prevalence of desired genetic characteristics and avoid genetic depression would result in long-term benefits to wild horses by increasing long-term health and genetic viability.

Considering the use of natural and artificial population control measures, as needed, to maintain the populations of wild horses in the initial appropriate management levels may result in long-term beneficial impacts to wild horses by improving health of populations and facilitating effective strategies for managing wild horses and their habitat.

Basing future adjustments to appropriate management levels in the HMAs on monitoring and multiple use considerations through development of and/or revisions to HMA Plans would result in long-term beneficial impacts to wild horses by providing an appropriate review of herd objectives and conditions before forage allocations are made.

The use of certified weed-free forage supplements would result in beneficial impacts to wild horses by decreasing the potential for invasive species establishment and spread that would compete with native vegetation and lead to losses in forage. The use of forage supplements would also reduce competition for food sources in times of drought between wild horses and other wildlife.

Maintaining up-to-date Herd Gathering Plans and emphasizing the gathering of wild horses that move outside HMAs or onto private lands would result in overall beneficial impacts to management of the wild horses program within the context of multiple use. A strategic and reasoned approach to gathering wild horses would result in more effective and efficient gathering activities. Gathering excess wild horses would also result in reduced competition for resources (e.g., forage, water, and habitat) which may increase the health and viability of the horses remaining within the initial appropriate management level.

Special designations may result in beneficial impacts to wild horses by limiting impacts to resources (e.g., soil, water, and vegetation) that would affect wild horses. Under all alternatives, HMAs overlap with WSAs. Managed to be consistent with BLM Manual 6330 (BLM 2012a), activities that would adversely impact resource uses may be limited or prohibited in WSAs. These limitations would result in beneficial impacts to wild horses in the HMAs, except that new water development or other projects to benefit wild horses would likely be precluded from construction in WSAs.

Alternative A

Surface Disturbance

Surface disturbance affects wild horses both directly and indirectly. The severity of impacts to wild horses from surface disturbance depends on the location of the surface disturbance. Disturbance in HMAs would more directly affect wild horses. The location of surface disturbance projected in Appendix T has not been determined. However, land use allocations under each alternative may affect the location of surface disturbance. Land use allocations by alternative in each HMA are summarized in Table 4-24.

Table 4-24. Land Use Allocations (acres) within Herd Management Areas by Alternative

Management		McCullough Peaks HMA						Fifteenmile HMA					
		Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Total Acreage in HMA		103,866	113,714	103,866	113,714	113,939	113,714	70,527	70,527	70,527	70,527	70,527	70,527
Travel Management Designation	Open/Play Area	0	0	0	0	0	0	0	0	0	0	0	0
	Limited to Designated	48,485	91,412	103,661	113,670	91,412	113,670	0	54,568	15,947	54,568	54,568	54,695
	Limited to Existing	55,357	1	181	20	1	20	54,698	0	54,568	127	0	0
	Closed	0	22,278	0	0	22,278	0	15,818	15,945	0	15,818	15,945	15,818
	Seasonal Restriction	0	59,611	0	0	59,611	0	0	13,469	0	0	13,469	0
ROW	Avoidance	26,754	107,536	62,467	113,694	53,331	70,513	18,157	69,506	27,442	70,261	57,044	70,513
	Exclusion	2,733	6,153	0	0	60,359	0	4,506	1,007	0	0	13,469	0
	Open	74,379	24	41,399	47,514	24	47,514	47,864	14	43,085	266	14	14
Livestock Grazing	Closed	22	60,272	22	22	60,272	22	0	34,603	0	0	34,603	0
	Open	103,844	53,442	103,844	113,692	53,442	113,692	70,527	35,926	70,527	70,527	35,926	70,506
Oil and Gas Constraints	Closed	17,884	97,055	11,816	21,649	97,054	21,649	15,947	64,469	15,947	15,947	64,469	15,947
	Major	2,541	16,014	6,068	37,332	16,014	37,359	11,124	6,055	0	15,125	6,055	15,125
	Moderate	27,377	16	38,091	54,103	16	54,076	24,682	3	14,224	39,466	3	39,455
	Open	55,434	0	47,261	0	0	0	15,125	0	40,356	0	0	0

Table 4-24. Land Use Allocations (acres) within Herd Management Areas by Alternative (Continued)

Management		McCullough Peaks HMA						Fifteenmile HMA					
		Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Salable Minerals	Closed	15,608	113,059	22,972	54,927	113,059	54,927	15,945	70,513	16,483	19,861	70,521	19,861
	Open	88,273	655	80,910	58,787	655	58,787	54,582	14	54,044	50,666	6	50,666
Locatable Minerals	Withdrawn	0	0	0	0	60,272	0	0	0	0	0	13,476	0
	Available	103,236	113,084	103,236	113,084	52,812	113,084	70,527	70,527	70,527	70,527	57,051	70,527

Sources: BLM 2009a; BLM 2013a

HMA Herd Management Area
ROW rights-of-way

Under Alternative A, 28,392 acres (16 percent) of HMAs are within WSAs, which will limit adverse impacts to HMAs from surface-disturbing activities. Surface disturbance and the removal of vegetation would directly limit the available forage for wild horses and other grazing animals and, without appropriate reclamation or rehabilitation, may also lead to the establishment and spread of invasive species, potentially contributing to forage reduction. Reductions in forage would impact wild horses by increasing competition between livestock and other wildlife.

Resource Uses

Management actions for minerals would result in both short-term and long-term impacts to wild horses. Mining activity would result in both short-term and long-term surface disturbance and loss of vegetation, which would reduce available forage. Construction and operation of mineral facilities and infrastructure would also displace horses and prevent movement in certain circumstances (e.g., linear infrastructure such as aboveground pipelines, transmission lines, and roads). Increased human presence and activity associated with mining may also reduce the wild and free-roaming nature of the horses.

Untreated invasive weeds that outcompete native vegetation and grasses may reduce available forage for wild horses. Treatments and reductions in invasive weeds may displace wild horses and reduce forage in the short term, but would reduce competition with native vegetation and increase available forage for wild horses in the long term. Under Alternative A, there would be beneficial impacts from treatments of invasive species on approximately 2,000 acres.

Management of ROWs would result in short- and long-term adverse impacts to wild horses. Wild horses would be displaced in the short term during construction activities and may be displaced in the long term depending on the size and activity level associated with ongoing operations on the ROW. The development of ROWs would also increase human activity and may result in avoidance behavior of wild horses, affecting access to resources and additional energy expenditure. Construction of ROWs and associated surface disturbance would result in short-term impacts to wild horses by removing forage. Successful reclamation of surface disturbance would reduce the potential for long-term loss of forage associated with ROW development. However, permanent (or long-term) facilities and infrastructure would still result in long-term surface disturbance that would reduce overall forage. Developing new ROWs in or adjacent to disturbed areas associated with existing ROWs or high traffic gravel roads or highways would reduce impacts to wild horses from the development of new ROWs. Alternative A has the most area open to ROW development in the Fifteenmile and McCullough Peaks HMAs (Table 4-24).

Management for travel and transportation would result in both short- and long-term impacts to wild horses. Travel designations that permit motorized vehicle use may disturb wild horses and result in short-term displacement when activity is occurring. In areas of frequent motorized vehicle use, wild horses may adjust behavior to adapt to human activity and noise, which may affect their wild and free-roaming nature and has been observed in the McCullough Peaks HMA. Areas open to cross-country motorized travel may reduce available vegetation and forage for wild horses; however, no areas in HMAs are completely open to cross-country motorized travel under any of the alternatives. Less than half of the area in HMAs is limited to designated roads and trails (Table 4-24). Limiting motorized vehicle use to designated roads and trails would limit adverse impacts to wild horses by restricting motorized access to help maintain their overall free-roaming and wild nature and to minimize disturbance.

Recreation management under Alternative A would result in localized short-term impacts to wild horses. Recreational activities may result in the temporary disturbance of horses from recreational wild horse viewing, hiking, hunting, camping, and other activities.

Livestock grazing management would result in adverse and beneficial impacts to wild horses. Impacts of livestock grazing on wild horses depend on the location, timing, intensity, duration, and frequency of grazing. Livestock grazing management results in the maintenance or improvement of range conditions as directed by the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N). Range improvements associated with livestock such as springs, wells, and reservoirs would also result in beneficial impacts to wild horses by increasing the availability of water. Conversely, fences constructed for range improvements may cause adverse impacts to wild horses by preventing herd movement and access to resources, necessitating additional management actions to open gates to allow horse movement. Livestock grazing may also result in competition for forage, water, and habitat with wild horses resulting in adverse impacts during periods of drought. Drought conditions can exacerbate conflicts between wild horses and livestock management relating to water and forage availability on rangelands and in HMAs. These impacts would occur only in the portions of HMAs managed as open to livestock grazing. Under Alternative A, over 99 percent of HMAs are open to livestock grazing (Table 4-24).

Special Designations

Management for regionally important prehistoric and historic trails (i.e., Other Historic Trails) would result in beneficial impacts to wild horses. The Bridger Trail passes through the eastern portion of the McCullough Peaks HMA. Restrictions on surface-disturbing activities, ROW development, and motorized vehicle use on and in the vicinity of the trail would result in beneficial impacts by reducing the potential for activities that would decrease forage and may disturb or displace wild horses.

Resources

Fire and fuels management would result in both adverse and beneficial impacts to wild horses. Management that increases the occurrence and spread of wildland fires in the short term, such as restrictions on fire suppression activities, would result in temporary displacement of wild horses and short-term reductions in available forage. However, fires of the appropriate intensity would improve forage production in the long term and result in vegetative communities with increased diversity, cover, and age class. Burned areas may also require fencing during stabilization and rehabilitation, which may temporarily decrease the movement of wild horses. Due to the short-term impact of these fences, they are not expected to affect the long-term genetic variability of wild horses.

Fire suppression activities, such as firebreaks and staging areas for suppression, would also result in short-term loss of forage. These impacts are expected to be minor, considering the amount of suppression activities and localized disturbance, compared to the size of the Planning Area and HMAs. However, the firebreaks historically have resulted in increased road use, which may fragment wild horse habitat. Any fire suppression activities in or near HMAs would increase short-term impacts to wild horses.

Mechanical fuels treatments, prescribed fire, and other fuels reduction activities may result in short- and long-term impacts to wild horses. However, most HMAs do not have a history of wildfires, and the likelihood of these areas receiving fuels treatments or being susceptible to wildfires is low. In the short term, any fuels reduction treatment that does occur may temporarily displace wild horses from localized areas. In the long term, any fuels reduction activities that help return fire to locations in the HMAs where it historically facilitated ecosystem health would benefit wild horses through improved forage production and vegetative diversity.

Proactive Management

Under Alternative A, the McCullough Peaks HMA would be maintained at about 103,866 acres and the Fifteenmile HMA at 70,527 acres (Map 45). Providing opportunities for the public to view wild horses in the McCullough Peaks and Fifteenmile HMAs may result in both adverse and beneficial impacts to wild horses. Increased human presence may adversely impact wild horses by acclimating horses to human presence and reducing their wild, free-roaming nature. Increases in foal mortality due to foal abandonments and increased risk of injuries to humans would result as horses continue to be acclimated to humans. However, increasing public interest in wild horses may result in beneficial impacts to wild horses by heightening awareness of the wild horse program and public opportunities to adopt excess horses removed from the range. Adoption activities may result in public participation in and support for the wild horse management program and long-term management activities.

SRPs in the HMAs would result in impacts similar to those described above for providing opportunities for public viewing of wild horses. However, these impacts may be greater due to the closer proximity and larger scale of activities associated with SRPs, camps, events, activities, and an increase in the number of visitor use days. When SRP holders use horses, additional risks can result from wild stallions approaching domesticated mares that are in estrus (in season). In large groups, domesticated horses may also escape and join bands of wild horses; the SRP holder is responsible for any costs associated with the collection of their horses. Additional impacts would result from the introduction of parasites and diseases brought into the HMA by domestic horses.

Evaluating and potentially allowing fences in the McCullough Peaks HMA on a case-by-case basis may result in beneficial and adverse impacts to wild horses. Fences may help achieve healthier rangelands by allowing for rotational livestock grazing. Any fence decision would require site-specific analysis with public participation under NEPA to ensure the consideration of adequate alternatives and mitigations, including gate management and horse movement, before construction.

Mitigating surface-disturbing and disruptive activities in the Fifteenmile HMA would result in beneficial impacts to wild horses by reducing adverse impacts associated with these activities, as previously described.

Alternative B

Surface Disturbance

Impacts of surface disturbance on wild horses would be similar to those described under Alternative A, although to a lesser extent, because the projected overall surface disturbance in the Planning Area is less under Alternative B (Table 4-1). With the expansion of the McCullough Peaks HMA, 38,268 acres (21 percent) of HMAs are contained in WSAs, which would limit adverse impacts to HMAs from surface-disturbing activities. Applying seasonal restrictions from February 1 to July 31 in the McCullough Peaks and Fifteenmile HMAs would further limit the potential for adverse impacts from surface-disturbing and disruptive activities on wild horses during foaling. Implementation of Alternative B would result in 46 percent and 31 percent less short- and long-term surface disturbance than Alternative A, respectively, and would therefore have less adverse impacts to wild horses.

Resource Uses

Management of minerals would result in impacts similar to those under Alternative A, although to a lesser extent. Implementation of Alternative B would close fewer acres in HMAs to mineral activity (Table 4-24).

Management of invasive species would result in impacts similar to those under Alternative A. However, under Alternative B, the BLM would treat less area (5 percent of the area treated under Alternative A) for invasive species, potentially allowing for increased weed establishment in HMAs, with associated forage reductions.

Management of ROWs would result in impacts similar to those under Alternative A, although to a lesser extent because there are more restrictions on ROW development under Alternative B. Alternative B includes more ROW avoidance or exclusion areas in the HMAs compared to Alternative A (Table 4-24). In addition, no areas are open to ROWs in the HMAs under Alternative B. ROW development would occur only in ROW avoidance areas, where the BLM would apply appropriate mitigation measures and BMPs to limit impacts to wild horses and other resources.

Management of travel and transportation would result in impacts similar to those under Alternative A, although to a lesser extent. Under Alternative B, the BLM would close or limit to designated roads and trails motorized vehicle travel in the HMAs in more area than under Alternative A (Table 4-24). Therefore, there would be fewer impacts from motorized vehicle use under Alternative B.

Impacts from recreation management under Alternative B would be similar to those under Alternative A.

Under Alternative B, fewer spring and reservoir developments associated with livestock grazing would be constructed compared to Alternative A, resulting in fewer beneficial impacts to wild horses. Under Alternative B, 94,875 acres (51 percent) of the HMAs are managed as closed to livestock grazing (Table 4-24), reducing competition for forage across most of the area open to wild horses and resulting in a beneficial impact to these animals. Apportioning additional sustained yield forage for wild horses and wildlife would result in beneficial impacts to wild horses by increasing forage and decreasing the potential for competition with livestock and other wildlife. Alternative B would result in greater potential to increase forage availability for wild horses, resulting in the greatest benefit to health and vigor for the constrained number of horses in the HMAs (i.e., 70 to 160 horses for the Fifteenmile HMA and 70 to 140 horses for the McCullough Peaks HMA).

Special Designations

Management of the Bridger Trail, which passes through the McCullough Peaks HMA, would result in similar beneficial impacts under Alternative B as those described under Alternative A, but to a greater extent due to the increased restrictions on resource uses and activities around the trail.

Resources

In general, management under Alternative B emphasizes the conservation and protection of resources (e.g., vegetation, water, and soils) which may improve forage and the health of wild horses. As a result, management of resources under Alternative B would have greater beneficial indirect impacts to wild horses compared to Alternative A.

Impacts to wild horses from fire and fuels management would be similar to those under Alternative A. However, under Alternative B, the likelihood of mechanical treatments for fuels and prescribed fire use in the HMAs would be lower, which may further reduce the potential disturbance and displacement of wild horses. Fewer fuels treatments also may increase the potential for larger, more intense fires in the long term and associated adverse impacts to wild horses. However, as under Alternative A, such fires would likely remain uncommon due to the historical absence of wildfires in the HMAs.

Proactive Management

Under Alternative B, expansion of the McCullough Peaks HMA and maintaining the initial appropriate management level of horses in the HMA would result in beneficial impacts to wild horses (Map 45). Beneficial impacts include accommodating the routine movement of wild horses, which is in conflict with the currently designated HMA, and reducing the need for roundups to remove horses outside of the HMA. Providing opportunities for wild horse viewing in the McCullough Peaks HMA would have the same impacts as those described under Alternative A. However, not promoting wild horse viewing in the Fifteenmile HMA under Alternative B may help retain the remote natural conditions and the wild and free-roaming nature of horses compared to Alternative A. Opportunities for wild horse viewing would be less under Alternative B compared to Alternative A, but only in the Fifteenmile HMA.

Prohibiting horse use-based organized SRPs in the HMAs would result in beneficial impacts to wild horses by retaining the remoteness of the herds and reducing the potential for human and domestic horse interaction that would reduce the wild and free-roaming nature of the horses. The chance of domestic horses joining wild horse herds, which would result in stress and harassment to wild horses from recapturing domestic horses and potential disease and parasite transmission, would be greatly reduced. However, this prohibition would reduce public opportunities to gain an appreciation for wild horses, possibly reduce adoption demand, and restrain public interest in wild horse management in the Planning Area.

Evaluating and removing interior fences in the McCullough Peaks HMA would result in beneficial impacts to wild horses by allowing movement in the HMA, increasing genetic viability, and reducing injuries and deaths.

Under Alternative B, applying seasonal restrictions from February 1 to July 31 to surface-disturbing and disruptive activities and land uses in the McCullough Peaks and Fifteenmile HMAs, as appropriate, and avoiding wild horse gathers from 6 weeks before to 6 weeks after foaling would beneficially impact wild horses by reducing the potential for foal abandonment or jeopardy of wild horse health and welfare.

Relative to Alternative A, Alternative B would result in the most indirect beneficial impacts to wild horses and their habitat because it conserves the most land area for physical, biological, and heritage resources and is the most restrictive to motorized vehicle use and mineral development.

Alternative C

Surface Disturbance

Impacts from surface disturbance on wild horses under Alternative C would be similar to those described under Alternative A, although to a greater extent. Similarly to Alternative A, 28,392 acres (16 percent) of HMAs are contained in WSAs, which will limit adverse impacts to HMAs from surface-disturbing activities under Alternative C. However, Alternative C is projected to result in the greatest amount of short- and long-term surface disturbance in the Planning Area (80 percent and 165 percent more than Alternative A, respectively), increasing the probability that surface disturbance would adversely affect wild horse habitat.

Resource Uses

Management of minerals under Alternative C would result in impacts similar to those under Alternative A, although to a greater extent. Implementation of Alternative C would result in the greatest amount of minerals development compared to other alternatives (Appendix T). There would be less acreage closed to mineral activity in the HMAs under Alternative C than under other alternatives (Table 4-24).

Management of invasive species would result in impacts similar to those under Alternative A.

Management of ROWs would result in impacts similar to those under Alternative A, although to a lesser extent because there are more restrictions on ROW development under Alternative C. Compared to Alternative A, Alternative C includes more ROW avoidance areas and less area open to ROW development within HMAs. Overall, Alternative C would result in the second-greatest adverse impact to wild horses from ROW development.

Management of travel and transportation would result in impacts similar to those under Alternative A, although to a greater extent. Under Alternative C, the BLM would not close areas to motorized vehicle travel in the Fifteenmile HMA and would limit motorized vehicle travel to designated roads and trails in HMAs in more area than under Alternative A, but less than under alternatives B and D (Table 4-24).

Impacts from recreation management would be similar to those described for Alternative A.

Management of livestock grazing, including areas in the HMAs closed to livestock grazing (Table 4-24), under Alternative C is similar to Alternative A, thereby resulting in similar impacts. Under Alternative C, additional sustained yield forage would only be apportioned to satisfy suspended permitted use of permittees and not for the benefit of wild horses or other wildlife as under Alternative B. This management action would result in the fewest beneficial impacts to wild horses from forage apportionment.

Special Designations

Management of the Bridger Trail, which passes through the McCullough Peaks HMA, would result in similar beneficial impacts under Alternative C as those described under Alternative A, but to a greater extent due to greater restrictions around the trail under Alternative C. Management of the Bridger Trail under Alternative C would result in more restrictions on resource uses and activities than Alternative A, but less than alternatives B and D.

Resources

In general, management under Alternative C would emphasize resource use over resource conservation, which would result in more adverse impacts to forage and the health of wild horses, compared to the other alternatives. As a result, management of resources under Alternative C would have the greatest adverse impacts on wild horses compared to other alternatives.

Impacts to wild horses from fire and fuels management would be similar to those under Alternative A, although to a greater extent because the BLM would perform mechanical fuels treatments and prescribed burns on more acreage. Impacts from vegetation management in the Planning Area to wild horses under Alternative C would be similar to those under Alternative A. However, Alternative C does not prohibit surface-disturbing activities in riparian/wetland areas, which may cause short- and long-term adverse impacts.

Proactive Management

Under Alternative C, the McCullough Peaks HMA would be maintained at about 103,866 acres and the Fifteenmile HMA at 70,527 acres (Map 45). Wild horse viewing would be actively promoted in the McCullough Peaks HMA with opportunities for public viewing, education, and interpretation under this alternative. Opportunities for wild horse viewing would also be provided in the Fifteenmile HMA. In general, management under Alternative C would result in the same level of wild horse viewing as under Alternative A, but less than under alternatives B and D.

The beneficial impacts from evaluating and removing interior fences in the McCullough Peaks HMA realized under alternatives B and D would not occur under this alternative.

Alternative C does not include seasonal restrictions on surface-disturbing or disruptive activities in HMAs. This would result in long-term adverse impacts to wild horses by increasing the potential for disturbance to wild horses during sensitive times of the year and by reducing forage and overall health of horses in the HMAs. Allowing SRPs in HMAs would cause impacts similar to those under Alternative A, although to a greater extent because the BLM would issue more SRPs under Alternative C. Evaluating fences on a case-by-case basis in the McCullough Peaks HMA would cause the same impacts as under Alternative A. Overall, proactive management for the protection of wild horses would provide the least beneficial impacts under Alternative C.

Alternative D

Surface Disturbance

Impacts of surface disturbance on wild horses would be similar to those described under Alternative A, although to a slightly greater extent because the projected short- and long-term surface disturbance in the Planning Area is 3 percent and 17 percent more, respectively, under Alternative D. The expansion of the McCullough Peaks HMA would be the same as under Alternative B, resulting in 38,268 acres (21 percent) of HMAs being contained in WSAs, which will limit adverse impacts to HMAs from surface-disturbing activities. Like Alternative B, Alternative D also applies seasonal restrictions from February 1 to July 31 in the McCullough Peaks and Fifteenmile HMAs, which would further limit the potential for adverse impacts from surface-disturbing and disruptive activities on wild horses during foaling.

Resource Uses

Management of minerals would result in impacts similar to those under Alternative A. The amount of disturbance associated with minerals development is projected to be slightly less than under Alternative A. In HMAs, the acreage closed to mineral activity under Alternative D is greater than under alternatives A and C, but less than under Alternative B (Table 4-24).

Management of invasive species would result in impacts similar to those under Alternative A.

Management of ROWs would result in impacts similar to those under Alternative A, although to a lesser extent because there are more restrictions on ROW development under Alternative D. The BLM would manage the majority of the McCullough Peaks and Fifteenmile HMAs as ROW avoidance areas where mitigation measures and the application of BMPs would limit impacts to wild horses (Table 4-24). Overall, Alternative D would result in the second-fewest adverse impacts to wild horses from ROW development.

Under Alternative D, HMAs are closed to motorized vehicle use or it is limited to designated roads and trails on more acreage than under alternatives A and C, but less than under Alternative B. The overall adverse impacts to wild horses from travel management would be similar to those described under Alternative A, although to a lesser extent. Restricting motorized travel would benefit wild horses by minimizing surface disturbance and stress to wild horses associated with motorized vehicle use.

Impacts from recreation management under Alternative D would be similar to those described under Alternative A.

The amount of rangeland improvement projects, such as springs, reservoirs, and fence development, constructed under Alternative D would be similar to that under Alternative A, resulting in similar adverse and beneficial impacts. Under Alternative D, the BLM would manage the same amount of acreage as

open to livestock grazing as under Alternative A (Table 4-24), resulting in impacts similar to those under Alternative A.

Special Designations

Under Alternative D, management of the Bridger Trail, which passes through the McCullough Peaks HMA, would cause beneficial impacts similar to those under Alternative A, but to a greater degree due to increased restrictions on resource uses and activities around the trail. Management of the Bridger Trail under Alternative D would result in more restrictions on resource uses and activities than under alternatives A and C, but less than under Alternative B.

Resources

Management designed to protect resources such as soil, water, and vegetation would benefit wild horses by limiting surface-disturbing activities and minimizing impacts to forage and habitat. Several management actions require avoidance of surface-disturbing activities for the protection of resources under Alternative D. In areas that require avoidance, surface-disturbing activities would be prohibited unless the impacts could be mitigated, thereby limiting long-term adverse impacts to wild horses.

Prescribed fire and mechanical fuels treatments are projected to disturb the same acreage as Alternative A, therefore causing similar impacts.

Proactive Management

Similar to Alternative B, expansion of the McCullough Peaks HMA and maintaining the initial appropriate management level of horses in the HMA would result in beneficial impacts to wild horses (Map 45). Under Alternative D, the BLM would promote opportunities for public viewing, education, and interpretation of wild horses in the McCullough Peaks HMA, but would not actively promote the Fifteenmile HMA to the public. Under Alternative D, fewer opportunities for wild horse viewing would exist in the Fifteenmile HMA than under alternatives A and C, resulting in similar beneficial impacts to those under Alternative B. In general, opportunities for wild horse viewing in the McCullough Peaks HMA would be similar under all alternatives, resulting in impacts similar to those described under Alternative A.

Under Alternative D, the BLM would prohibit and avoid, respectively, organized SRPs using domestic horses in the McCullough Peaks and Fifteenmile HMAs. Restricting SRPs using domestic horses in the HMAs would result in impacts similar to those described under Alternative B. Although SRPs are not prohibited in the Fifteenmile HMA, avoidance would require that impacts are mitigated, reducing the potential for long-term impacts.

Evaluating and removing interior fences in the McCullough Peaks HMA to provide for wild horse movement would result in similar beneficial impacts as those under Alternative B.

Seasonal restrictions to prevent foal abandonment and jeopardy of wild horse health would result in similar beneficial impacts as those under Alternative B, although to a lesser extent because the restrictions would not apply to disruptive activities.

Alternative E

Surface Disturbance

Impacts from surface disturbance on wild horses under this alternative would be the same as Alternative B, except in the Greater Sage-Grouse Key Habitat Areas ACEC. Under Alternative E, greater restrictions on locatable mineral entry, mineral materials disposal, renewable energy development, and ROW

development would apply in the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Implementation of Alternative E would result in the least amount of short- and long-term surface disturbance compared to the other alternatives, and would therefore have the fewest adverse impacts to wild horses.

Resource Uses

Impacts to wild horses from minerals development would be the same as Alternative B, except within the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Alternative E would have additional restrictions on surface-disturbing activities and mineral development within the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Alternative E would therefore result in the least adverse impacts to wild horses from mineral development relative to the other alternatives and would close the most acreage in HMAs to mineral activity (Table 4-24).

Management of ROWs under Alternative E would result in the same impacts to wild horses as Alternative B, although to a greater extent due to the larger area of ROW exclusion in the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Alternative E includes the most area in HMAs managed as ROW exclusion areas (Table 4-24).

Alternative E requires that Special Recreation Permits in the proposed Greater Sage-Grouse Key Habitat Areas ACEC have neutral or beneficial effects to sage-grouse habitat, which would reduce the potential for disruptive activities in areas of the HMAs that overlap the ACEC.

Special Designations

Under Alternative E, restrictions on surface-disturbing activities, including locatable mineral entry, mineral materials disposal, renewable energy development, and ROW development, would be the same as Alternative B, except within the Greater Sage-Grouse Key Habitat Areas ACEC. Alternative E would reduce impacts to wild horses relative to Alternative B in areas of overlap between the proposed ACEC and HMAs. Reduced surface disturbance and associated disruptive activities would augment the protective management actions for wild horses under Alternative E, resulting in the greatest beneficial indirect impacts to wild horses compared to the other alternatives. All other impacts to wild horses from special designations would be consistent with Alternative B.

Resources

Impacts from the management of resources under Alternative E would be the same as Alternative B, except in the proposed Greater Sage-Grouse Key Habitat Areas ACEC. Management actions for habitat restoration/vegetation, invasive species, and fire and fuels within the proposed Greater Sage-Grouse PHMAs ACEC may indirectly improve wild horse forage and health by incorporating objectives for the conservation and restoration of sagebrush habitats. Conversely, additional restrictions on fuels treatments in these areas also may increase the potential for larger, more intense fires in the long term and associated adverse impacts to wild horses. However, as under Alternative A, such fires would likely remain uncommon due to the historical absence of wildfires in the HMAs.

Proactive Management

Under Alternative E, proactive management actions that limit surface disturbance and disruptive activities within the proposed Greater Sage-Grouse Key Habitat Areas ACEC would augment protection provided by seasonal restrictions in HMAs under Alternative B. Proactive management actions outside the proposed Greater Sage Grouse Key Habitat Areas ACEC would be the same as Alternative B.

Alternative F

Surface Disturbance

Impacts from surface disturbance on wild horses under this alternative would be the same as Alternative D, except in the proposed Greater Sage-Grouse PHMAs ACEC. Alternative F would place greater restrictions on oil and gas development and motorized vehicle use in the proposed Greater Sage-Grouse PHMAs ACEC when compared to Alternative D. Impacts of surface disturbance on wild horses would be similar to Alternative A, although to a slightly greater extent because the projected short- and long-term surface disturbance in the Planning Area is greater under Alternative F.

Resource Uses

Resource uses under Alternative F would result in fewer adverse impacts to wild horses than Alternative D and greater adverse impacts than Alternative A. This alternative closes more than twice the amount of federal mineral estate to oil and gas leasing as Alternative D, but like Alternative D, applies a NSO stipulation within 0.6 mile of occupied sage-grouse leks in PHMAs. However, Alternative F limits surface disturbances to one per 640 acres and 3 percent or less of the Wyoming DDCT analysis area, compared to 5 percent under Alternative D, which would afford greater protection for wild horses that use habitats within the Greater Sage-Grouse PHMAs ACEC.

ROW development would be similar to alternatives A and D across much of the Planning Area but would be subject to additional restrictions within the proposed Greater Sage-Grouse PHMAs ACEC. Additional management in these areas may indirectly benefit wild horses where they overlap HMAs by imposing seasonal restrictions on powerline development and encouraging the use of buried lines.

Alternative F would also limit motorized vehicle use to designated roads and trails over a greater area within HMAs than Alternative D, resulting in fewer adverse impacts than alternatives A, C, and D, but more adverse impacts than alternatives B and E. Where these limitations on motorized travel overlap HMAs, they would benefit wild horses by minimizing surface disturbance and stress to wild horses associated with motorized vehicle use.

Impacts from livestock grazing management would be consistent with Alternative D across much of the Planning Area but would incorporate greater sage-grouse habitat objectives within the proposed Greater Sage-Grouse PHMAs ACEC, which may have beneficial indirect impacts on wild horse forage and habitat.

Impacts from all other resources uses would be the same as Alternative D.

Special Designations

Under Alternative F, impacts to wild horses from special designations would be the same as Alternative D, except within the proposed Greater Sage-Grouse PHMAs ACEC. Additional constraints on oil and gas leasing and motorized vehicle use in the proposed Greater Sage-Grouse PHMAs ACEC under Alternative F would result in fewer adverse impacts to wild horses than Alternative D in areas of overlap with HMAs. Similarly, beneficial indirect impacts to wild horses may result from management actions that conserve or restore greater sage-grouse habitat within these areas of overlap.

Resources

Management designed to protect resources such as soil, water, and vegetation would benefit wild horses by limiting surface-disturbing activities and minimizing impacts to forage and habitat. These benefits would be slightly greater under this alternative than under Alternative D due to additional management actions that require avoidance of surface-disturbing activities for the protection of

resources within the proposed Greater Sage-Grouse PHMAs ACEC. In areas that require avoidance, surface-disturbing activities would be prohibited unless the impacts could be mitigated, thereby limiting long-term adverse impacts to wild horses.

Prescribed fire and mechanical fuels treatments are projected to disturb the same acreage as alternatives A and D, therefore causing similar impacts. Although fuels buildup within the ACEC would be greater than under Alternative D, adverse impacts from wildfires are unlikely given the historical absence of wildfires in the HMAs.

Proactive Management

Proactive management actions that limit specific surface disturbances and disruptive activities within the proposed Greater Sage-Grouse PHMAs ACEC would augment protection provided by seasonal restrictions in HMAs under Alternative D. All other proactive management actions outside of the proposed Greater Sage-Grouse PHMAs ACEC would be consistent with Alternative D.

4.5 Heritage and Visual Resources

4.5.1 Cultural Resources

Because cultural resources are fragile, often unique, nonrenewable resources that occupy relatively small areas, almost any management action has the potential to affect the resource. Actions under each alternative may directly or indirectly affect cultural resources, and impacts may be beneficial or adverse. Except for setting, there is little distinction between short- and long-term impacts. Refer to Section 4.7.3 *National Historic Landmarks* for a discussion of impacts to the Heart Mountain Relocation Center. Section 4.7.4 *National Historic Trails and Other Historic Trails* in this chapter analyzes historic trails in detail. This section and Section 4.8.5 *Tribal Treaty Rights* identify Native American concerns.

Direct adverse impacts to cultural resources from RMP alternatives typically result from actions that disturb the soil or physically alter, damage, or destroy all or part of a resource; alter characteristics of the surrounding environment that contribute to resource significance; introduce visual or audible elements out of character with the property or alter its setting; or result in neglect or physical exposure of the resource to the extent that it deteriorates or is destroyed. Surface-disturbing activities would result in direct adverse impacts because, once a cultural resource has been disturbed, it cannot be replaced and the potential for collecting or preserving meaningful data is compromised. Actions resulting in data collection are considered to be adverse, despite being a common mitigation requirement for disturbance of properties with significant scientific-data potential. Indirect impacts to cultural resources result from project-induced increases or decreases in activity in the Planning Area, such as an interpretive area that increases visitor use. A beneficial impact to cultural resources enhances their value (for example, constructing interpretive signs). Paradoxically, the same actions that can result in direct or indirect adverse impacts also may result in beneficial impacts. The discovery of previously unknown cultural resources, or the facilitation of data collection, preservation, or public education are possible beneficial impacts.

Once a cultural resource is physically altered, the impact is permanent; therefore, there is no difference between short- and long-term direct impacts from surface disturbance. Stabilization can halt deterioration, and restoration may be possible in unique situations; however, the disruption of cultural deposits on archeological sites and the deterioration of rock art, for two examples, are irreversible. For indirect impacts, the duration of a disturbing element or activity can be short or long. As examples, a pipeline construction corridor that results in erosion to or deposition on a cultural resource may be a short-term disturbance, because normal reclamation ultimately stabilizes the soil. For the analysis, surface disturbance lasting more than 5 years is considered long-term and disturbance lasting 1 year is considered long-term for assessing impacts to the setting for cultural resources.

The BLM complies with NHPA Section 106 for all actions with the potential to adversely impact historic properties (cultural resources eligible for listing or listed on the National Register of Historic Places [NRHP]). Section 106 compliance typically includes a cultural resources inventory and evaluation of any resources found. If historic properties are present, the BLM consults with the State Historic Preservation Office (SHPO), interested Native American tribes, and other interested parties to develop measures to mitigate adverse impacts to affected historic properties.

Under all alternatives, the BLM continues its obligation to engage in government-to-government consultations with interested tribes regarding sensitive resources in the Planning Area. Impacts to Native American traditional resources or sacred sites are identified in consultation with the affected tribes. Alterations to the important characteristics of traditional or sacred resources can adversely

impact traditional use of the area. While temporary disturbances, such as construction activities, may not be of major concern, long-term increases in noise, changes in visual setting and smells, and increases in motion and activity, all have the potential to detract from a site's setting. In addition, physical impacts to traditional or sacred sites and limitations on tribal access can impact traditional uses.

The BLM initiated contact with the following tribes, listed alphabetically, to identify potential impacts of the alternatives to sites of cultural concern on BLM lands:

- Blackfeet, living on the Blackfeet Reservation, Browning, Montana
- Crow, living on the Crow Reservation, Crow Agency, Montana
- Nez Perce, living on the Nez Perce Reservation, Lapwai, Idaho
- Northern Arapaho, living on the Wind River Reservation, Fort Washakie, Wyoming
- Northern Cheyenne, living on the Northern Cheyenne Reservation, Lame Deer, Montana
- Salish and Kootenai, living on the Flathead Reservation, Pablo, Montana
- Shoshone, represented by two tribes
  - Eastern Shoshone, living on the Wind River Reservation, Fort Washakie, Wyoming
  - Shoshone Bannock, living on the Fort Hall Reservation, Fort Hall, Idaho
- Sioux, represented by three tribes
  - Cheyenne River Sioux living on the Cheyenne River Reservation, Eagle Butte, South Dakota
  - Oglala Sioux, living on the Pine Ridge Reservation, Pine Ridge, South Dakota
  - Rosebud Sioux, living on the Rosebud Reservation, Rosebud, South Dakota

4.5.1.1 Methods and Assumptions

For all federal undertakings that may affect cultural resources, the BLM complies with NHPA Section 106 before proceeding with the undertaking. Section 106 compliance typically includes inventory and evaluation, and consultation with the SHPO. Existing Planning Area plans considered the maintenance of a ¼-mile-wide buffer zone adequate protection in most site situations, and the occasional application of a 5-mile-wide buffer zone a generous allowance that would protect the viewshed of the resource. However, with the introduction of new technologies, particularly wind turbines that are often grouped into wind farms, these distances do not always protect the significant values of a resource. Because the historic preservation community has begun placing more emphasis on setting as the initial aspect of integrity for a NRHP-eligible cultural resource, management must approach the application of viewshed criteria with flexibility, and account for the distance from the resource and the type of intrusion when determining the impact. On a case-by-case basis, and as appropriate for some projects, project decisions account for the importance of viewshed in a resource's eligibility and the distance necessary to protect its NRHP significance.

Methods and assumptions used in this impact analysis include the following:

- Cultural resources will continue to be found throughout the Planning Area.
- All surface-disturbing activities may damage, destroy, or otherwise impact cultural resources.
- Natural and prescribed fire may damage rock art sites and sites composed of combustible materials.
- Compliance with Section 106 before project initiation is required by law. All cultural resources will be protected in accordance with federal laws and BLM regulations and agreements,

including the national Programmatic Agreement (BLM, ACHP, and National Conference of SHPO 2012) and the Wyoming State Protocol (BLM and Wyoming SHPO 2014), regardless of whether the resources are specifically identified in the RMP.

- Avoidance is the preferred mitigation measure. When avoidance is not a practicable solution, the BLM will develop measures to mitigate impacts in accordance with Section 106 and other applicable laws and guidance.
- Adverse impacts to historic properties from surface-disturbing activities occur primarily at the time of initial surface disturbance. The BLM used the projected numbers for short-term surface disturbance to quantify impacts to cultural resources.
- The intensity of surface disturbance by alternative, as identified in Appendix T, equates to levels of development and, in turn, increased access to public lands.
- Increases in the number and extent of surface-disturbing activities and improved access may all result in increased impacts to cultural resources.
- The BLM has not identified all tribally sensitive sites in the Planning Area.
- Identifying tribally sensitive sites will benefit heritage resources.
- Tribal consultations benefit heritage resources.

4.5.1.2 Summary of Impacts by Alternative

Because cultural resources are fragile, often unique, nonrenewable resources that occupy relatively small areas, almost any management action has the potential to affect them. Principal impacts to cultural resources result directly from surface disturbance or visual intrusions, and indirectly from increased access related to management of other resources. The BLM anticipates impacts to cultural resources from the alternatives to be similar in type, but different in intensity. Proactive cultural resource management actions result in beneficial impacts across all alternatives. Overall, Alternative C allows the most resource use; therefore, it may result in the most direct and indirect impacts, adverse and beneficial, to cultural resources. However, despite the most use and the most potential impact, Alternative C incorporates a contemporary understanding of cultural resources management, in contrast to current management (Alternative A), which reflects the status of cultural resource management from the 1980s. While the BLM instituted current management in good faith and in compliance with Section 106 and BLM regulations, improved approaches and increased knowledge of options allow for more protection, even with more resource use. Potential impacts are likely to be the least adverse under alternatives B and E because of more restrictions on resource uses for the protection of other resources. However, with less use of other resources, there also is likely to be less Section 106 compliance and associated inventory, so that the knowledge base would not grow at the same rate as it would under Alternative C. Alternatives D and F reflect a balanced approach overall, in some cases mirroring the active management recommendations of Alternative A, providing less specific protection than Alternative B, but acknowledging and specifying situations in which more protective measures would be needed than under alternatives A or C.

Under all alternatives, the BLM continues its obligation to engage in government-to-government consultations with interested tribes. Actions required by the National Historic Preservation Act (NHPA) and the Wyoming State Protocol will form the foundation of all project-specific decisions regarding cultural resources. The Wyoming State Protocol and NHPA provisions will resolve conflicts between cultural resources and other resource uses not addressed in the RMP.

4.5.1.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Potential impacts to cultural resources are similar under all alternatives; however, the BLM anticipates that the intensity of impacts will vary. Therefore, impacts to cultural resources from surface-disturbing activities related to management of other resources are described for individual alternatives. Essentially, any activity that disturbs or has the potential to disturb the surface, regardless of the resource program with which the activity is associated, has the potential to affect cultural resources. Other types of disturbance also can affect cultural resources, including the adverse interaction of vibration impact, dust and airborne chemicals on rock art sites.

A number of management actions are common to all alternatives. These fall into several categories. Reactive actions include the investigation of all alleged violations of the Archeological Resources Protection Act; emergency site stabilization and long-term protection projects on important sites as appropriate, including the Hanson Site and several rock art occurrences; and assignment of an archeologist to all fires with heavy equipment employed beyond Minimum Impact Suppression Techniques (see *Glossary*) to assist in determinations of appropriate suppression strategies.

Native American consultation actions, which can affect how the BLM manages cultural resources, include continuing existing relationships and development of new relationships with Native American tribes to identify sites, areas, and resources important to them; documenting and maintaining confidentiality of sites, areas, and resources worthy of protection and the incorporation of information obtained from the tribes into the planning system; identifying resource conflicts in the earliest stages; avoiding these conflicts whenever possible; and managing identified areas of tribal importance to minimize disturbance to them and to ensure continued access. The BLM must ensure that areas important to Native American communities are not transferred from federal ownership, physically modified, or affected by management actions in ways that restrict or deny access and/or use. The BLM also must inventory potentially sensitive cultural places identified during Native American consultations independent of specific land use actions and apply tools (such as site avoidance and setting consideration zones [see the Glossary]) to protect sensitive cultural sites, as necessary.

Under all alternatives, all cultural properties will be categorized according to the six use allocations defined in BLM Manual 8110 (BLM 2004d) – scientific use, conservation use, public use, traditional use, experimental use, and discharged from public use.

Under all alternatives, compliance with NHPA Section 106 before an action is approved serves to moderate the amount of actual disturbance to cultural resources. In cases in which there can be no accommodation, the BLM and the SHPO consult to develop and implement a treatment plan to mitigate adverse impacts to historic properties. Often, this results in data recovery, which can take the form of planned excavation, detailed recording and mapping, or Historic American Buildings Survey/Historic American Engineering Record documentation. Other options include interpretation, one of many techniques that can be used for impact mitigation, depending on the type of site and the nature of the potential adverse impacts.

Exploration and development of locatable minerals may result in adverse impacts to cultural resources from the discovery and inadvertent destruction or degradation of cultural resources during project activities. Current regulations require operators to notify the BLM if cultural resources are discovered to reduce potential impacts to those resources. Under current policy, the BLM must allow mining operations to proceed within 10 working days after notification to the authorized officer of a discovery of cultural resources that might be altered or destroyed on BLM-administered lands by operations

(43 CFR 3809.420(b)(8)(ii)). This requirement also applies to not only a plan of operations that requires an approval of an action, but also for operations under a 3809 notice, which does not require agency approval before commencing actions.

For all alternatives, the BLM identified proactive management actions that would have a beneficial impact on cultural resources. These actions include preparation of activity plans for important sites, as appropriate (including the Hanson Site and several rock art occurrences), Ten Sleep Raid, Minick Sheep Camp Raid, historic trails (including the Bridger Trail), and the Fort Washakie to Red Lodge stage route; management of the Legend Rock Petroglyph Site for public education in cooperation with the state of Wyoming; and initiation of work to acquire the private land portions of the Legend Rock Petroglyph Site from willing landowners, preferably through a land exchange. The BLM also will develop additional cultural resource interpretive areas employing scenic overlooks, signs, and walking trails. Surface-disturbing activities associated with the construction and use of sites and facilities are subject to appropriate mitigation developed through implementation of the National Programmatic Agreement (BLM, ACHP, and National Conference of SHPO 2012) and the State Protocol (BLM and Wyoming SHPO 2014). Based on analysis and assessment, the BLM may need to apply additional restrictions beyond those specifically described in the alternatives.

Proactive management actions that protect cultural resources include prohibiting the use of bulldozers in areas of important cultural resources or historic trails for fire suppression unless an archeologist and/or resource advisor is present, and restricting or prohibiting the use of fire-retardant chemicals to protect rock art. All alternatives apply an NSO restriction on the Legend Rock Petroglyph Site and pursue withdrawals on a case-by-case basis for the protection of important cultural sites. The BLM also limits the use of motorized vehicles to designated roads and trails in areas with important cultural and paleontological resources to reduce the potential for looting and resource degradation.

Alternative A

Surface Disturbance

Any action that results in surface disturbance or subsurface disturbance (as identified in Appendix T) through culture-bearing strata may impact cultural resources. However, the net potential adverse impact to historic properties is limited because compliance with NHPA Section 106 requires the application of some type of mitigation to historic properties before any disturbance. The relative amount of surface disturbance projected for each alternative defines the level of potential to impact cultural resources. Under Alternative A, the BLM anticipates that impacts to cultural resources from surface-disturbing activities would increase with a greater intensity of surface disturbance, represented by the reasonable foreseeable actions shown in Appendix T. Moreover, the BLM anticipates that impacts to cultural resources from surface disturbance under Alternative A would primarily be adverse.

Restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations) under Alternative A provide additional protection for cultural resources.

Resource Uses

Resource exploration, development, and extraction can result in a long-term, direct adverse impact. Associated resources in the Planning Area, including locatable minerals, leasable minerals, mineral materials disposal, and forest products, all can lead to surface disturbance that may affect cultural resources. In addition to the actions required to develop these resources, associated actions, such as the creation and use of roads and other utilities, may impact cultural resources. Dust and vibration from

some methods of resource exploration can result in a direct impact to rock art (Francian 1998). The dust accumulates on the panels and can degrade the paint, and vibrations from blasting can cause spalling and rock fall that also adversely affects rock art. The BLM anticipates that these actions will occur under Alternative A.

Under Alternative A, the BLM pursues leasable mineral and mineral material restrictions to protect cultural resource sites on a case-by-case basis. The allowance for more case-by-case management under Alternative A, while providing discretionary protection, increases the chance of adverse impacts to cultural resources. Development of locatable minerals may result in adverse impacts to cultural resources if activities degrade or destroy resources. Pursuing mineral withdrawals would result in beneficial impacts to cultural resources by prohibiting mineral activities that may degrade or destroy resources. Under Alternative A, the BLM pursues withdrawals on a total of 72,861 acres.

Land exchanges may result in both beneficial and adverse impacts. The survey required for compliance with NHPA Section 106 in the case of either disposal or acquisition could result in a beneficial impact because of data that furthers understanding of cultural resources in the Planning Area. In addition, if the BLM acquires land with sensitive resources for the purpose of managing that resource, that would be beneficial. However, if historic properties are identified during the inventory, it may result in an adverse impact because once in private ownership, there are no protective measures for cultural resources. For that reason, Section 106 classifies land-tenure adjustment as an adverse impact. Alternative A identifies 115,905 acres as available for disposal, resulting in the potential for adverse impacts.

Any resource use that includes road development has the potential to result in direct impacts to cultural resources because the road may pass through or over a site. These resource uses may include any resource use already mentioned, but also invasive species and pest management, CTTM, and recreation. An indirect impact from this type of development occurs when the road provides access to a previously remote and/or inaccessible location. People who gain access may inadvertently damage fragile resources, or may vandalize or loot sensitive sites, particularly rock art and rock shelters. The BLM anticipates that Alternative A could result in 3,199 acres of short-term disturbance from new road construction and motorized vehicle use (Appendix T).

ROWs and corridors, renewable energy, CTTM, and recreation can result in similar impacts. The linear nature of corridors means they can reach far into areas where remoteness previously provided protection for the cultural resources. Balancing the needs of recreation with preservation presents a challenge because increased recreational use of an area exposes the cultural resources there to inadvertent damage and potential vandalism and looting. Under Alternative A, the BLM manages 940,943 acres as ROW avoidance areas and 61,147 acres as ROW exclusion areas. Renewable energy development is considered on a case-by-case basis, consistent with applicable policy and guidance and other resource management objectives, including cultural resource objectives. CTTM designations that place fewer restrictions on access to portions of the Planning Area, such as limiting travel to existing roads and trails (2,137,574 acres under Alternative A), would result in indirect adverse impacts to cultural resources by increasing the possibility of looting and vandalism. In contrast, CTTM that places greater restrictions on the routes available for use (e.g., limiting travel to designated roads and trails; 797,077 acres) or closes these routes altogether (68,115 acres) may reduce such impacts. Prohibiting and avoiding surface-disturbing activities in specified recreation areas would benefit cultural resources.

Livestock trampling and wallowing in areas of concentrated livestock use can directly affect cultural artifacts and features on or just below the surface by breaking or scattering these artifacts. Placing salt blocks increases the local adverse impact because cows lick the soil as the salt block melts into the ground. Alternatively, cattle trails and other heavily trampled and exposed areas can unearth otherwise

undetected cultural resources and allow them to be identified and recorded, resulting in a beneficial impact. However, in most cases concentrated livestock grazing would result in adverse impacts. Properly managing livestock grazing can mitigate these impacts by improving the distribution of livestock and reducing instances of concentrated use by these animals. Restrictions on livestock grazing also can help reduce impacts by limiting the area in which livestock can graze, and closures under Alternative A would generally benefit cultural resources. However, even in areas closed to livestock grazing, the presence of wildlife or wild horses may result in some impacts from trampling and wallowing.

Special Designations

Under Alternative A, the BLM manages three ACECs (Sheep Mountain, Little Mountain, and Upper Owl Creek) for their cultural values (among other values). Managing these areas as ACECs would provide additional protection to cultural resources and reduce the potential for adverse impacts.

Resources

Management actions related to other resources have the potential to impact cultural resources. As discussed above, compliance with BLM regulations and guidance and NHPA Section 106 would prevent some of the impacts and mitigate others. However, impacts are still possible, and most would be adverse. There may be some beneficial impacts. For example, standards for air quality that reduce dust and chemicals in the air would reduce adverse impacts to rock art and improve the viewshed for cultural resources where setting is an integral part of NRHP eligibility. Similarly, protecting cave and karst resources would benefit cultural resources in these areas.

Fire, fuels, and vegetation management may result in adverse or beneficial impacts. Protecting resources from fire reduces adverse impacts from heat, such as spalling at rock art sites. Protecting resources from fire also protects against the loss of vegetative cover, which protects cultural resources from the effects of erosion and provides camouflage for sensitive resources, protecting them from inadvertent and purposeful damage. However, fire management also can result in adverse impacts from loss of cover, firebreak construction, clearing vegetation, and revegetation activities (e.g., reseeding) and deployment of fire retarding chemicals. Prescribed fire is used on approximately 40,000 acres in the Planning Area over the life of the plan.

Wild horse management under Alternative A allows visitor access to HMAs and recreational use of some HMAs, which may result in greater access to remote areas and put cultural resources at risk.

Proactive Management

Under Alternative A, the BLM manages cultural resources proactively in compliance with BLM regulations and guidelines and the NHPA. The BLM strives to meet its Section 110 responsibility through inventory, and Section 106 compliance through identification, evaluation of cultural resources and mitigating impacts to those resources. Proactive management includes further exploration of the Hanson site, with the goal of nominating it as a National Historic Landmark. If designated as such the BLM will pursue nominating the site to the World Heritage List. Alternative A emphasizes the management of rock art and other archeological sites for research and interpretation, and for preservation for future study. As previously noted, this alternative pursues restrictions on leasable minerals to protect sites on a case-by-case basis and takes similar actions for mineral materials disposal and the location of renewable energy development.

Alternative A manages portions of the town of Gebo and adjacent coal mining areas for preservation and interpretation of cultural and historic values and emphasizes management of historic oil and gas fields for scientific and public use.

Alternative B

Surface Disturbance

As for all the alternatives, any action that results in surface disturbance or subsurface disturbance through culture-bearing strata may affect cultural resources. Alternative B would involve less surface disturbance than Alternative A; therefore, Alternative B would result in less impacts to cultural resources associated with surface and subsurface disturbances.

Under Alternative B, there are more restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations), providing additional protection for cultural resources and reducing adverse impacts, in comparison to Alternative A. Paradoxically, because less surface disturbance would result in less Section 106 compliance and therefore less cultural resources surveying, the beneficial impacts from such surveys would be lower than Alternative A under this alternative.

Resource Uses

Activities associated with resource exploration, development, and extraction that can have a long-term, direct adverse impact on cultural resources will be less under Alternative B than under Alternative A. Not only will these activities be reduced from Alternative A, Alternative B provides more avoidance protection, including larger buffer zones (see the 'Proactive Management' section, below).

Alternative B applies an NSO restriction for leasable minerals within 3 miles of important cultural sites and a CSU stipulation within 5 miles, in contrast to management under Alternative A, which pursues restrictions on a case-by-case basis. Under Alternative B, mineral materials disposal are prohibited within 3 miles or in view within 5 miles of important cultural sites. These mineral restrictions would benefit cultural resources by prohibiting surface disturbance from mineral activities in areas with cultural sites or resources that may degrade or destroy these resources. Impacts to cultural resources from locatable mineral development would be similar to those described for Alternative A, although to a lesser degree because withdrawals are pursued in more area (314,223 acres) than under Alternative A.

The types of impacts from land exchanges under Alternative B are the same as those under Alternative A, although the intensity varies. Under all alternatives, land available for disposal would be surveyed for the presence of cultural resources, but after disposal it would not necessarily be protected from adverse impacts. Alternative B identifies less area for disposal and more area for retention than Alternative A; adverse impacts from land tenure adjustments would be the same as Alternative A, but to a lesser extent due to the reduced area available for exchange or disposal and greater area retained. However, the BLM expects that most adverse impacts associated with land tenure adjustments would be mitigated through Section 106 compliance.

As described for Alternative A, any resource use that includes road development can result in direct impacts to cultural resources. The BLM anticipates that Alternative B would result in the construction of fewer new roads compared to Alternative A, with the result that Alternative B would result in less impact to cultural resources.

The types of impacts associated with ROWs and corridors, renewable energy, CTTM, and recreation are the same as described for Alternative A, although the intensity varies under Alternative B. Alternative B

is anticipated to result in fewer ROW authorizations than Alternative A and a greater degree of ROW consolidation to limit impacts. In contrast, Alternative B has more than twice the trails and recreational development of Alternative A. The BLM manages areas within 5 miles of trails and sites eligible for the NRHP and traditional cultural properties (TCPs) as renewable energy (specifically, wind turbine) exclusion areas, unless the structures are screened from the site by intervening topography. Under Alternative B, this requirement is more specific and more protective of these resources than under Alternative A, which has no specific management for such development and manages it on a case-by-case basis. CTTM under Alternative B includes a greater amount of area limited to designated road and trails or closed (2,416,378 acres and 170,253 acres, respectively), and less area limited to existing roads and trails than under Alternative A. Adverse impacts from looting and trespassing due to increased access may be less under this alternative than Alternative A.

The types of impacts from livestock grazing under Alternative B are similar to those described under Alternative A, although grazing under Alternative B has more restrictions, resulting in less potential for adverse impacts to cultural resources.

Special Designations

Under Alternative B, the BLM manages the three Alternative A ACECs that include cultural resources among their values of concern (Sheep Mountain, Little Mountain, and Upper Owl Creek) and expands the Carter Mountain ACEC to include cultural resources. Expansion of the Carter Mountain ACEC would result in the greatest beneficial impacts to cultural resources in relation to other alternatives, particularly Alternative C, under which the BLM does not manage any of the previously mentioned areas as ACECs.

In contrast to Alternative A, under Alternative B, the BLM manages all lands with wilderness characteristics specifically to preserve their wilderness characteristics, which would benefit cultural resources by limiting access and travel, imposing more restrictive VRM, and limiting minerals leasing. The only action in lands with wilderness characteristics that results in direct impacts to cultural resources is the restriction that excavation of cultural resource sites is allowed only where scientific information would be collected under permit, with minimum site disturbance.

Resources

As described for Alternative A, management actions related to other resources have the potential to result in both adverse and beneficial impacts to cultural resources. Measures that protect other resources and that may, in turn, protect cultural resources are similar between alternatives A and B, with slightly more protection under Alternative B.

Impacts from fire and fuels management under Alternative B would be similar to those under Alternative A. However, under Alternative B, the BLM would initiate the second-to-least prescribed fire than among the alternatives; therefore, Alternative B would present less potential for adverse impacts. The same is true for silvicultural treatments and timber harvesting, both of which would occur less frequently under Alternative B, resulting in less potential for adverse impacts.

Wild horse management under Alternative B includes more restrictions to HMAs than under Alternative A, which would have the added beneficial impact of limiting access to remote areas that may contain important cultural resources.

Proactive Management

In addition to the BLM managing cultural resources in accordance with its regulations and federal laws, Alternative B would augment existing plans and add a number of proactive measures. For further

exploration of the Hanson site with the goal of nominating it as a National Historic Landmark, Alternative B would identify and test other deposits of similar age to determine the full extent of Folsom-age deposits. Compared to the Alternative A emphasis on managing rock art and other archeological sites for research and interpretation, and preservation for future study, Alternative B would explicitly avoid surface-disturbing activities and ROW authorizations in view within 5 miles of important cultural sites where integrity of setting is a contributing element of NRHP significance, except within designated utility corridors. In contrast to the case-by-case management approach under Alternative A, Alternative B applies an NSO restriction for leasable minerals within 3 miles and a CSU stipulation in view within 5 miles of important cultural sites, and follows a similar plan for mineral materials disposal. Alternative B identifies exclusion areas for renewable energy development and also imposes visual restrictions, depending on the topography, for sites eligible for the NRHP (including trails) and TCPs; Alternative A does not. On a case-by-case basis, visual restrictions under Alternative B may exceed the 5-mile buffer to avoid adverse impacts to cultural resources, where structures are not screened from the resource by intervening topography.

Under Alternative B, the BLM manages portions of the town of Gebo and adjacent coal mining areas for preservation and interpretation, emphasizing a pedestrian trail rather than a road, thereby reducing access and associated indirect adverse impacts. This alternative also will provide comprehensive information about the site on the BLM website.

Finally, under Alternative B, the BLM limits motorized vehicle use to designated roads and trails on BLM-administered land along the Bighorn Slope, Bridger, Owl Creek, and Absaroka foothills to manage (minimize issues such as looting) for cultural and paleontological resources. Alternative A, which does not restrict motorized vehicle use in these areas to designated roads and trails, provides less protection than Alternative B.

Alternative C

Surface Disturbance

Alternative C allows the most surface disturbance compared to the other alternatives, with the consequence that there would be the greatest potential for disturbance of cultural resources. As with the other alternatives, however, potential adverse impact to cultural resources would be limited through compliance with NHPA Section 106.

Because Alternative C places more emphasis on resource use, there are fewer restrictions on surface-disturbing activities for the protection of other resources (such as soil, water, biological resources, and special designations), so that although there is some additional protection for cultural resources, it is less than under the other alternatives. However, the potential for more surface-disturbing activities under Alternative C also may result in the identification of more cultural resources and their subsequent protection than under any of the other alternatives.

Resource Uses

Actions associated with resource exploration, development, and extraction are the most extensive and would have the greatest adverse impact on cultural resources under Alternative C. For leasable minerals, Alternative C applies an NSO restriction within ¼ mile and a CSU stipulation within 1 mile of important cultural sites. Similarly, there is a prohibition on mineral materials disposal within ¼ mile, or in view within 1 mile of these sites. Under Alternative C, adverse impacts to cultural resources from management of mineral leasing and mineral materials disposal would be similar to those under the other alternatives, although to a greater degree because of the smaller area of restriction around

important cultural sites. Impacts to cultural resources from locatable mineral development would be similar to those described for Alternative A, although to a greater degree because withdrawals are pursued over a smaller area (48,095 acres) than under the other alternatives.

The types of potential impacts due to land exchanges under Alternative C are the same as those for the other alternatives. The survey required for compliance with NHPA Section 106 in the case of either disposal or acquisition would result in a beneficial impact because of data that furthers understanding of cultural resources in the Planning Area. However, more area is identified for disposal and less area is identified for retention than under any other alternative, resulting in the greatest potential for adverse impacts.

Alternative C results in more road and trail construction, thereby accommodating more recreational and other uses in the Planning Area than under the other alternatives, exposing more cultural resources to impacts. For example, managing the Basin Gardens Play Area as open to cross-country motorized travel would expose cultural resources to potential damage caused by off-trail motorized recreation.

Under Alternative C, the types of impacts associated with ROWs and corridors, renewable energy, and recreation would be the same as described for Alternative A, although the intensity would vary; impacts from CTTM would be the same as described for Alternative B. Alternative C is projected to result in the greatest extent of ROWs development, potentially providing the most survey acreage and the most access to previously remote cultural resources. The location of renewable energy development is subject to similar restrictions, but compliance with NHPA Section 106 may impose greater visual restrictions to reduce the visual impact of developments such as wind farms on all types of sites, including sites of importance to Native Americans, NRHP-listed and/or eligible sites, and trails. CTTM designations under Alternative C are similar to Alternative A except that a greater area is open to cross-country motorized travel (14,830 acres compared to 1,311 acres) and a smaller area is closed to travel, which may increase impacts in certain areas under this alternative.

Livestock grazing under Alternative C has the least restrictions and therefore the greatest potential adverse impact.

Special Designations

Under Alternative C, the BLM would not manage the Sheep Mountain, Little Mountain, and Upper Owl Creek areas as ACECs, removing any beneficial impacts to cultural resources from the application of restrictions on surface-disturbing activities specific to these special designations.

Resources

Under Alternative C, management for resources (e.g., soils and special status species) is less restrictive than under the other alternatives, which may result in the greatest impact on cultural resources by increasing resource use and the potential for degradation of cultural resources.

Impacts from fire and fuels management and vegetative treatments would be similar to those for the other alternatives, although there is greater disturbance from prescribed fire under Alternative C than the other alternatives. The same relation is true for forest, woodlands, and forest products.

Wild horse management under Alternative C is similar to alternatives A and D, and applies fewer recreational restrictions that allow more access to HMAs than under Alternative B. Management under this alternative may result in greater access to remote areas, which may put cultural resources at increased risk than under Alternative B.

Proactive Management

Proactive management under Alternative C is closer to that under Alternative B than under Alternative A, reflecting current understanding of the importance of cultural resources and the potential impacts of other management actions. Proactive measures include further exploration of the Hanson site and nearby deposits, although Alternative C does not seek World Heritage nomination. Alternative C also emphasizes management of rock art and other archeological sites for research and interpretation, but imposes the smallest buffer zone, avoiding ROW authorizations in view within ¼ mile of important cultural sites where integrity of setting is a contributing element of NRHP significance, except within designated utility corridors. As previously mentioned, management of mineral leasing and mineral materials disposal under Alternative C results in smaller buffers than under the other alternatives. Alternative C imposes visual restrictions, depending on the topography, within 5 miles of sites eligible for the NRHP and TCPs, and specifies avoidance areas (in contrast to the exclusion areas under Alternative B), unless structures are screened from the site by intervening topography.

Under Alternative C, the BLM manages portions of the town of Gebo similar to alternatives A and D. Alternative C also emphasizes interpretation of historic oil and gas fields, providing interpretive signs in safe viewing areas, which would increase beneficial impacts to these historic resources compared to alternatives A or B. As with Alternative B, Alternative C would restrict motorized vehicle use to designated roads and trails on BLM-administered land along the Bighorn Slope, Bridger, Owl Creek, and Absaroka foothills to minimize issues such as looting.

Alternative D

Surface Disturbance

Although Alternative D allows more surface disturbance than alternatives A or B, it results in approximately half the disturbance of Alternative C (Appendix T); there is more potential to disturb cultural resources under this alternative than under alternatives A or B, but considerably less than under Alternative C. As with the other alternatives, adverse impacts to historic properties would be limited through BLM compliance with NHPA Section 106.

Restrictions on surface-disturbing activities for the protection of other resources (such as soil, water, biological resources, and special designations) would provide additional protection for cultural resources on a level overall greater than under Alternative C, and similar to that under alternatives A and B.

Resource Uses

Impacts from resource exploration, development, and extraction under Alternative D would be similar to impacts under alternatives A and C. Restrictions on mineral leasing and mineral materials disposal are more stringent than under Alternative C, but less restrictive than Alternative B in relation to determining the importance of setting and the use of BMPs to avoid, minimize and/or compensate adverse impacts. As with the other alternatives, withdrawals would benefit cultural resources by prohibiting mineral activities that may degrade or destroy resources. Under Alternative D, withdrawals would be less than under alternatives A and B, but greater than Alternative C.

Under Alternative D, beneficial and adverse impacts from land exchanges are the same as for other alternatives, with beneficial impacts resulting from information gathered through compliance with Section 106 and adverse impacts resulting from the loss of mandatory compliance with NHPA once the land has left public ownership. Alternative D allows disposal on more land than Alternative B, but less

than alternatives A and C; the adverse impacts from disposal under Alternative D also are less than under alternatives A and C and more than under Alternative B.

Linear projects that include ROWs and corridors, renewable energy, CTTM, and recreation can result in similar adverse impacts. Potential adverse impacts from ROWs for road development are similar to impacts under Alternative A, but less than under Alternative C (Appendix T). Managing more area as ROW avoidance or exclusion areas than under Alternative A may consolidate ROWs and limit adverse impacts to cultural resources to a greater extent. However, the affected area from open cross-country motorized travel under Alternative D is greater than under alternatives A or B, and approximately half that under Alternative C. CTTM designations under Alternative D are similar to Alternative A, but limiting off-road travel (OHV and mountain bike) to within 300 feet of established roads and trails would limit route proliferation and associated impacts to cultural resources. Additionally, management under Alternative D limits motorized vehicle use to existing roads and trails along the Bighorn Slope, Bridger, Owl Creek and Absaroka foothills. As for alternatives B and C, management of these areas is designed to minimize looting and facilitate management of cultural resources; however, management of motorized travel in these areas under Alternative D is less restrictive than under alternatives B and C and would result in fewer beneficial impacts to cultural resources.

Under Alternative D, impacts from livestock grazing would be similar to those under Alternative A, with management focused on maximizing multiple use while requiring buffer zones and managing livestock grazing to support other resource uses. Furthermore, Alternative D would mitigate new resource uses to minimize or avoid conflicts with livestock grazing where appropriate. Alternative D presents more potential for adverse impacts than Alternative B because of the much smaller area closed to livestock grazing and greater reliance on case-by-case evaluations of impacts.

Special Designations

As for Alternative A, under Alternative D, the BLM would manage the Sheep Mountain Anticline, Little Mountain, and Upper Owl Creek areas as ACECs for their cultural values (among other values), and would manage the Little Mountain ACEC expansion area discussed for Alternative B as the Craig Thomas Little Mountain SMA. Unlike Alternative B, Alternative D would not expand the Carter Mountain ACEC. Management of these areas as ACECs or SMAs provides additional protection for cultural resources and reduces the potential for adverse impacts.

Resources

Fire and fuels management under Alternative D is similar to that under Alternative A and provides fewer restrictions than Alternative B. Prescribed fire would be implemented on approximately 40,000 acres in the Planning Area over the life of the plan.

Wild horse management under Alternative D is similar to that proposed under Alternative B. Alternative D promotes public viewing and education, similar to Alternative C. However, compared to Alternative C, Alternative D limits access and SRPs to some areas, providing additional protection to remote areas that may contain important cultural resources.

Proactive Management

As with alternatives B and C, Alternative D proactively recognizes the current understanding of cultural resources management practices. Proactive measures are a mix of alternatives A, B, and C. The BLM would investigate and nominate the Hanson site as a National Historic Landmark, but would not pursue World Heritage nomination. Rock art and other prehistoric and historic sites and districts are managed for scientific, public and sociocultural use, and research and preservation for future study and use.

Known important cultural sites are protected from surface-disturbing activities. For resources where setting is important to the site's integrity, the site's foreground is to be avoided (in contrast to prohibited under Alternative B) with buffers that may be up to 3 miles wide or the visual horizon, whichever is closer (the setting consideration zones). This buffer is smaller than the buffer under Alternative B, but larger than the buffers under alternatives A and C, and applies to mineral leasing and mineral materials disposal actions for all site types (e.g., trails, sites eligible for the NRHP, and TCP). In addition, implementing BMPs would avoid, minimize and/or compensate adverse effects.

Alternative D management of historic resources in oil and gas fields is the same as Alternative C, including the installation of interpretive signs. Under Alternative D, the BLM would manage the town of Gebo and adjacent coal mining areas as it would under Alternative A.

Alternative E

Surface Disturbance

Any action resulting in the disturbance of culture-bearing strata from surface or subsurface disturbances may impact cultural resources. Among all the alternatives, Alternative E would result in a similar, though slightly reduced, amount of surface and subsurface disturbances to Alternative B; the type of impacts would be the same as Alternative A, and the magnitude of adverse impacts would be similar to Alternative B.

Alternative E provides the same restrictions on surface-disturbing activities as Alternative B, except in greater sage-grouse Key Habitat Areas, where Alternative E further restricts allowable disturbances compared to that alternative. Alternative E provides the overall greatest protection for cultural resources. Conversely, because less surface disturbance would occur under Alternative E, fewer cultural resource surveys would occur during Section 106 consultation and the benefits gained from additional surveys in the Planning Area would be lowest under this alternative.

Resource Uses

Management of activities associated with mineral resource exploration, development, and extraction that could result in long-term impacts to cultural resources under Alternative E would be similar to Alternative B. Impacts from mineral resource exploitation under Alternative E would therefore be similar to Alternative B, except within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), where locatable withdrawals and closure to mineral materials disposal would reduce the area available for mineral exploitation to a greater extent than under any other alternative.

The types of impacts associated with ROWs and renewable energy development under Alternative E would be the same as Alternative A, but to a lesser extent. Alternative E includes the largest ROW and renewable energy exclusion areas (1,322,879 acres and 1,945,204 acres, respectively) of any alternative, which limits the potential for impacts on cultural resources from ROW development across a large portion of the Planning Area. However, the BLM anticipates that even with these additional restrictions, ROWs across BLM-administered land would be approved at the same rate as Alternative B, and impacts would be similar to Alternative B.

Areas available for land tenure adjustments, CTTM, recreation, and livestock grazing management outside greater sage-grouse Key Habitat Areas under Alternative E are the same as Alternative B, and therefore, potential impacts to cultural resources would be the same as Alternative B in these areas.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), is the same as Alternative B, and impacts would be similar to Alternative B. Due to the size and additional restrictions on surface-disturbing activities and resource uses (e.g., the mineral development and CTTM management described under Resource Uses above) applied for the Greater Sage-Grouse Key Habitat Areas ACEC, special designation management under Alternative E would result in additional protection for cultural resources compared to the other alternatives.

Resources

As described for Alternative A, management actions for resources have the potential to result in both adverse and beneficial impacts to cultural resources. Measures that protect other resources and that may, in turn, protect cultural resources are similar under all alternatives, with slightly more protection under Alternative E than under the other alternatives. In particular, management actions restricting resource use in the Greater Sage-Grouse Key Habitat Areas ACEC would provide additional protection for cultural resources compared to the other alternatives.

Fire and fuels management under Alternative E would result in similar, though slightly reduced, surface disturbance from prescribed fire as Alternative B. Impacts from fire and fuels management and silvicultural and other vegetation treatments would be similar to Alternative A, and the magnitude of impacts would be similar to Alternative B.

Wild horse management under Alternative E is the same as Alternative B, and impacts to cultural resources would be the same as Alternative B.

Proactive Management

Under Alternative E, cultural resources would be managed in the same manner as Alternative B and would result in the same beneficial impacts as Alternative B.

Alternative F

Surface Disturbance

Any action resulting in the disturbance of culture-bearing strata from surface or subsurface disturbances may impact cultural resources. Alternative F would result in a similar, though slightly reduced, amount of surface and subsurface disturbances as Alternative D. The type of impacts would be the same as Alternative A, and the magnitude of adverse impacts would be similar to Alternative D, less than under Alternative C, and more than under alternatives A, B, and E.

Under Alternative F, restrictions on surface-disturbing activities for the protection of other resources (such as soil, water, biological resources, and special designations) are the same as Alternative D, except for areas within the Greater Sage-Grouse PHMAs ACEC, where additional restrictions to protect greater sage-grouse would apply. Impacts to cultural resources from surface-disturbing activities would be the same as Alternative D, but to a lesser extent due to these additional restrictions on surface disturbance.

Resource Uses

Management for activities associated with mineral resource exploration, development, and extraction that could result in long-term impacts to cultural resources would be similar to Alternative D. Impacts from mineral exploitation would therefore be similar in type and magnitude to Alternative D, except within greater sage-grouse PHMAs (1,232,583 acres), where an NSO restriction around occupied greater sage-grouse leks would provide additional protection from surface disturbance for cultural resources.

Under Alternative F, areas available for land tenure adjustments, recreational management, and livestock grazing management are the same as Alternative D, and the impacts on cultural resources would be the same as Alternative D.

CTTM practices under Alternative F would be the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC, where motorized vehicle use would be limited to designated roads and trails. CTTM and recreation management under Alternative F would provide greater protections for cultural resources than under alternatives A, C, and D, but fewer protections than under alternatives B and E.

Special Designations

Management of special designations under Alternative F, except in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres), is the same as Alternative D, and impacts would be similar to Alternative D. Due to the relative size and additional restrictions on surface-disturbing activities and resource uses (e.g., the mineral development and CTTM management described under Resource Uses above) applied for the Greater Sage-Grouse PHMAs ACEC under Alternative F, special designation management would result in greater protections for cultural resources in comparison to alternatives A, C, and D, but fewer than under alternatives B and E.

Resources

Management actions for managing other resources have the potential to result in both adverse and beneficial impacts to cultural resources. Measures that protect other resources and that may, in turn, protect cultural resources are similar under all alternatives; effects from these protections under Alternative F would be similar to Alternative D.

Disturbance from fire and fuels management, and silvicultural and other vegetation treatments under Alternative F would be similar to Alternative D, and effects on cultural resources would be similar to Alternative D.

Wild horse management under Alternative F is the same as Alternative D, and impacts to cultural resources would be the same as Alternative D.

Proactive Management

Under Alternative F, cultural resources would be managed in the same manner as Alternative D and would result in the same beneficial impacts as described in Alternative D.

4.5.2 Paleontological Resources

The widespread presence of paleontological resources throughout the Planning Area and their close spatial association with extractive resources present a number of management challenges. Adverse impacts to paleontological resources result from management actions that damage or destroy fossils or their context. Any surface-disturbing activities in an area that contain fossils may result in adverse impacts through disturbance of important paleontological resources. Direct impacts to paleontological resources from RMP alternatives may result from actions that physically alter, damage, or destroy fossils or their context. It is important to remember that trace fossils, exemplified by dinosaur tracks such as those at the Red Gulch Tracksite, are as important as body fossils, and can also be affected by surface-disturbing activities. In fact, the rarity of trace fossils underscores the potential adverse impact from surface disturbance. Indirect impacts may arise as a result of ancillary actions, such as when a construction road provides improved access to sensitive areas, possibly resulting in increased vandalism or unauthorized or unintentional collecting. Paradoxically, the same actions that can result in direct or

indirect adverse impacts from increased public access and awareness may also have beneficial impacts. The discovery of previously unknown deposits or the facilitation of data collection, preservation, or public education are possible beneficial impacts.

There is little difference between short-term and long-term impacts to paleontological resources; once the resource is disturbed, it cannot be restored because it is unique and not renewable. However, the situation is more complicated for indirect impacts. Because some paleontological resources are in inaccessible areas, it is possible that a short-term, direct impact would indirectly lead to a long-term beneficial impact. For example, a road that improves access but leads to vandalism in the short term may also, in the long term, make study of the resource more feasible. Similarly, surface disturbance that exposes or destroys part of an important deposit would simultaneously bring new resources to light, thereby enhancing scientific knowledge.

4.5.2.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Vertebrate and other scientifically important paleontological resources will continue to be found in the Planning Area.
- Adverse impacts to paleontological resources occur from physical damage or destruction of fossils, from loss of related scientific data, including context and stratigraphic control, and potentially due to transfer from public ownership.
- Adverse impacts to paleontological resources from surface-disturbing activities occur primarily at the time of initial surface disturbance. Therefore, it is valid to use the projected numbers for short-term surface disturbance to quantify impacts to paleontological resources. Erosion resulting from long-term surface disturbance also can adversely impact paleontological resources, but generally not to the extent of short-term surface disturbance.
- Development activities over the life of the RMP are anticipated to be similar in intensity to the intensity represented by surface-disturbance acres identified in Appendix T.
- Inventories required before surface disturbance in high-probability areas would result in the identification and evaluation of previously undiscovered resources, which the BLM would then manage accordingly. Surface-disturbing and other disruptive activities also may dislocate or damage paleontological resources that were not discovered before surface disturbance (i.e., unanticipated discoveries). In some cases, surface-disturbing activities, along with avoidance or full mitigation, can benefit the resource.
- The number and types of paleontological resources that could be affected by various actions directly correlate to the degree, nature, and quantity of surface-disturbing activities in the Planning Area.
- Paleontological resources at the surface are most typically associated with bedrock exposures. Areas of deep soils, alluvium, or colluvium only rarely contain scientifically significant fossils. Therefore, the main areas of concern for impacts to paleontological resources are where fossil-bearing bedrock is at or near the surface, such as badlands, along structural uplifts, hill slopes, or in areas with thin soils over bedrock.

4.5.2.2 Summary of Impacts by Alternative

The principal direct impacts to paleontological resources would result from surface-disturbing activities, while indirect adverse impacts would result from increased access to important paleontological locations that lead to overuse, increased legal and illegal collecting, and vandalism. Conversely, all of these adverse impacts may also lead to beneficial impacts as new deposits are located, educational opportunities arise, and research programs are instituted. Proactive paleontological resource management actions result in beneficial impacts across all alternatives. Furthermore, compliance with the Paleontological Resources Preservation Act (PRPA) and BLM PRPA guidance would limit adverse impacts and maximize beneficial impacts. The PRPA provides for criminal and civil penalties for theft and vandalism of fossils on public land. Other resource uses are, by law, required to minimize impacts to paleontological resources from vandalism and theft and maintain the confidentiality of resource locations.

Alternative E, by designating eight ACECs (116,720 acres) for paleontological resources as well as the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), and subjecting the least total acreage to surface-disturbing activities, would have the least adverse impacts and most resource protection compared to the other alternatives. Alternative C provides the least protection and the greatest exposure to direct impacts from surface-disturbing activities, but may result in more identification of paleontological localities due to increased resource use. In terms of potential impacts, management under alternatives D and F fall between management under alternatives A and B, in that alternatives D and F employ a less proactive management approach than Alternative B, but a similar approach to casual use and education.

4.5.2.3 Detailed Analysis of Alternatives

Allowable uses and management actions that impact paleontological resources include all surface-disturbing activities, changes in ownership, visitor accessibility, motorized vehicle use, and proactive paleontological resource management actions.

Impacts Common to All Alternatives

Potential impacts to paleontological resources as a result of other resource management actions are similar, although the intensity varies across alternatives. For all alternatives, impacts may stem from any surface-disturbing activity in an area where fossils are known or found to be present.

Similarly, paleontological resources would experience beneficial impacts from proactive management actions common to all alternatives. Although the degree of protection may vary by alternative, the goals of such management are the same for each alternative. For example, positive interaction with the public to prevent illegal activities and project reviews to avoid scientifically important paleontological resource sites are management priorities that result in beneficial impacts. The latter action will allow the avoidance of surface-disturbing activities that could damage or destroy significant paleontological resources on BLM-administered land, including resources listed in National Park Service inventories of possible National Natural Landmarks. Other proactive, beneficial impacts across all alternatives come from balancing restrictions on access to newly discovered paleontological resources with opportunities for the public to collect fossils in a limited, recreational manner. This is accomplished through the management of scientifically significant paleontological resources for scientific and public use.

The recently enacted PRPA provides a new level of protection for paleontological resources (see Section 3.5.2 *Paleontological Resources* in Chapter 3). The interface of this law with BLM guidance is under

development, and it remains to be seen specifically how it will affect the management of paleontological resources under BLM jurisdiction.

Brown/Howe Dinosaur Area ACEC, which the BLM manages for its paleontological resources, appears under all alternatives. The management of and impacts from the management of this and other ACECs that include paleontological resources is mentioned in this section, but discussed in detail in Section 4.7.1 *Areas of Critical Environmental Concern*.

Alternative A

Surface Disturbance

Under Alternative A, surface-disturbing activities may result in impacts to paleontological resources. The BLM anticipates that impacts to paleontological resources from surface disturbance under Alternative A (see Appendix T) would be primarily adverse. However, required resource identification through on-the-ground survey of PFYC 4 and 5 before surface-disturbing activity will identify resources, and may mitigate adverse impacts, possibly resulting in data collection or preservation of paleontological resources, which would result in a beneficial impact. PFYC 3 may or may not require a survey prior to approval of a surface-disturbing activity. Once a paleontological locality is identified, Alternative A requires a 50-foot-wide buffer to preclude any surface-disturbing activities from damaging the locality.

Restrictions on surface-disturbing activities for the protection of other resources (such as soil, water, biological resources, and special designations) under Alternative A may provide additional protection for paleontological resources, because management that limits the potential for disturbance would result in beneficial impacts.

Resource Uses

Exploration for and development of locatable minerals, leasable minerals, and mineral materials would result in adverse impacts. Impacts would be direct, if exploration for or development led to disturbance of the paleontological resource, or indirect, if a road or other associated activity improved access to an otherwise inaccessible locale. However, mineral exploration or development activity also would lead to beneficial impacts, because discovery, improved access, and avoidance would eventually result in the opportunity to study previously unknown fossils and to educate the public.

Management actions associated with lands and realty would result in adverse and beneficial impacts. The BLM anticipates potential beneficial impacts under Alternative A, wherein the acquisition and retention of lands with significant paleontological resources is to be considered, but is not pursued as an active management strategy. However, if lands with important paleontological resources are disposed of and leave federal management, there may be adverse impacts because these areas would no longer be subject to the PRPA and other federal laws and regulations designed to protect these resources.

Impacts from linear resource uses (e.g., ROWs, corridors, and road development) and renewable energy development are similar, and may result in direct adverse impacts from surface disturbance associated with development. Indirect impacts arise from increased accessibility and resulting increased recreation use provided by the corridors and associated development. These activities may result in beneficial impacts if the development results in the discovery of resources or research and educational opportunities.

Off-road motorized vehicle use on public lands has the potential to directly and indirectly affect paleontological resources. Direct impacts occur when vehicles run over exposed fossils on a trail;

indirect impacts result from accelerated erosion and degradation due to exposure. In addition, off-road motorized vehicle use enables access to remote paleontological localities, and would increase opportunities for theft and vandalism. While there may be adverse impacts due to off-road or inappropriate use of motorized vehicles under any circumstances, restricting motorized vehicle use in certain areas would provide some protection for sensitive resources. The BLM anticipates that Alternative A would result in disturbance associated with motorized vehicle use, which would have the potential to adversely affect paleontological resources in areas such as the Bighorn Slope, Bridger, Owl Creek, and Absaroka foothills. Recreation would result in adverse and beneficial impacts to paleontological resources. Increased use of the Planning Area and an increase in the number of recreational collection permits would increase the potential for damage to paleontological resources; an increase in opportunities to improve education and paleontological interpretation would benefit the resources.

Special Designations

Under Alternative A, the BLM manages four ACECs, including the Brown/Howe Dinosaur Area ACEC, for their paleontological resources. For the Little Mountain ACEC, management would emphasize avoidance of sensitive areas, provide some restrictions for mineral development, and pursue withdrawal from appropriation under the mining laws in limited areas within the ACEC. Under Alternative A, the BLM also manages the Red Gulch Dinosaur Tracksite and Big Cedar Ridge areas as ACECs, limiting surface disturbance and providing other protections to paleontological resources in these areas.

Resources

The BLM anticipates surface disturbance associated with prescribed fire and mechanical fuels treatment under Alternative A. Actions related to fire and fuels management may result in adverse impacts to paleontological resources. Construction of fire breaks can cause surface disturbance, which may damage or destroy important fossils. However, there may also be beneficial impacts if the disturbance exposes previously unknown resources or improves access for study. Surface disturbance related to fire and fuels management would result in fewer impacts to paleontological resources than other types of surface disturbance, because it is less likely to penetrate deeply into strata that contain important resources.

Proactive Management

Under Alternative A, management actions that aid in the identification and preservation of scientifically important fossils include attachment of standard Paleontological Resources Protection Stipulations to surface-disturbing activities on PFYC 3, 4, or 5; retention and acquisition of lands for significant paleontological resources (although this is on a case-by-case basis); and development of additional interpretive areas. Under Alternative A, development of interpretive areas at informational locations is on a case-by-case basis. Surface disturbance associated with development of the interpretive area may result in adverse impacts to the paleontological resources. However, the public would benefit from development of this educational exhibit. Potential impacts from this management illustrate the dichotomy between the adverse impacts of direct disturbance and increased access, and the beneficial impacts of education and discovery.

Alternative A also includes several management actions, all of which are applied on a case-by-case basis, designed to protect paleontological resources from actions not related to resource use, such as theft and vandalism. These management actions include closing areas with vertebrate or other scientifically significant paleontological resources at risk for damage from illegal activities and implementing on-the-

ground surveys before surface disturbance or land disposal actions for all PFYC 4 and 5 formations, while PFYC 3 formations may or may not require a survey prior to approval of these actions.

Alternative B

Surface Disturbance

Alternative B includes fewer acres subject to surface-disturbing activities than Alternative A. Therefore, surface disturbance under this alternative would result in the less impact to paleontological resources. Similar to Alternative A, impacts to paleontological resources from surface disturbance projected for Alternative B may be primarily adverse. However, an increase in resource identification due to on-the-ground surveys of PFYC 3 through 5 before surface-disturbing activity would result in a beneficial impact because it would identify more resources, and may mitigate adverse impacts or result in data collection and preservation of paleontological resources. Alternative B also requires a 100-foot–wide buffer around paleontological localities to preclude any surface-disturbing activities, providing greater protection than the other alternatives.

Alternative B includes more restrictions on surface-disturbing activities for the protection of other resources, thereby resulting in more beneficial impacts than Alternative A.

Resource Uses

As with Alternative A, exploration for and development of locatable minerals, leasable minerals, and mineral materials are likely to result in direct and indirect adverse impacts from disturbance and improved access. However, because Alternative B would result in less surface disturbance associated with minerals development, it also would result in fewer impacts to paleontological resources compared to Alternative A. Making greater sage-grouse Key Habitat Areas closed to mineral leasing would result in indirect beneficial impacts by limiting the potential degradation of paleontological resources in these areas.

Management actions associated with lands and realty would result in adverse and beneficial impacts. Actively pursuing the acquisition and retention of lands with significant paleontological resources under Alternative B would result in greater beneficial impacts than Alternative A, under which acquisition and retention of lands with significant paleontological resources is only considered.

Impacts from ROW-related actions and renewable-energy resource development would be less under Alternative B than under Alternative A. Impacts from trails management and recreation under Alternative B would be similar to those under Alternative A, but to a lesser degree. Alternative B is projected to result in more surface disturbance from cross-country motorized travel in small, localized areas than Alternative A (Appendix T), but limits motorized vehicle use to designated roads and trails and closes more area to motorized vehicle use in the Planning Area. Limiting motorized vehicle use to designated roads and trails in the Bighorn Slope, Bridger, Owl Creek, and Absaroka foothills, and the Absaroka Front Management Area (partially closed to motorized vehicle use) would reduce potential disturbance and restrict access, thus decreasing the risk of looting. As with the other alternatives, the potential for beneficial impacts through discovery and subsequent research and educational opportunities would remain.

Special Designations

Alternative B designates eight ACECs for paleontological resources and increases the size of several existing ACECs. For the Little Mountain ACEC, management under Alternative B is similar to Alternative A, with the addition of an expansion area. The Brown/Howe Dinosaur Area ACEC is maintained across

all alternatives, but under Alternative B it would be closed to mineral leasing, managed as ROW avoidance, and the BLM pursues a withdrawal from appropriations under the mining laws. For the Red Gulch Dinosaur Tracksite and Big Cedar Ridge ACECs, management under Alternative B would be the same as under Alternative A. Alternative B also would add four ACECs with paleontological resources – Clarks Fork Basin/Polecat Bench West Paleontological Area, McCullough Peaks South Paleontological Area, Foster Gulch Paleontological Area, and Rainbow Canyon Paleontological Area. Section 4.7.1 *Areas of Critical Environmental Concern* further discusses the management of and impacts from ACECs.

Resources

Actions related to fire and fuels management are anticipated to have an adverse impact on paleontological resources. Projected impacts are less under Alternative B than under Alternative A.

Proactive Management

Proactive management under Alternative B provides greater protection for paleontological resources than Alternative A. This management includes protection for PFYC below 4 and 5, larger buffer zones around important paleontological discoveries and sites, and prohibitions on surface disturbance. Alternative B also provides more protection for vertebrate or other scientifically significant paleontological resources from actions related to non-resource use (e.g., theft and vandalism) compared to Alternative A through the use of measures such as increased law enforcement and resource specialist presence in areas of high resource values and posting additional signs warning against illegal collection. Alternative B also includes management actions requiring the BLM to pursue opportunities to acquire private lands with vertebrate or other scientifically significant paleontological resources, actively solicit paleontological research, and sponsor data sharing and symposia. While management under Alternative B designates areas for casual use and collection of certain fossil types, it also seeks to minimize the development of interpretive areas in the Planning Area.

Alternative C

Surface Disturbance

The BLM anticipates that Alternative C would result in the most short-term and long-term surface disturbance. Therefore, this alternative would result in the most adverse impacts to paleontological resources of any alternative. Projected impacts to paleontological resources from surface disturbance under Alternative C (Appendix T) are anticipated to be similar to those described for Alternative B, although to a greater extent and intensity. The BLM requires on-the-ground surveys before it approves surface-disturbing activities, and monitoring of surface-disturbing activities in PFYC 5 formations, which would provide some mitigation of adverse impacts and may result in beneficial data collection or the preservation of paleontological resources.

As with the other alternatives, restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations) would protect paleontological resources, although the more limited nature of these protections under Alternative C would result in the least additional protection of any alternative.

Resource Uses

Impact from the exploration for and development of locatable minerals, leasable minerals and mineral materials would be greater under Alternative C than the other alternatives due to more projected surface disturbance. Monitoring is only provided for actions in PFYC 5, and standard Paleontological Resources Protection Stipulations are only attached to surface-disturbing activities in PFYC 4 or 5. Once

a paleontological locality is identified, Alternative C requires a 50-foot-wide buffer, as does Alternative A. As with the other alternatives, resource use may also have a beneficial impact if discovery, improved access, and avoidance lead to the opportunity to study previously unknown fossils and to educate the public.

Management actions associated with lands and realty would result in adverse and beneficial impacts. The potential beneficial impact is similar to that under Alternative B, under which the BLM retains lands with important paleontological resources. However, under Alternative C, there would be no beneficial impacts from acquisition of lands with significant paleontological resources, as described for Alternative B.

Impacts from linear resource uses such as ROWs, corridors, and roads, and from renewable-energy resource development, would be greatest under Alternative C. Management under Alternative C includes relatively few restrictions on ROW development and associated surface-disturbing activities, increasing the chance of direct and indirect impacts to paleontological resources. However, although the area affected by this management is larger under Alternative C, it is not likely that the corresponding beneficial impact also would be larger, because the magnitude of the increased use would probably not be balanced by a corresponding beneficial gain in knowledge and resource discovery. A similar adverse-to-beneficial impact imbalance would occur in the management of recreation and motorized vehicle use, because the magnitude of the increase in visits and traffic may outweigh the increase in knowledge gained. Restricting motorized vehicle use to designated roads and trails in the Bighorn Slope, Bridger, Owl Creek, and Absaroka foothills and the Absaroka Front Management Area would result in similar impacts to those under Alternative B.

Special Designations

Special designations under Alternative C would result in the least overall beneficial impact to paleontological resources. Alternative C does not designate any ACECs with paleontological resources other than the Brown/Howe Dinosaur ACEC, which is designated under all alternatives. Paleontological resources in the Little Mountain, Red Gulch Dinosaur Tracksite, Big Cedar Ridge and other areas designated as ACECs under the other alternatives would be at a higher risk of degradation under Alternative C.

Resources

The area potentially affected by management of fire and fuels under Alternative C is projected to be twice that of Alternative A, and therefore likely to result in more adverse impacts to paleontological resources. Although beneficial impacts also are possible, the increased potential for adverse impacts would outweigh the benefits.

Proactive Management

Under Alternative C, some current management practices would continue. However, focus would shift to reactive investigations, such as implementation of the PFYC system for permits exceeding 5 acres and survey and monitoring in PFYC 5 formations. The BLM attaches Standard Paleontological Resources Protection Stipulations to authorization of surface-disturbing activities only for PFYC 4 or 5. Protection of significant paleontological resources from theft and vandalism would be the same as for Alternative A, resulting in similar beneficial impacts. As for alternatives B and D, under Alternative C the BLM retains public ownership of lands with important paleontological resources, but does not seek to acquire additional lands with important fossils. Under Alternative C, the BLM actively develops paleontological interpretive areas where scientifically significant paleontological resources are known to occur, resulting in impacts similar to those described for Alternative A, although to a greater degree.

Alternative D

Surface Disturbance

The BLM anticipates that Alternative D would result in slightly more surface disturbance and associated adverse and beneficial impacts to paleontological resources than Alternative A. However, the amount of surface disturbance varies by resource use, and certain resource uses that adversely affect paleontological resources (e.g., mineral development) would be similar to or disturb less area than Alternative A. New roads and trails, primarily associated with user-pioneered routes in areas designated as open to cross-country motorized travel, are anticipated to result in the largest increase in surface disturbance under Alternative D. Before surface-disturbing activity, on-the-ground surveys of all PFYC 4 and 5 will be performed, which would identify resources and may mitigate adverse impacts. PFYC 3 may or may not require a survey prior to approval of a surface-disturbing activity. This management also may result in beneficial impacts to data collection or preservation of paleontological resources, which would result in a beneficial impact. Surface-disturbing activities are allowed within at least 100 feet of the outer edge of a paleontological locality if the impacts can be adequately mitigated, in contrast to the other alternatives, which prohibit surface-disturbing activity within a certain buffer width of a paleontological locality.

Resource Uses

Minerals development under Alternative D would result in impacts similar to but slightly less than Alternative A, resulting in fewer impacts to paleontological resources. Limitations on mineral leasing in Key Habitat Areas for species such as greater sage-grouse would result in indirect beneficial impacts by limiting potential degradation of paleontological resources in those areas.

Under Alternative D, management actions associated with lands and realty are the same as under Alternative B, including the retention of BLM-administered land with significant paleontological resources and the pursuit of acquisition of private lands with such resources. Impacts from ROW-related actions and renewable-energy resource development would be similar to those described for Alternative A, though to a lesser degree.

Impacts from trails management and recreation under Alternative D would be more than under alternatives A and B, but less than under Alternative C. Alternative D is projected to result in more surface disturbance from cross-country motorized travel in small, localized areas than alternatives A and B (Appendix T). CTTM designations under Alternative D are similar to those under Alternative A, but limiting off-road travel (OHV and mountain bike) for big-game retrieval to within 300 feet of roads would limit route proliferation and the associated impacts to paleontological resources. As with Alternative B, limiting motorized vehicle use to designated roads and trails in the Bighorn Slope, Bridger, Owl Creek, and Absaroka foothills, and the Absaroka Front Management Area (partially closed to motorized vehicle use) would limit potential disturbance and restrict access to decrease the risk of looting. As with the other alternatives, there would be a potential under Alternative D for beneficial impacts through discovery and subsequent research and educational opportunities.

Special Designations

Under Alternative D, the BLM would manage four areas as ACECs for paleontological resources. For the Little Mountain ACEC, management is similar to Alternative A, but with portions managed as closed to oil and gas leasing. The BLM would manage the Brown/Howe Dinosaur Area ACEC under all alternatives, but under Alternative D would manage it as VRM Class III, allow minor ROW authorizations and other minor surface-disturbing activities following on-the-ground surveys before approving such activities or land disposal activities, and monitor surface-disturbing activities for PFYC 4 and 5 formations. For the

Red Gulch Dinosaur Tracksite and Big Cedar Ridge ACECs, management under Alternative D is the same as under Alternative A. The Rainbow Canyon Paleontological Area, proposed under Alternative B, is not managed under Alternative D, and the beneficial impacts from BLM management described for Alternative B would not occur. Three areas proposed under Alternative B – Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch Paleontological Area, and McCullough Peaks South Paleontological Area – are not designated as ACECs, but part of all three of these areas lie within the proposed PETM ACEC, which is only designated under alternatives D and F. Section 4.7.1 *Areas of Critical Environmental Concern* further discusses management of and impacts from these special designations.

Resources

Under Alternative D, actions related to fire and fuels management would result in similar adverse impacts to paleontological resources as for Alternative A.

Proactive Management

Proactive management under Alternative D most resembles Alternative A, with fewer proactive actions than Alternative B. Differences from Alternative A include attaching Standard Paleontological Resources Protection Stipulations to authorization of surface-disturbing activities in PFYC 1 through 5; allowing surface-disturbing activities within at least a 100-foot-wide buffer of the outer edge of a paleontological locality as long as impacts can be adequately mitigated; encouraging research (in contrast to providing opportunities for research).

Alternative E

Surface Disturbance

Among all the alternatives, Alternative E would result in a similar, though slightly reduced, amount of surface and subsurface disturbances to Alternative B; the type of impacts would be the same as Alternative A, and the magnitude of adverse impacts would be similar to Alternative B. When compared to the other alternatives, Alternative E provides the most restrictions on surface-disturbing activities and allows for the greatest protection of other resources, which may subsequently provide additional protection from disturbance for paleontological resources. In particular, Alternative E manages greater sage-grouse Key Habitat Areas to minimize anthropogenic disturbances, resulting in the fewest acres of disturbance and fewest impacts to paleontological resources.

Resource Uses

Management of activities associated with mineral resource exploration, development, and extraction that could result in impacts to paleontological resources under Alternative E would be similar to Alternative B. Impacts from mineral resource exploitation under Alternative E would therefore be similar in type and magnitude to Alternative B, except within the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres) where locatable withdrawals and closure to mineral materials disposal would reduce mineral exploitation to a greater extent than under any other alternative.

Under Alternative E, management actions associated with lands and realty would result in the same adverse and beneficial impacts as Alternative B, except in the Greater Sage-Grouse Key Habitat Areas ACEC. Due to the additional lands and realty restrictions of Alternative E (e.g., retain public ownership of Key Habitat Areas), the greatest benefit to paleontological resources would result when compared to the other alternatives. The least benefit would be under Alternative A, under which acquisition and

retention of lands with significant paleontological resources is only considered and, lastly, under Alternative C, under which no acquisition of private lands is planned.

Impacts from ROW-related actions and renewable-energy resource development would be fewer under Alternative E than the other alternatives. Under Alternative E, the Greater Sage-Grouse Key Habitat Areas ACEC would be managed as a ROW and renewable energy exclusion area, resulting in less surface disturbance from potential renewable developments when compared to Alternative B. However, the BLM anticipates that even with these additional restrictions, ROWs across BLM-administered land would be approved at the same rate as Alternative B, and impacts would be similar to Alternative B.

CTTM under Alternative E would be the same as Alternative B, and therefore, potential impacts to paleontological resources would be the same as Alternative B. As with the other alternatives, the potential for beneficial impacts through discovery and subsequent research and educational opportunities would remain.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), would be the same as Alternative B, and impacts would be similar to Alternative B. Due to the relative size and additional restrictions on surface-disturbing activities and resource uses (e.g., the mineral development and CTTM management described under Resource Uses above) applied for the Greater Sage-Grouse Key Habitat Areas ACEC, special designation management under Alternative E would result in additional protection for paleontological resources in comparison to the other alternatives.

Resources

Fire and fuels management under Alternative E is projected to result in similar, though slightly reduced, surface disturbance from fuels treatment and prescribed fire as Alternative B; impacts would be similar to Alternative A, and the magnitude of impacts would be similar to Alternative B.

Proactive Management

The management of paleontological resources under Alternative E is the same as Alternative B, and the type and magnitude of impacts to paleontological resources would be the same as Alternative B.

Alternative F

Surface Disturbance

Surface disturbances and associated adverse impacts to paleontological resources under Alternative F would be similar, though slightly reduced, to Alternative D. Under Alternative F, restrictions on surface-disturbing activities for the protection of other resources (such as soil, water, biological resources, and special designations) are the same as Alternative D, except for areas within the Greater Sage-Grouse PHMAs ACEC, where additional restrictions to protect greater sage-grouse would apply. Impacts to paleontological resources from surface-disturbing activities would be the same as Alternative A, but to a lesser extent due to these additional restrictions on surface disturbance.

Resource Uses

Management for activities associated with mineral resource exploration, development, and extraction that could result in long-term impacts to cultural resources is similar to Alternative D. Impacts from mineral exploitation would be the same as Alternative D, except within the Greater Sage-Grouse PHMAs

ACEC (1,116,698 acres), where an NSO restriction around occupied greater sage-grouse leks would provide additional protection from surface disturbance for paleontological resources.

Under Alternative F, areas available for land tenure adjustments, recreational management, and livestock grazing management are the same as Alternative D, and the impacts on paleontological resources would be the same as Alternative D.

CTTM practices under Alternative F would be the same as Alternative D, except within the Greater Sage-Grouse PHMAs ACEC, where motorized vehicle use would be limited to designated roads within priority sage-grouse habitat. CTTM and recreation management under Alternative F would provide greater protections for paleontological resources than under alternatives A, C, and D, but fewer protections than under alternatives B and E.

Special Designations

Management of special designations under Alternative F, except in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres), is the same as Alternative D, and impacts would be similar to Alternative D. Due to the relative size and additional restrictions on surface-disturbing activities and resource uses (e.g., the mineral development and CTTM management described under Resource Uses above) applied for the Greater Sage-Grouse PHMAs ACEC under Alternative F, special designation management would result in greater protections for paleontological resources in comparison to alternatives A, C, and D, but fewer than under alternatives B and E.

Resources

Disturbance from fire and fuels management and prescribed fire under Alternative F would be similar to Alternative D, and effects on paleontological resources would be similar to Alternative D.

Proactive Management

The management of paleontological resources under Alternative F is the same as Alternative D, and the type and magnitude of impacts to paleontological resources would be the same as Alternative D.

4.5.3 Visual Resources

Adverse impacts result from projects that create visual contrast with the natural form, line, color, or texture of the landscape to the extent that it degrades the visual values of an area, which are documented in the visual resource inventory (see Chapter 3 and Appendix X, *Visual Resource Inventory*). The visual values recorded in the visual inventory form the baseline assessment of the quality of the visual landscape against which impacts from changes in management proposed under the management alternatives are measured. Adverse impacts can occur regardless of whether a resource development project meets an established visual objective. Adverse impacts are not limited to human-caused activity, as wildland fire or other natural phenomenon also can adversely affect visual values. If resource development creates little or no contrast with the natural form, line, color, and texture of the landscape in the area of development, little or no impact would result. Human activity may, in certain cases, create beneficial impacts to visual resources if the activity adds visual variety that is in harmony with the natural landscape.

Direct impacts to visual resources occur if the visual values of the landscape are diminished or enhanced through the creation of natural or human-caused contrast. Indirect impacts on VRM include actions on lands the BLM does not administer, or lands managed under a different VRM objective, that can change the characteristic of the landscape. For example, a BLM-authorized surface-disturbing project or use

allocation located on public lands under VRM Class IV objectives would influence the characteristic of the immediate landscape, and could also influence neighboring areas managed under VRM Class I, II, or III objectives.

For purposes of this analysis, short-term impacts are those that last up to 5 years before the visual impact is mitigated or removed. Long-term impacts are any impacts that affect visual resources for longer than 5 years, such as visual intrusions associated with the construction of wind turbines.

4.5.3.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- The BLM will manage public lands in a manner that conforms to visual objectives established in this RMP. Resource development proposals in areas with VRM Class I, II, or III visual objectives will be held to those standards. The VRM Class objectives are defined in Section 3.5.3.
- The Class I objective is to preserve the existing character of the landscape. Projects in Class I areas must not attract attention.
- The Class II objective is to maintain the existing character of the landscape. Projects may be seen, but may not attract the attention of the casual observer.
- The Class III objective is to partially maintain the existing character of the landscape. Projects may be seen and attract attention, but must not dominate the attention of the casual observer.
- The Class IV objective provides for major changes to the landscape. Projects may be seen and be the major focus of attention for the casual observer. Class IV allows for substantial changes to the form, line, color, and texture of the landscape.
- The visual inventory classes (I, II, III, IV) are used to represent the relative value of visual resources in the Planning Area; these classes are based on an areas scenic quality, sensitivity level, and distance zone (see Chapter 3 for a list of the criteria used to rate these three factors). Visual inventory Classes I and II are applied to the most visually valuable areas, Class III represents somewhat lesser value areas, and Class IV represents the least valued areas (due to low scenic quality or substantial development). In the Planning Area, visual inventory Class I is generally assigned to WSAs.
- Adverse impacts would occur where an area's visual management is less protective than warranted by its inventory class. For example, adverse impacts would occur if an inventory Class II area (i.e., a highly visually valuable area) was managed as VRM Class IV (i.e., managed to allow for a major modifications of the existing landscape). Conversely, beneficial impacts would occur in areas where the management applied is consistent with or more restrictive than warranted by the inventory class. For example, a beneficial impact would occur where a visual inventory Class III area (i.e., an area of moderate visual value) is managed as VRM Class II (i.e., managed to allow for minimal visual contrast). Generally, any activity that creates new visual contrast is considered adverse; however, contrast that is commensurate with the area's visual inventory class is generally considered to have a smaller adverse impact.
- Inconsistency between an areas visual values and its management, particularly where management is less restrictive, can degrade or improve an areas visual values to the point that it shifts visual inventory classes. For example, a visual inventory Class II area managed as VRM Class IV may become altered by human actions to the point that it takes on the lower visual values of a visual inventory Class IV area.

4.5.3.2 Summary of Impacts by Alternative

VRM Classes establish a measurable standard for the amount of change allowed to visual resources in a specific area. Visual Resource Inventory (VRI) Classes establish the general value of the landscape in terms of its scenic resources. VRM Classes range from I-IV with Class I allowing the least amount of change and IV allowing the most amount of change to the characteristic landscape. VRI Classes also range from I-IV with Class I being the highest value scenic resource and Class IV being the lowest value scenic resource. Comparing and contrasting VRM Classes to VRI Classes in the Bighorn Basin provides an indicator of the level of impact to visual resources across the Planning Area.

Alternatives A and C would be the least protective of visual values because both alternatives manage substantial portions of the Planning Area below their visual inventory class, including substantial areas of visual inventory Class II managed as VRM Classes III and IV (see Table 4-25). However, compared to Alternative C, Alternative A manages a larger portion of lower visual value visual inventory Class IV areas as a more restrictive VRM Class III, which would result in greater beneficial impacts in those areas. Alternatives B and E are the most protective of visual values, as they would manage almost the entire Planning Area consistent with or more restrictive than the classification determined from the visual inventory (see Table 4-26). Alternatives B and E would therefore be the most effective at maintaining the existing, primarily undeveloped, character of the landscape; managing areas of lower visual value under more restrictive management may also lead to an enhancement of these areas, primarily over the long term. Under alternatives D and F, VRM closely matches the updated Visual Resource Inventory Classes and manageability (i.e., most visual inventory Class II areas are managed as VRM Class II); this management would thereby be aimed at retaining the visual values identified during the visual inventory.

Table 4-25. Acres of Visual Resource Inventory Classes in Visual Resource Management Classes by Alternative

VRM Class and Acreage	Visual Resource Inventory Class Acreage[1,2]			
	Class I	Class II	Class III	Class IV
Alternative A				
Class I (141,127)	140,949	178	0	0
Class II (340,784)	21	288,571	32,726	19,102
Class III (890,482)	0	314,379	170,858	405,234
Class IV (1,815,043)	0	381,403	180,959	1,256,839
Alternatives B and E				
Class I (154,359)	140,963	13,298	95	0
Class II (1,784,854)	8	967,586	365,431	456,022
Class III (394,106)	0	3,922	4,315	385,868
Class IV (858,263)	0	3	18,965	843,503
Alternative C				
Class I (140,976)	140,963	12	0	0
Class II (333,027)	0	321,805	7,550	3,650
Class III (510,535)	7	238,062	104,820	171,860
Class IV (2,202,825)	0	424,930	272,219	1,505,664
Alternatives D and F				
Class I (141,127)	140,949	178	0	0
Class II (731,812)	22	635,833	73,883	21,683
Class III (738,531)	9	250,851	269,322	222,564
Class IV (1,580,470)	0	97,922	45,548	1,441,218

Source: BLM 2013a

[1]The inventory classes provide the baseline for visual resources in the Planning Area and are the indicator of visual values against which the impacts from VRM under the various management alternatives are measured. Inventory and visual resource management class acreages shown are for BLM-administered surface.

[2]The BLM does not assign surface lands managed by another federal agency, such as the National Park Service, to a visual resource management class, and these areas are therefore not included in the by-alternative comparison in this table.

VRM Visual Resource Management

4.5.3.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

There would be adverse impacts to visual resources under each alternative. However, the intensity and extent of impacts would vary. Impacts to visual resources may occur where VRM is not commensurate with an area's visual inventory class rating, or where major visually impairing projects, such as wind farms or mining areas, located in areas with low VRM objectives (Class IV) negatively influence the scenic quality of areas managed to maintain scenic quality, such as Class I or II areas. To a lesser extent, any project that creates new visual contrast, regardless of whether that contrast is commensurate with the area's visual values as identified in the visual inventory, would result in impacts. Under any of the alternatives analyzed here, the major sources of visual contrast in the Planning Area would be from ongoing oil and gas development; renewable energy (wind) development; mining; fire, fuels, and vegetation management; and off-road motorized vehicle activities. Depending on the visual values of an area, varying degrees of visual contrast may be compatible with the landscape and can occur without being considered an adverse impact.

Energy development would cause surface disturbance and introduce facilities that create contrasts with the form, line, color, and texture in the landscape. The forms of tanks, wind turbines, and similar facilities, and earthwork would contrast with the natural form of the landscape. The lines created by roads, powerlines, and facilities would contrast with the natural lines in the landscape. Energy facilities would typically be a lighter color and have smoother surfaces than the surrounding landforms and vegetation, thus creating contrasts of color and texture. Implementing BMPs to reduce visual contrast with surroundings may mitigate potential adverse impacts to visual resources resulting from the development of energy and associated facilities. Through the design and placement of facilities in consideration of the surrounding environment, visual contrast can be reduced, although not completely eliminated.

Mining activity, particularly for locatable minerals, would result in new visual contrast on the landscape due to road construction and excavation. As mining proceeds, artificial forms such as spoil piles and excavation pits are created that contrast with the surrounding natural landscape. For example, locatable bentonite mining usually involves establishing temporary stockpiles of mined bentonite, which would be a much lighter color than the surrounding undisturbed landscape. Locatable mineral development would be evaluated for conformance to the VRM Class objectives. However, since development of these minerals is not a discretionary activity, the BLM may not be able to deny a permit based on non-conformance to the VRM objective. If site-specific NEPA analysis discloses that a locatable mineral development project would not be in conformance with the VRM objectives after all opportunities of mitigation have been integrated into the proposed plan, then the VRM Class may need to be amended to be consistent with the level of visual change associated with the non-discretionary proposed action. Adverse impacts from locatable mineral development are most likely to occur on the 346,206 acres with known bentonite potential and the 114,095 acres with known gypsum potential.

The development of wind energy would result in substantial visual contrast over relatively large areas. Wind turbines can reach up to 500 feet in height and also add an element of movement that can attract the attention of viewers. In addition, changes to the characteristic landscape from wind farms are often greater than other types of development because they generally require multiple wind turbines in a concentrated area. Wind potential is typically greater at higher elevations and, consequently, in more visible and sensitive locales that experience greater and more constant wind speed. These characteristic of wind development mean that mitigating its visual contrast can be difficult. Highly visible areas

(mountaintops and ridges) and areas with high visual value (generally visual inventory Class I and II areas) with high potential for wind-energy development, such as Rattlesnake Mountain, may be the most adversely affected by this type of development if the values commensurate with their visual classification are not protected or mitigated. Mineral and renewable energy development would produce both short- and long-term visual contrast on the landscape. Construction and staging activities are generally short-term, whereas the life of a mineral development or renewable energy project is either long-term (30 to 50 years, plus final reclamation) or permanent. Interim reclamation measures can reduce the degree of contrasting elements of long-term surface disturbance.

Motorized vehicle activity would further exhibit or create contrasting elements of line and color from roads and trails against the natural elements in the surrounding landscape. The exposed lighter-colored soil would contrast with the surrounding vegetation, which is usually a darker gray-green color. Unreclaimed surface disturbance from unauthorized motorized vehicle activity would be either short-term or long-term. There would likely be unauthorized use (e.g., cross-country motorized travel in areas with limited travel designations) under all alternatives, though restrictions and the use of travel management designations may limit the creation of additional roads and trails that would cause new visual contrast.

Fire, fuels, and vegetation management can remove or alter the structure and density of vegetation and affect visual resources. Wildland fires can create substantial visual contrast in the form of large burned areas that, depending on the visual value of an area, may result in short-term adverse impacts. However, reducing hazardous fuels to decrease the chance of stand-replacing fires and diversifying stand age and improving forest health would reduce the chance of more severe fires and their associated large burn areas. Fire suppression activities and vegetation management can change the natural line, color, form, and texture of vegetative communities and the introduction of new visual intrusions, such as access roads or fire lines and breaks. The new contrasts from most of these activities would be short-term in nature. Over the long term, visual contrast would diminish as vegetative communities regenerate.

Under all alternatives, the BLM would manage visual resources in accordance with VRM Class objectives (see the 'Methods and Assumptions' section above). Before authorizing land uses that may affect the visual values of the landscape, the BLM would require the land use to align with the VRM Class objective. For example, the BLM would allow surface-disturbing activities within VRM Class II areas only if the level of change to the landscape from the activities are low, and will not attract attention of the casual observer, or the if project can be mitigated to meet these objectives. The BLM manages all WSA areas under VRM Class I objectives, resulting a minimal potential for adverse impacts to visual values in these areas. The size of the VRM Class areas vary by alternative, as discussed below.

Alternative A

Under Alternative A, the BLM manages 141,127 acres of BLM-administered surface as VRM Class I, 340,784 acres as VRM Class II, 890,482 acres as VRM Class III, and 1,815,043 acres as VRM Class IV. The objective of VRM Classes I and II (9 percent of BLM-administered surface) is to preserve or retain the existing character of the landscape. VRM Classes III and IV (85 percent of BLM-administered surface) would generally allow changes to the characteristic landscape, subject to some level of mitigation.

VRM under Alternative A is generally not commensurate with the visual values (represented by the visual inventory classes) identified in the visual resource inventory for the Planning Area, resulting in the potential for both adverse and beneficial impacts. As shown in Table 4-25, Alternative A manages substantial portions of the Planning Area at or above (i.e., less protective of visual values) their visual

inventory Class, which would result in adverse impacts to visual values by potentially allowing the construction of contrasting elements (described below and under *Impacts Common to All Alternatives*) incompatible with these areas. The potential for adverse impacts would be greatest where visual inventory Class II and III areas are managed as VRM Class IV (381,403 acres and 180,959 acres, respectively), but would also occur in the 314,379 acres of visual inventory Class II managed as VRM Class III. As shown in Table 4-26, this alternative would also manage large portions of the Planning Area with High Sensitivity as either VRM Class III (353,686 acres) or VRM Class IV (388,893 acres), providing a lower degree of protection to these areas of high viewer sensitivity; similarly, large areas inventoried as Scenic Quality A are to be managed as VRM Class III (368,435 acres) and VRM Class IV (702,384 acres). Such management would allow easily seen projects and/or strongly contrasting elements to be added to these high scenic quality and/or sensitivity areas, resulting in adverse impacts to these visual values. Without other restrictions, VRM Class III or IV objectives on lands identified as Inventory Class II could eventually alter these areas toward a lower rated inventory class.

Table 4-26. Acres of Scenic Quality Ratings or Visual Sensitivity Levels in Visual Resource Management Classes by Alternative

VRM Class and Acreage[1]	Scenic Quality Rating				Visual Sensitivity Level			
	SPECIAL AREAS[2]	A	B	C	SPECIAL AREAS[2]	HIGH	MEDIUM	LOW
Alternative A								
Class I (141,127)	140,959	168	0	0	140,959	167	0	0
Class II (340,784)	16	261,949	63,423	15,054	16	270,983	62,917	6,526
Class III (890,482)	1	368,435	282,525	239,519	1	353,686	177,697	359,096
Class IV (1,815,043)	0	702,384	671,939	444,885	0	388,893	238,738	1,191,577
Alternatives B and E								
Class I (154,359)	140,976	13,256	127	0	140,976	13,276	95	0
Class II (1,784,854)	0	882,702	644,717	261,653	0	990,819	424,211	373,730
Class III (394,106)	0	49,045	177,307	167,754	0	8,231	20,225	365,650
Class IV (858,263)	0	392,430	199,999	270,052	0	1,403	39,039	822,038
Alternative C								
Class I (140,976)	140,976	0	0	0	140,976	0	0	0
Class II (333,027)	0	311,994	21,033	0	0	320,035	9,347	3,646
Class III (510,535)	0	244,656	171,281	98,816	0	225,922	127,044	161,788
Class IV (2,202,825)	0	776,564	825,618	600,642	0	468,013	343,045	1,391,767

Table 4-26. Acres of Scenic Quality Ratings or Visual Sensitivity Levels in Visual Resource Management Classes by Alternative (Continued)

VRM Class and Acreage[1]	Scenic Quality Rating				Visual Sensitivity Level			
	SPECIAL AREAS[2]	A	B	C	SPECIAL AREAS[2]	HIGH	MEDIUM	LOW
Alternatives D and F								
Class I (141,127)	140,959	168	0	0	140,959	168	0	0
Class II (731,812)	18	529,151	194,600	7,651	18	598,692	113,717	18,942
Class III (738,531)	0	257,206	357,707	127,828	0	301,345	268,834	172,562
Class IV (1,580,470)	1	550,912	469,782	563,993	1	113,694	101,077	1,369,916

Source: BLM 2013a

[1]Total acreage of each BLM class for each alternative. Scenic quality, sensitivity, and Visual Resource Management Class acreages shown are for BLM-administered surface.
[2]Wilderness Study Areas. For the visual resource inventory, "Special Areas" include Wilderness Study Areas and surface lands managed by other federal agencies, such as the National Park Service. However, the BLM does not assign surface lands managed by other federal agencies to a Visual Resource Management Class, and are therefore not included in this table.

VRM Visual Resource Management

Surface Disturbance

Under Alternative A, all surface-disturbing activities anticipated to occur in the Planning Area (Appendix T) may affect visual resources, although the intensity of the impact will vary by resource use and the visual values of the location. Alternative A would result in 136,253 acres of short-term surface disturbance. Adverse impact from surface-disturbing activities would be greater in areas where VRM allows disturbance that are inconsistent with the areas visual values identified in the visual resource inventory. Small-scale, dispersed development (e.g., range improvements) will result in less contrast due to the ability to blend these developments into the natural landscape. Large-scale, concentrated development, such as oil and gas development, is likely to result in more contrast, because these developments are more difficult to blend into the surrounding landscape.

Management actions that restrict surface disturbance for the protection of other resources (e.g., soil, water, biological resources, cultural resources, and special designations) would help to protect visual values by reducing visual contrast.

Resource Uses

Under Alternative A, mineral development would result in surface disturbance that would degrade visual values, particularly in areas where VRM is inconsistent with the area's visual inventory class. Activities associated with leasable mineral and other mining, such as well pad development and road and pipeline construction, would result in adverse impacts to visual values through disturbances to the natural form, line, color, and texture in the landscape, subject to VRM restrictions. Except on the 72,861 acres of BLM mineral estate withdrawn under Alternative A, locatable mineral development would be evaluated for conformance to the VRM Class objectives. However, since development of these minerals is not a discretionary activity, the BLM may not be able deny a permit based on non-conformance to the VRM objective. If site-specific NEPA analysis discloses that a locatable mineral development project

would not be in conformance with the VRM objectives after all opportunities of mitigation have been integrated into the proposed plan, then the VRM Class may need to be amended to be consistent with the level of visual change associated with the non-discretionary proposed action.

Visual impacts from ROW projects, such as powerlines, pipelines, and wind-energy projects, are required to conform to VRM objectives, but would still result in adverse impacts to some high visual value areas under Alternative A. In the case of renewable energy, a long-term visual contrast and, depending on location, an adverse impact to visual values could occur. Alternative A does not include specific management for renewable energy, but is instead managed consistent with other ROWs.

CTTM under Alternative A limits potential damage to resources from motorized vehicles by restricting their use to existing roads and trails in most of the Planning Area (2,137,574 acres). Allowing off-road motorized vehicle use for big game retrieval and dispersed campsite access in areas with limited travel designations may increase road and trail proliferation, introducing more contrast in the form of unnatural lines and vegetation removal. Alternative A also includes a small area (1,311 acres) managed as open to cross-country motorized travel where substantial visual contrast from vegetation and user-pioneered routes could occur. However, because these areas have been open to cross-country motorized travel for a number of years, substantial visual contrast is already evident, resulting in visual inventory Class IV ratings.

Special Designations

Under Alternative A, management for special designations (e.g., ACECs and WSR eligible waterways) generally includes restrictions or limitations on surface-disturbing activities (such as ROW development, mining, and renewable energy) intended to protect the values for which the area is managed. Restrictions, limitations, or specific mitigation requirements for surface-disturbing activities, mining, ROW development, and renewable energy development would reduce activities that may cause visual contrast. Such restrictions may result in beneficial impacts to visual values where they limit development that results in new contrast, but is consistent with VRM objectives.

Proactive Management

Proactive management actions for visual resources under Alternative A would provide some protection for visual resources in the Planning Area by identifying or reducing the potential for adverse impacts. Alternative A requires VRM contrast rating worksheets and visual simulations for highly visible projects and those proposed in VRM Class I areas. Contrast rating worksheets may also be used for other projects where it would appear to be the most effective design or assessment tool. Under Alternative A, simulations would also be used when they may serve as a means to evaluate design opportunities for reducing visual contrast, even in areas already conforming to the VRM class objective. However, because VRM classes under this alternative are not commensurate with the visual inventory classes across a large portion of the Planning Area, VRM Class-specific proactive management would not benefit all areas with high visual values.

Alternative B

Alternative B emphasizes conservation of resources over resource use and would result in less adverse impacts compared to Alternative A by reducing development that may affect visual values, and by increasing proactive management. Under Alternative B, the BLM manages 154,359 acres of BLM-administered surface as VRM Class I, 1,784,854 acres as VRM Class II, 394,106 acres as VRM Class III, and 858,263 acres as VRM Class IV. The area managed as VRM Class IV, where major modifications to existing landscape are allowable, is less than under Alternative A. This alternative includes more

acreage of VRM Classes I and II than Alternative A, (61 percent of BLM-administered surface acreage in the Planning Area) with the goal of maintaining the existing landscape character. As shown in Table 4-25, Alternative B manages more acreage than Alternative A consistent with or more protective than its visual values (i.e., at a lower visual inventory class). Alternative B manages the smallest acres of visual inventory Classes II and III areas as VRM Class IV (3 acres and 18,965 acres, respectively), and would generally restrict activities where major modifications to the landscape can occur to visual inventory Class IV areas, where adverse impacts would be concentrated in areas of lower visual value and where existing disturbances are already present. Many of the areas inventoried as Class III or IV that Alternative B manages as VRM Class II or III contain sensitive resources, such as proposed ACECs, ACEC expansions, lands with wilderness characteristics, and Special Recreation Management Areas.

As shown in Table 4-26, this alternative also places the majority of areas inventoried as High Sensitivity and Scenic Quality A into more protective VRM Classes I and II. More than Alternative A, VRM under Alternative B would prevent easily seen projects and/or strongly contrasting elements from being added to these high scenic quality and/or sensitivity areas.

Surface Disturbance

Alternative B places more restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, cultural resources, and special designations) and would result in less surface disturbance than Alternative A. These restrictions would decrease the potential for the creation of new visual contrast from such disturbance. For example, Alternative B applies an NSO restriction to avoid surface disturbance in big game crucial winter range year-round, compared to Alternative A, which applies a TLS for part of the year. In relation to Alternative A, large-scale disturbances, high-profile intrusions, and concentrated development are more limited under this alternative. Because the BLM would manage more acres as VRM Classes I and II under Alternative B, fewer and less-intrusive activities would be permitted and visual resources would be more protected, including in high visual value visual inventory Class I and II areas. However, in locations where visual contrast from intensive development in VRM Class IV occurred, adverse impacts to visual values may still result, particularly where areas of such development abut areas of substantially higher visual value (i.e., visual inventory Class I and II) (see Map 48).

Resource Uses

Mineral resource development under Alternative B would result in fewer acres of surface disturbance than Alternative A. Relatively fewer disturbances from well pad development, road, and pipeline construction would limit new visual contrast that would disrupt the natural form, line, color, and texture of the landscape.

Under Alternative B, ROW projects such as powerlines and pipelines are anticipated to result in fewer disturbances and, therefore, fewest instances of new contrast compared to Alternative A.

Renewable energy projects are more restricted under Alternative B than Alternative A. Alternative B classifies more acres as renewable energy exclusion areas and less acres as open to renewable energy development. Because wind-energy development is often visible from far away, even when it is placed in areas where such development is consistent with the underlying VRM Class objective, the visual values of the surrounding scenic quality rating units will be compromised and altered to a lower visual resource inventory class. Excluding and avoiding renewable energy development across large portions of the Planning Area would reduce potential adverse impacts to visual values.

CTTM under Alternative B places more restrictions on motorized vehicle use than Alternative A, limiting the potential for new visual contrast from route creation. In particular, prohibiting off-road motorized

vehicle (OHV and mountain bike) use for big game retrieval in areas with limited travel designations would reduce the potential for road and trail proliferation that may adversely affect visual values. Alternative B is anticipated to result in more contrasting elements due to the creation of more new roads, hiking trails, and trailheads than Alternative A.

Special Designations

Under Alternative B, impacts from management in special designations would be similar to those described for Alternative A, but would occur over a larger area. Alternative B includes more ACECs than Alternative A and manages all the WSR-eligible waterways segments discussed under Alternative A as suitable for inclusion in the NWSRS. Although most of these areas are managed under VRM Class II objectives, additional restrictions on development in the portions managed under less restrictive VRM (primarily VRM Class III) would further reduce contrast and resulting adverse impacts to visual values.

Additionally, managing all lands with wilderness characteristics specifically to preserve their wilderness characteristics (476,349 acres of BLM-administered land) and managing them as VRM Class II would result in beneficial impacts to visual values in these areas.

Proactive Management

In addition to managing to meet the more restrictive VRM Class objectives under Alternative B, specific proactive management under this alternative imposes additional visual resource protections compared to Alternative A. Alternative B requires the project proponent to submit VRM contrast rating worksheets for all proposed actions in areas managed as VRM Class I, II, or III, and to submit visual simulations and mitigation design in VRM Class I and II areas. This alternative also limits motorized vehicle use to designated roads and trails in VRM Class II areas and closes VRM Class I areas to motorized vehicle use to preserve areas of high visual resource value by reducing the potential for road and trail proliferation. Because VRM classes under this alternative are generally commensurate with or more protective than the visual inventory classes for the same areas, VRM Class-specific proactive management would be more effective under this alternative than under Alternative A.

Alternative C

Management of visual resources under Alternative C places a greater emphasis on resource use and development compared to the other alternatives, and more impacts to visual values from surface-disturbing and other activities would result than under the other alternatives. Under Alternative C, the BLM would manage 140,976 acres of BLM-administered surface as VRM Class I, 333,027 acres as VRM Class II, 510,535 acres as VRM Class III, and 2,202,825 acres as VRM Class IV. Compared to the other alternatives, Alternative C manages the most area as VRM Class IV (69 percent of BLM-administered surface in the Planning Area), which may result in more visual contrast due to surface disturbance in support of resource development activities.

Alternative C manages substantial portions of the Planning Area at or above their visual inventory class (see Table 4-25) and would have the greatest adverse impacts to visual values of any alternative because it allows the construction of contrasting elements (described below and under *Impacts Common to All Alternatives*) incompatible with visual inventory classes. The potential for adverse impacts would be greatest where visual inventory Class II and III areas are managed as VRM Class IV (424,930 acres and 272,219 acres, respectively), but also in the 238,062 acres of visual inventory Class II managed as VRM Class III. Similar to Alternative A, this alternative would manage large areas with High Sensitivity as VRM Class III (225,922 acres) or VRM Class IV (468,013 acres) (Table 4-26). Similarly, large areas inventoried as Scenic Quality A are managed as VRM Class III (244,656 acres) or VRM Class IV (776,564 acres). Such

management would allow new strongly contrasting elements to be added to these high scenic quality and sensitivity areas and, without other restrictions, would eventually alter these areas toward a higher visual inventory class.

Surface Disturbance

Alternative C would result in the most surface disturbance of any alternative and, therefore, the greatest potential for new visual contrast. Adverse impacts from surface-disturbing activities would be greater in areas where VRM allows disturbance that is not commensurate with the area's visual values identified in the visual resource inventory. Compared to the other alternatives, Alternative C allows for more large-scale disturbances, high-profile intrusions, and concentrated developments. The larger area managed as VRM Class IV under Alternative C would allow more visually intrusive activities in the Planning Area and with less mitigation.

Alternative C places the least restriction on surface-disturbing activities for the protection of other resources, providing the least protection against new visual contrast compared to the other alternatives.

Resource Uses

Under Alternative C, mineral resource development would result in impacts similar to Alternative A, except that withdrawals under this alternative would be smaller (48,095 acres). ROW development under Alternative C would result in impacts similar to those described under Alternative A, though to a greater degree. Due to the increased acreage being designated as VRM Class III and IV across the spectrum of inventoried visual values, the ROW projects under Alternative C are anticipated to result in the most disturbances and, therefore, the greatest adverse impacts to high visual value areas under this alternative. Except for Alternative A, which does not include specific management for renewable energy authorizations, Alternative C includes the most area open to renewable energy development, which would increase the potential for wind-energy development and resulting impacts to visual values.

CTTM under Alternative C places the fewest restrictions on motorized vehicle use, including managing the largest acreage as open to cross-country motorized travel, and would provide the least protection from travel-related visual contrast. Areas open to cross-country motorized travel, such as OHV "play" areas, would display substantial visual contrast due to user-pioneered routes and damage to vegetation. However, areas open to cross-country motorized travel under Alternative C, are all located in visual inventory Class IV areas of the least visual value. These areas may help to concentrate this type of motorized vehicle use in these relatively small, lower visual value areas, and potentially focus use that might otherwise occur in higher visual value areas not designated for cross-country motorized travel. Allowing off-road motorized vehicle (OHV and mountain bike) use for big game retrieval and dispersed campsite access would result in impacts similar to those under Alternative A. Alternative C is anticipated to result in the greatest surface disturbance associated with the creation of new roads and trails compared to the other alternatives and would have the greatest potential to introduce new contrasting lines to the landscape.

Special Designations

Impacts to visual resources from management of special designations would be similar to those described for Alternative A, though to a lesser degree. Under Alternative C, the BLM would designate the fewest ACECs of any alternative and would not manage eligible waterways as suitable for inclusion in the NWSRS, resulting in the least protection from adverse impacts of any alternative.

Proactive Management

Proactive management actions for visual resources under Alternative C provide the fewest protections for visual resources of any alternative. Like Alternative A, Alternative C requires the project proponent to submit VRM contrast rating worksheets for highly visible projects and those proposed in VRM Class I areas, but this alternative also exempts the project proponent from submitting contrast rating worksheets and visual simulations for all mineral actions and activities in designated ROW corridors. As under Alternative A, VRM inconsistent with visual inventory classes under this alternative may reduce the benefits of this management. This alternative also does not require visual simulations and does not limit motorized vehicle use by VRM class, which will not minimize the degree of contrasting elements and may not adequately mitigate the impact surface-disturbing activities to visual values.

Alternative D

Compared to the other alternatives, management of visual resources under Alternative D would balance the protection of visual values with resource uses and development. Under Alternative D, the BLM would manage 141,127 acres of BLM-administered surface as VRM Class I, 731,812 acres as VRM Class II, 738,531 acres as VRM Class III, and 1,580,470 acres as VRM Class IV. Alternative D manages less area as VRM Class IV than alternatives A and C, but more than Alternative B.

As shown in Table 4-25, Alternative D matches VRM classes to their corresponding visual inventory class more than alternatives A and C, but less than Alternative B. For example, most visual inventory Class II areas are managed as VRM Class II, resulting in fewer adverse impacts from managing areas with higher visual values under less stringent visual objectives. Adverse impacts to the visual resource inventory would therefore be lower under this alternative than under alternatives A and C. Alternative D manages the second smallest number of acres of visual inventory Classes II and III areas as VRM Class IV (97,922 acres and 45,548 acres, respectively), which would restrict locations where major changes to the landscape could occur to primarily less visually valuable areas. Areas such as portions of the Absaroka Mountain Foothills and the Clarks Fork River inventoried as Class III have SRMA management prescriptions specific to protect the visual values. Other areas that do not have specific VRM management prescriptions, such as the Absaroka Mountain Foothills ERMA and areas north of Thermopolis contain other resources, which would benefit from VRM Class II or III, or management to maintain the viewshed for travelers visiting the Bighorn Basin. Alternative D manages 313,912 acres of visual inventory classes III and IV with more protective VRM, resulting in the potential for beneficial impacts in these areas as described under Alternative B.

As shown in Table 4-26, this alternative also places nearly the same area inventoried as High Sensitivity and Scenic Quality A into more protective VRM Classes I and II as Alternative A, less area than Alternative B, and more area than Alternative C. Such VRM would increase the management protection for these areas compared to Alternative C, and would result in similar beneficial impacts in these areas to management under Alternative A, and would result in somewhat less beneficial impacts in these areas to management under Alternative B.

Surface Disturbance

The amount of projected surface disturbance under Alternative D is more than under alternatives A and B, but less than under Alternative C. The impacts to visual values from surface disturbance would be similar to the impacts described for Alternative A, although to a lesser degree because VRM commensurate with the Planning Area's visual values, as identified in the visual resource inventory, focuses disturbances likely to result in the greatest visual contrast in areas of lower visual value. As

noted for Alternative A, visual contrast from surface disturbance will vary based on the type of resource use, location, and other factors. For example, compared to Alternative A, Alternative D is projected to result in more disturbance associated with the creation of new roads and trails for recreational purposes, introducing more linear features to the visual landscape, but less disturbance from mineral development.

As described under Alternative A, management actions that restrict surface disturbance for the protection of other resources, especially where they overlap areas less restrictive VRM, would further reduce visual contrast from mineral leasing, ROW development, and other activities.

Resource Uses

While mining under Alternative D would result in a similar amount of surface disturbance than Alternative A, applying VRM that is more commensurate with visual inventory classes would reduce the potential for impacts to visual values, compared to that alternative. Effects from Oil and Gas Management Areas would be similar to those described for Alternative C, although to a lesser extent due to the smaller size of these areas under Alternative D (348,617 BLM-administered surface acres). Alternative D would result in more withdrawals (83,321 acres) than Alternative A and therefore may have more beneficial impacts to visual values. However, Alternative D would result in fewer beneficial impacts to visual values than management under Alternative B, due to fewer withdrawals.

Under Alternative D, ROW projects and renewable energy development are projected to result in the same amount of surface disturbance as under Alternative A. Nevertheless, impacts to visual resources are anticipated to be lower under Alternative D due to the compatibility of VRM with visual inventory classes. Compared to alternatives A and C, Alternative D would result in additional restrictions on the placement of ROWs and additional mitigation to protect visual values where ROW permits are granted. Alternative D also places more restrictions on motorized vehicle use, through closures and limiting motorized vehicle use to designated roads and trails, than alternatives A and C, but also designates the second largest area as open to cross-country motorized travel. Closing areas, limiting motorized vehicle use to designated roads and trails, and limiting off-road motorized use to access primitive campsites and to retrieve big game to within 300 feet from existing routes would reduce adverse impacts from user-pioneered routes. As with Alternative C, areas open to cross-country motorized travel under Alternative D are all located in areas of the least visual value, visual inventory Class IV areas. These areas may help to concentrate this type of motorized vehicle use in these relatively small, lower visual value areas, and potentially focus use that might otherwise occur in higher visual value areas not designated for cross-country motorized travel.

Special Designations

Under Alternative D, the BLM would manage special designations and other management areas that would minimize surface disturbance, which would reduce visual contrast beyond that required by VRM in the areas, benefitting visual values. Alternative D designates a larger portion of the Planning Area as ACECs compared to Alternative A, but less than Alternative B. Impacts from ACECs would be similar to those described under Alternative B. Alternative D does not manage any of the eligible waterways as suitable for inclusion in the NWSRS; even without special management, impacts to visual values under Alternative D would be similar as Alternative B because these waterways would be primarily managed as VRM Class I or II under both alternatives. Alternative D does not manage lands with wilderness characteristics specifically to preserve their wilderness characteristics, which would result in fewer beneficial impacts in these areas than under than Alternative B.

Proactive Management

Under Alternative D, VRM contrast rating worksheets would be required for all proposed actions in areas managed as VRM Classes I and II and for all projects with a high degree of impact, resulting in enhanced identification of potential adverse visual impacts in VRM Class II areas compared to Alternative A. Visual simulations use under Alternative D would be the same as described for Alternative A, and would allow the identification of potential adverse impacts as described under that alternative. Similar to, though to a lesser degree than, Alternative B, VRM classes under this alternative are consistent with visual inventory classes for the same areas, which may make VRM Class-specific proactive management more effective under this alternative than under alternatives A and C. Alternative D, like Alternative C, does not limit motorized vehicle use by VRM Class, which will not minimize the potential for the creation of contrasting elements from user-pioneered routes to the same degree as Alternative B.

Alternative E

Under Alternative E, the BLM manages the same acreages of VRM Class I, II, III, and IV areas as Alternative B (Map 48), and the resulting benefits to visual values would be the same as Alternative B. The same beneficial impacts to visual resources described under Alternative B would result under Alternative E, except to a greater extent. Under Alternative E, greater sage-grouse Key Habitat Areas are managed so that anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) do not exceed one disturbance per 640 acres and cover less than 3 percent of the total sage-grouse habitat, compared to a larger allowable disturbance of 5 percent in these areas under Alternative B. Therefore, Alternative E would reduce development affecting visual values to the greatest extent of any alternative.

Surface Disturbance

Alternative E places the most restrictions on surface-disturbing activities for the protection of resources, and would therefore result in the fewest visual impacts from surface disturbance. In comparison to the other alternatives, large-scale disturbances, high-profile intrusions, and concentrated development are the most limited under Alternative E. In particular, Alternative E includes management in greater sage-grouse Key Habitat Areas (1,232,583 acres) that would exclude or limit new aboveground ROWs and renewable energy developments and prohibit most mineral development activities.

Resource Uses

Mineral resource development under Alternative E would result in the least surface disturbance of any alternative. Relatively fewer disturbances from well pad development, road, and pipeline construction would limit new visual contrast that would disrupt the natural form, line, color, and texture of the landscape.

Renewable energy and ROW development are more restricted under Alternative E than the other alternatives, reducing the potential adverse impacts to visual values from such developments. Despite this larger area of exclusion that results from the management of the Greater Sage-Grouse Key Habitat Areas ACEC, the BLM projects that under Alternative E, renewable energy and ROW projects (e.g., roads, powerlines and pipelines) would result in similar surface disturbances and impacts to visual values as Alternative B (Appendix T).

Restrictions on motorized vehicle use under Alternative E are the same as Alternative B, such as designating and implementing the seasonal closures to motorized use within greater sage-grouse Key Habitat Areas. However, impacts from the CTTM under Alternative E would be slightly less adverse than

those described under Alternative B due to limitations on the construction of new roads and a focus on closing roads not serving a public function in the Greater Sage-Grouse Key Habitat Areas ACEC.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), is the same as Alternative B, and impacts would be similar to Alternative B. Due to the size and additional restrictions on surface-disturbing activities and resource uses (e.g., the mineral development and CTTM management described under Resource Uses above) applied for the Greater Sage-Grouse Key Habitat Areas ACEC, special designation management under Alternative E would reduce contrast and resulting adverse impacts to visual values compared to the other alternatives.

Proactive Management

Alternative E manages the Planning Area under the same VRM Classes as Alternative B; beneficial impacts from this management under Alternative E would be the same as Alternative B.

Alternative F

Under Alternative F, the BLM manages the same acreage of VRM Class I, II, III, and IV areas as Alternative D, and the impacts to visual values would be the same as Alternative D, but to a greater extent. The Greater Sage-Grouse PHMAs ACEC (1,116,698 acres) would be managed so that anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) do not exceed one disturbance per 640 acres and cover less than 3 percent of the total sage-grouse habitat.

Surface Disturbance

Under Alternative F, adverse impacts to visual values from surface disturbance would be the same as Alternative D (Map 50), but to a lesser extent. Compared to Alternative D, additional restrictions on surface-disturbing activities for the protection of resources would provide greater protection from new visual contrast, especially where they overlap areas of less-restrictive VRM. In particular, Alternative F is projected to result in less surface disturbance associated with mineral development due to restrictive management for lands in the Greater Sage-Grouse PHMAs ACEC. These restrictions would provide a beneficial impact to visual values by reducing the amount of visual contrast on the landscape resulting from mineral development.

Resource Uses

Management of mineral exploration and development under Alternative F would result in similar adverse impacts on visual resources as Alternative D, but to a lesser extent due to additional restrictions on leasable mineral development in greater sage-grouse PHMAs under Alternative F.

Alternative F applies additional constraints on ROW grants and renewable energy development compared to Alternative D, but is still anticipated to result in a similar amount of surface disturbance to that projected under alternatives A and D. Management for ROW and renewable energy development in the Greater Sage-Grouse PHMAs ACEC that requires the use of existing roads to the extent practicable and limits the potential to develop wind developments for the protection of greater sage-grouse would reduce adverse impacts compared to Alternative D.

Alternative F CTTM is the same as Alternative D, except that travel in greater sage-grouse PHMAs is limited to designated roads and trails, which would reduce adverse impacts to visual resources in these areas.

Special designations under Alternative F are the same as Alternative D, with the exception of an additional 1,116,698 acres of BLM-administered land within greater sage-grouse PHMAs that would be designated as an ACEC under Alternative F. The relative size and additional restrictions on surface-disturbing activities and resource uses in special designation areas under Alternative F would further reduce contrast and resulting adverse impacts to visual values in comparison to alternatives A, C, and D. Alternative F manages 49,396 acres of lands with wilderness characteristics specifically to preserve their wilderness characteristics, which would result in beneficial impacts in these areas, but less than under than Alternative B.

Proactive Management

Under Alternative F, the use of VRM contrast rating worksheets and visual simulations are the same as described for Alternative D and would allow the identification of potential adverse impacts as described under that alternative. VRM Class would be managed in the same manner as Alternative D, and the beneficial impacts would be the same as Alternative D. However, Alternative F would result in greater overall beneficial impacts to visual resources when compared to alternatives A and D due to the additional management actions in the Greater Sage-Grouse PHMAs ACEC.

4.6 Land Resources

4.6.1 Lands and Realty

This section describes potential impacts to the lands and realty program from implementing the alternatives. The lands and realty program includes land tenure adjustments (e.g., sales, exchanges, acquisitions), land use authorizations (i.e., leases, permits, grants), and withdrawals, classifications, and segregations. The BLM authorizes ROWs and renewable energy through lands and realty actions (land use authorizations). Refer to Sections 4.6.2 *Renewable Energy* and 4.6.3 *Rights-of-Way and Corridors* for impacts to these resource uses. This section focuses on how management actions could impact the lands and realty program by increasing, limiting, or preventing the potential for realty actions.

The purpose of the lands and realty program is to facilitate management of BLM-administered lands and resources in the Planning Area. The program adapts according to changing land management, resource needs, demand for public land to meet expanding communities and other public purposes, and other issues. Therefore, lands and realty program actions generally result in beneficial impacts to multiple-use objectives in the Planning Area.

Adverse impacts to the lands and realty program result from management actions that make land tenure adjustments or land use authorizations more difficult to complete. Beneficial impacts to lands and realty result from land tenure adjustments that increase land management efficiency or enhance the management of resources through consolidation of public lands into more easily managed blocks. Direct impacts to lands and realty occur when other resources are present, preventing or making it more difficult to complete a transaction. Mitigating resource values required for a land disposal transaction can require additional lands and realty actions and increase processing costs and timeframes required to complete the transaction, which would temporarily delay the transaction. Indirect impacts to the lands and realty program result from management that subsequently affects realty actions, such as the development of parcels disposed out of BLM ownership, which can increase, limit, or prevent the potential for future realty actions. Most impacts to the lands and realty program are long-term and result from management that allocates land for land tenure adjustments or land use authorizations over the life of the plan.

4.6.1.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- The demand for land tenure adjustments and land use authorizations will increase over the life of the plan based on reasonably foreseeable actions listed in Appendix T.
- The BLM's ability to respond to or to satisfy increased demands for land tenure adjustments will be limited by budget and personnel constraints into the foreseeable future.
- Land acquisition is a support function for resources programs (e.g., cultural resources, fish and wildlife, recreation). The priority or the urgency associated with any acquisition is established by the resource program benefiting from the acquisition.
- Public lands are managed under BLM guidance and policy. The lands and realty program follows guidance when disposing of public lands or when acquiring lands to support BLM management programs.
- The number of land use authorizations will increase over the life of the plan.
- Disposal of lands would be consistent with disposal criteria.

- All proposed land tenure adjustments would require site-specific NEPA review and determination of mineral development potential in accordance with FLPMA sections 206 and 209.
- Before any potential land disposal, mineral development potential would be evaluated according to FLPMA sections 206 and 209.
- The BLM will retain existing withdrawals not otherwise specified in the alternatives.
- The BLM would use voluntary approaches to increase access to lands.
- Except where specified, BLM-administered lands will be retained in federal ownership.
- During the life of this RMP, the BLM will continue to address known trespass issues; however, additional trespasses may continue during the life of the plan. Continued resolution of trespass issues will depend on staff and funding availability.
- Consolidation of public lands would decrease the cost of public land administration in the Planning Area and enhance efficiency in management of the remaining public lands.

4.6.1.2 Summary of Impacts by Alternative

Impacts to the lands and realty program from implementing the alternatives include land disposal, acquisition, and withdrawal, and management that makes realty actions more difficult to complete. Alternative C includes the largest area available for disposal (117,845 acres), followed by Alternative A (115,905 acres), alternatives D and F (66,363 acres), and alternatives B and E (24,042 acres). In the past, there has been an overall net decrease of BLM-administered land in the Planning Area, and this trend is expected to continue under all the alternatives. Land would continue to be available for community expansion under all alternatives, with Alternative C providing more opportunities for small-scale property boundary adjustments and agricultural expansion for private land owners. Long-term impacts associated with the withdrawal and segregation of lands would be the greatest under Alternative E, because the BLM would recommend withdrawal of the largest area, followed by Alternative B, Alternative A, alternatives D and F, and Alternative C, respectively.

4.6.1.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

This section describes impacts to the lands and realty program from management common to all alternatives.

Land Tenure Adjustments

Under all alternatives, acquiring state and private lands from willing sellers to consolidate the land ownership pattern would result in long-term beneficial impacts to the lands and realty program by increasing the land base and enhancing the BLM's ability to effectively manage resources and resource uses (e.g., wildlife habitats, riparian/wetland areas, special designations). Consolidating public lands also results in long-term beneficial impacts by improving access to public lands, reducing the number of easements needed, and helping reduce conflicts from encroachment and subdivision of private land by adjacent property owners.

Considering opportunities to acquire access easements across private lands for access to BLM-administered land under all alternatives would result in long-term benefits to the lands and realty

program by eliminating the need for future land acquisitions to meet resource use needs and reducing potential trespass conflicts with other landowners. Identifying areas of interest for acquiring easements, which are based on criteria listed in Appendix M, also would benefit the lands and realty program.

Conveyance of 16,122 acres of land to the Westside Irrigation District would create long-term impacts to the lands and realty program by removing these lands from the land base available for land tenure adjustments and land use authorizations.

Special designations (WSAs, ACECs, WSRs) and the designation of SRMAs could encourage the acquisition of adjacent private and state lands and inholdings, and affect the lands and realty program for as long as these areas are designated. Acquiring adjacent lands or inholdings in or surrounding designated areas would improve the manageability of these areas.

Similar to land use authorizations, requiring on-the-ground surveys (for paleontological, cultural, and other resources) before any land disposal action could create long-term adverse impacts to the lands and realty program. Requiring resource inventories, surveys, and analyses before land tenure adjustments and land use authorizations could make it more difficult to complete lands and realty actions. Site-specific NEPA analyses for land tenure adjustments and land use authorizations could further decrease the efficiency of processing land tenure adjustments and land use authorizations.

Ensuring that important Native American TCPs and historic properties are not transferred from BLM ownership or affected by management in ways that restrict or deny access could affect the lands and realty program over the long term. Preventing land tenure adjustments or land use authorizations that may affect these sites reduces the land base available for lands and realty actions.

Considering opportunities for the acquisition of small parcels of land from private landowners for cultural and other resource values (such as acquiring the private land portions of the Legend Rock Petroglyph Site) would result in long-term beneficial impacts to the lands and realty program. However, because of the small size of these acquisitions, benefits would be minimal.

Land Use Authorizations

Under all alternatives, the BLM considers land use authorizations (permits, grants, etc.) on a case-by-case basis consistent with other resource objectives. During processing of a land use authorization, the BLM would perform site-specific inventories and NEPA analyses for cultural, paleontological, biological, and other appropriate resources as part of the case-by-case assessment. Identifying these resources in areas considered for a land use authorization may require mitigation, implementation of BMPs, and other stipulations, or the BLM may deny the application. If the BLM denies the application, there may be indirect impacts to lands and realty from an applicant pursuing land use authorizations in other areas.

Responding to R&PP applications and approving leases and conveyances to qualified applicants would benefit the lands and realty program by providing locations for certain uses (e.g., shooting ranges, landfills) that may reduce illegal use, trespass, or other issues on other BLM-administered land.

Retaining classification of BLM-administered land for the future expansion of Park County landfill south of Cody and of lands to the north, south, and west of the Worland landfill would have long-term impacts to the lands and realty program by classifying these areas in preparation of an R&PP lease or conveyance. These lands would not be available for other land tenure adjustments and land use authorizations.

Impacts specific to ROW and renewable energy development are discussed in their respective sections of this chapter.

Withdrawals, Classifications, and Segregations

Table 4-27 summarizes withdrawals and segregations by alternative. Withdrawals that close areas to operation of the public land laws cause long-term impacts to the lands and realty program by limiting or restricting lands and realty actions in these areas. Reviewing other agency withdrawals and BLM-administered power withdrawals would help the BLM determine whether the withdrawals are serving or are needed for their intended purposes. Revoked or modified withdrawals could open these public lands to allocation and management under the public land laws and mining laws. The BLM would open restored U.S. Bureau of Reclamation (BOR) lands to mineral location on a case-by-case basis, except where said lands should remain closed to mineral entry to meet other resource objectives. Opening public lands to management and allocation would result in long-term impacts to the lands and realty program by increasing the available land base for land tenure adjustments and land use authorizations.

Table 4-27. Withdrawals, Classifications, and Other Segregations in the Planning Area

Field Office	Name	Acres by Alternative						Segregates/ Withdraws from	
		Alternative A	*Alternative B*	*Alternative C*	*Alternative D*	*Alternative E*	*Alternative F*	*Land Disposal*	*Locatable Mineral Entry*
Resource Protection									
CYFO	Stock Driveway	37,297	37,297	37,297	37,297	37,297	37,297	■	
WFO	Stock Driveway	60,452	60,452	60,452	60,452	60,452	60,452	■	
CYFO	Cave and Karst Areas	0	836	836	853	836	853		■
WFO	Cave and Karst Areas[1]	8,560	8,560	8,560	8,560	8,560	8,560		■
CYFO	Spirit (Cedar) Mountain Cave	234	234	234	234	234	234	■	■
CYFO	Horsethief/ Natural Trap Caves	519	519	519	519	519	519	■	■
WFO	Big Cedar Ridge Paleontological Area	264	264	0	264	264	264	■	■
WFO	Red Gulch Dinosaur Tracksite	1,798	1,798	0	1,798	1,798	1,798	■	■
WFO	Castle Gardens Recreation Site	110	110	110	110	110	110	■	■
CYFO	Beck Lake Scenic Area (Proposed)	708	708	0	708	708	708		■
CYFO	National Historic Landmark	72	72	72	72	72	72		■

Table 4-27. Withdrawals, Classifications, and Other Segregations in the Planning Area (Continued)

Field Office	Name	Acres by Alternative						Segregates/ Withdraws from	
		Alternative A	*Alternative B*	*Alternative C*	*Alternative D*	*Alternative E*	*Alternative F*	*Land Disposal*	*Locatable Mineral Entry*
Management Areas[1]									
CYFO	ACECs	11,935	73,953	0	11,935	760,160	11,935		■
WFO	ACECs	22,239	23,763	8,560	24,195	954,301	24,195		■
CYFO	WSRs	4,518	6,751	0	0	6,751	0		■
WFO	WSRs	12,129	15,106	0	0	15,106	0		■
Other Segregations									
CYFO	Cody Industrial Park	0	208	0	208	208	208		■
WFO	BLM-WSO Public Water Reserve	2,140 Existing	2,140	2,140	2,140	2,140	2,140	■	
CYFO	BLM-WSO Public Water Reserve	625	625	625	625	625	625	■	
WFO	BLM-WSO Power Site Reservation	159	159	159	159	159	159	■	■
CYFO	BLM Power Site Reservation	3,308	5,619	3,308	1,615	5,619	1,615	■	■
Other Federal Agency Withdrawals									
WFO	Power Site Classification (FERC)	1,246	1,246	1,246	1,246	1,246	1,246	■	■
CYFO	Power Site Classification (FERC) (Clarks Fork of the Yellowstone and Bighorn rivers)	15,696	24,358	15,696	15,696	24,358	15,696	■	■
CYFO	Department of Defense (Lovell Military Training Area)	3,543	3,543	3,543	3,543	3,543	3,543	■	■
CYFO	National Park Service – Big Horn Recreation Area	15,630	15,630	15,630	15,630	15,630	15,630	■	
CYFO	U.S. Forest Service – Wood River Guard Station	39	39	39	39	39	39	■	■

Table 4-27. Withdrawals, Classifications, and Other Segregations in the Planning Area (Continued)

Field Office	Name	Acres by Alternative						Segregates/ Withdraws from	
		Alternative A	*Alternative B*	*Alternative C*	*Alternative D*	*Alternative E*	*Alternative F*	*Land Disposal*	*Locatable Mineral Entry*

Sources: BLM 2009a; BLM 2013a

Note: Due to overlapping resources, numbers are not additive.

[1]Acreages reported for withdrawals in ACECs are BLM-administered surface acres. Case-by-case withdrawals from locatable mineral entry are not included in calculations of ACEC withdrawals.

ACEC	Area of Critical Environmental Concern	U.S.	United States
BLM	Bureau of Land Management	WFO	Worland Field Office
BOR	Bureau of Reclamation	WSO	Wyoming State Office
CYFO	Cody Field Office	WSRs	Wild and Scenic Rivers
FERC	Federal Energy Regulatory Commission		

Alternative A

Land Tenure Adjustments

Alternative A identifies a total of 115,905 acres in the Planning Area for disposal by sale, exchange, or other means (Map 51) (Appendix M). Disposal can include none, some, or all of the mineral estate. A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate. Alternative A identifies the remaining land base of 3,071,909 acres of BLM-administered land for retention. Table 4-28 lists acreages associated with retention and disposal under each alternative. Disposal of lands out of federal ownership could result in indirect impacts if the new landowner develops the land. Development of disposed land could increase management difficulties and diminish resource values on adjacent BLM-administered lands (due to visual impacts, noise, barriers to migration, etc.). Reducing the resource values of BLM-administered land could increase the potential for disposal of additional BLM-administered land and result in long-term impacts to the lands and realty program. Lands identified for retention identify the BLM-administered land base to be kept in federal ownership; however, these lands could still be disposed of on a case-by-case basis. Lands kept in retention result in long-term impacts to the lands and realty program because land tenure adjustments and land use authorizations could occur on these lands, consistent with other resource objectives.

Under Alternative A, the BLM would consider the acquisition of private or state land to enhance resource objectives, consolidate management, and enhance public access in:

- Important wildlife areas;
- Public lands on the Bighorn, Shoshone, Clarks Fork of the Yellowstone, and Greybull rivers; Gooseberry Creek; the upper portions of Cottonwood and Grass creeks; and on lands where other riparian areas occur to enhance recreational opportunities and wildlife management;
- Lands with significant paleontological resources (case by case);
- Areas in the Bighorn River SRMA for hunting, fishing, boating, and camping;
- The Tatman Mountain Area for recreational opportunities;
- Areas in Horse Mountain, Trapper Creek, and White Creek for hunting, fishing, and camping;

- The Brokenback Logging Area, including North and South Brokenback creeks for hunting, fishing, boating, and camping;
- Areas in the South Bighorns including Otter Creek, Deep Creek, Little Canyon Creek, and along the Nowood River;
- The Canyon Creek area for hunting, fishing, and camping;
- Area in the Carter Mountain ACEC; and
- Bobcat Draw WSA.

Acquiring these areas could result in long-term beneficial impacts to the lands and realty program by enhancing management efficiency and consolidating land ownership in these areas. For example, riparian restoration projects have a higher chance for success when implemented along a continuous corridor of BLM-administered land than when applied to discontinuous tracts managed by multiple entities.

Under Alternative A, considering Desert Land Entry (DLE) applications for unclassified lands on a case-by-case basis, subject DLE criteria (43 CFR §2520), would cause long-term impacts to the lands and realty program by removing these lands from the land base for potential land use authorizations and land tenure adjustments. However, because most of the lands suitable for agricultural development in the Planning Area have already been transferred into private ownership, impacts would be minimal.

Land Use Authorizations

Under Alternative A, the BLM considers land use authorizations on a case-by-case basis consistent with other resource objectives. BLM would not classify, open, or make available any BLM-administered lands for agricultural entry under the Desert Land Act that meet one or more of the following criteria: unsuitable topography, presence of sensitive resources or resource conflicts, lack of water or access, small parcel size, or unsuitable soils. Impacts to lands and realty from land use authorizations result primarily from management actions associated with ROWs, communications sites, and renewable energy, which are discussed in their respective sections.

Withdrawals, Classifications, and Segregations

Under Alternative A, the BLM withdraws 72,861 acres from locatable mineral entry (Map 9) and pursues another 115,942 acres of land disposals. Table 4-27 summarizes withdrawals by area and type. Withdrawals that close areas to operation of the public land laws cause long-term impacts to the lands and realty program by limiting or restricting lands and realty actions in these areas.

Table 4-28. Land Retention and Disposal by Alternative

	Acreage					
	Alternative A	***Alternative B***	***Alternative C***	***Alternative D***	***Alternative E***	***Alternative F***
Retention	3,071,909	3,164,297	3,069,967	3,121,558	3,164,297	3,121,558
Disposal	115,905	24,042	117,845	66,363	24,042	66,363

Source: BLM 2013a

Alternative B

Land Tenure Adjustments

Alternative B identifies a total of 24,042 acres in the Planning Area for disposal by sale, exchange, or other means (Map 52) (Appendix M). Disposal can include none, some, or all of the mineral estate. All land actions to acquire or dispose of lands would require a site-specific analysis under NEPA. Alternative B identifies the remaining land base of 3,164,297 acres of BLM-administered land for retention. Table 4-28 lists acreages associated with retention and disposal under each alternative.

The impacts of retention and disposal would be less than those for Alternative A, because Alternative B identifies more areas for retention and a fewer areas for disposal.

Under Alternative B, the BLM would consider the acquisition of all areas identified under Alternative A. Under Alternative B, the BLM would also consider acquisition of the following:

- Private lands with vertebrate or other scientifically significant paleontological resources and values adjacent to public lands for protection via exchange, purchase, or donation from a willing seller;
- Lands and interests in lands for public access for motorized and/or mechanized access in the Trapper Creek RMZ;
- Lands and interests in lands in the Brokenback/Logging Road RMZ including Luman Creek Road, Military Creek Road, Dorn Draw Road, and other sites determined on a case-by-case basis;
- Lands and interests in lands in the South Bighorns RMZ including Cherry Creek Road to Hazelton Road Back Country Byway and Lysite Mountain, access to lands within Spring Creek, Spring Creek Road to Rome Hill Road, and other sites determined on a case-by-case basis; and
- Inholdings and lands or interests in lands within all WSA boundaries.

Impacts from acquisitions would be similar to Alternative A, although to a slightly greater extent because Alternative B considers more areas for acquisition.

Under Alternative B, the BLM would terminate existing DLE classifications and would not classify new lands for this purpose. This would result in long-term impacts to the lands and realty program by opening these lands to allocation under the public land laws. Because these areas are small (1,409 acres), impacts from opening these lands would be minimal.

Under Alternative B, disposing of the federal mineral estate under the Cody Industrial Park to entities who wish to purchase the surface estate would result in long-term impacts to lands and realty. Disposing of the mineral (sub-surface) estate along with the surface area would eliminate potential issues associated with split-estate management. However, disposing of federal mineral estate would reduce the total available land base of federal minerals in the Planning Area. A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate.

Under Alternative B, pursuing conservation easements on lands adjacent to areas managed as VRM Class I and II would result in long-term benefits to the lands and realty program by increasing the land base available for realty actions and increasing management effectiveness in these areas.

Land Use Authorizations

Under Alternative B, the BLM would consider land use authorizations on a case-by-case basis consistent with other resource objectives. Impacts to lands and realty from land use authorizations result primarily

from management actions associated with ROWs, communications sites, and renewable energy, which are discussed in their respective sections.

Withdrawals, Classifications, and Segregations

Under Alternative B, the BLM would pursue withdrawals from locatable mineral entry on a total of 314,223 acres in the Planning Area (Map 10). Alternative B would also pursue 2,724 acres of land disposals. Table 4-27 summarizes withdrawals by area and type of segregation. Alternative B identifies more areas for withdrawal than Alternative A, including select ACECs, WSR suitable waterway segments (27,317 acres), and the Cody Industrial Park (208 acres). Withdrawals that close areas to operation of the public land laws would result in impacts similar to Alternative A, although to a greater extent because Alternative B would withdraw more acreage.

Alternative C

Land Tenure Adjustments

Alternative C identifies a total of 117,845 acres in the Planning Area for disposal by sale, exchange, or other means (Map 53) (Appendix M). Disposal can include none, some, or all of the mineral estate. All land actions to acquire or dispose of lands would require a site-specific analysis under NEPA. Alternative C identifies the remaining land base of 3,069,967 acres of BLM-administered land for retention. Table 4-28 lists acreages associated with retention and disposal under each alternative.

Impacts from retention and disposal of lands would be similar to those for Alternative A; however, Alternative C identifies slightly less acres for retention and slightly more acres for disposal. As a result, Alternative C identifies more area for disposal and less area for retention than all other alternatives. The larger acreages of BLM-administered lands identified for disposal under Alternative C may benefit private landowners and community development more than the other alternatives.

Under Alternative C, the emphasis for acquisition of lands and interests in lands in recreation areas and special designations is to address use and user conflicts, public health and safety, or resource protection. Long-term impacts to the lands and realty program could result from not identifying lands that could increase management efficiency and help meet management objectives in these areas. Future acquisitions of lands or interests in lands to accomplish these goals may be more difficult.

Under Alternative C, considering DLE applications for unclassified lands on a case-by-case basis would result in the same impacts as for Alternative A.

Under Alternative C, maintaining the mineral estate under the Cody Industrial Park would result in long-term adverse impacts to lands and realty by creating a split-surface estate where the BLM administers sub-surface minerals and a private landowner manages the surface area. However, maintaining the federal mineral estate would retain the minerals in federal ownership and contribute to the overall federal mineral land base in the Planning Area. A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate.

Land Use Authorizations

Under Alternative C, the BLM would consider land use authorizations on a case-by-case basis consistent with other resource objectives. Impacts to lands and realty from land use authorizations result primarily from management actions associated with ROWs, communications sites, and renewable energy, which are discussed in their respective sections in this chapter.

Withdrawals, Classifications, and Segregations

Under Alternative C, the BLM would pursue locatable mineral withdrawals on a total of 48,095 acres of federal mineral estate in the Planning Area (Map 11). Existing withdrawals and segregations that are not carried forward will be allowed to expire. Table 4-27 summarizes withdrawals by area and type. Withdrawals that close areas to operation of the public land laws would result in impacts similar to Alternative A, although to a lesser extent because the BLM would withdraw fewer acres under Alternative C. Under Alternative C, the BLM would pursue the least area for withdrawals compared to the other alternatives.

Alternative D

Land Tenure Adjustments

Alternative D identifies a total of 66,363 acres in the Planning Area for disposal by sale, exchange, or other means (Map 54) (Appendix M). Disposal can include none, some, or all of the mineral estate, which would be determined through a mineral potential report. All land actions to acquire or dispose of lands would require a site-specific analysis under NEPA. Alternative D identifies the remaining land base of 3,121,558 acres of BLM-administered land for retention (Map 54). Table 4-28 lists acreages associated with retention and disposal under each alternative.

Impacts from retention and disposal of lands would be less than Alternative A. Alternative D has more area identified for disposal than Alternative B, but less than alternatives A and C. Alternative D identifies more area for retention than alternatives A and C, but less than Alternative B.

Under Alternative D, management and acquisition of lands along the Bighorn River would be similar to Alternative C, with the addition of other river tracts acquired over the life of the plan. Under Alternative D, areas considered for acquisition in the Bighorn River SRMA would be the same as for Alternative A, with similar long-term beneficial impacts. Similar to Alternative B, Alternative D emphasizes the acquisition of lands for legal and physical access in recreational areas to maximize recreational opportunities. Acquiring lands in recreational areas would result in long-term benefits in these areas by increasing management efficiency, consolidating ownership, and reducing the potential for trespass and illegal access.

Under Alternative D, considering DLE applications for unclassified lands on a case-by-case basis would result in the same impacts as Alternative A. Similar to Alternative B, disposing of the federal mineral estate under the Cody Industrial Park to entities who wish to purchase the surface estate would result in long-term impacts to lands and realty. However, disposing of the mineral (sub-surface) estate along with the surface area would eliminate potential issues associated with split-estate management described for Alternative C. A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate. Pursuing conservation easements on lands adjacent to areas managed as VRM Class I and II would result in long-term benefits, but pursuing these easements on a case-by-case basis may decrease the potential (and quantity) of easements compared to Alternative B.

Land Use Authorizations

Similar to the other alternatives, under Alternative D, the BLM considers land use authorizations on a case-by-case basis, consistent with other resource objectives. Impacts to lands and realty from land use authorizations result primarily from management actions associated with ROWs, communications sites, and renewable energy, which are discussed in their respective sections in this chapter.

Withdrawals, Classifications, and Segregations

Under Alternative D, the BLM would pursue withdrawals from locatable mineral entry on a total of 83,321 acres in the Planning Area (Map 12). Alternative D also pursues 625 acres of land disposals. Table 4-27 summarizes withdrawals by area and type of segregation. Withdrawals that close areas to operation of the public land laws would have similar impacts to Alternative A, although to a greater extent because the BLM would withdraw more acres under Alternative D. Under Alternative D, the BLM would pursue withdrawals for more acres than alternatives A and C but fewer than alternatives B and E.

Alternative E

Land Tenure Adjustments

Alternative E identifies the same acreage (24,042) as Alternative B in the Planning Area for disposal by sale, exchange, or other means (Map 55) for community expansion, exchanges, and other purposes, subject to the disposal criteria (Appendix M). Also as in Alternative B, Alternative E identifies the remaining land base of 3,164,297 acres of BLM-administered surface ownership for retention (Map 55). Table 4-28 lists acreages associated with retention and disposal under each alternative.

Impacts of retention and disposal would be less than Alternative A, as Alternative E identifies the same area for disposal as Alternative B. Along with Alternative B, Alternative E identifies the least amount of acreage for standard disposal compared to alternatives A, C, D and F.

The areas considered for acquisition under Alternative E are the same as Alternative B, but also include lands and interests to conserve, enhance, or restore greater sage-grouse habitat in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres).

Under Alternative E, the effects of terminating the existing DLE classifications and disposing of the federal mineral estate under the Cody Industrial Park would be the same as Alternative B.

In addition to the conservation easements pursued under Alternative B, Alternative E also pursues conservation easements on lands for the benefit of greater sage-grouse habitat. This would result in long-term benefits to the lands and realty program by increasing the land base available for realty actions and increasing management effectiveness in these areas.

Land Use Authorizations

Under Alternative E, the BLM considers land use authorizations on a case-by-case basis consistent with other resource objectives. Impacts to lands and realty from land use authorizations would result primarily from management actions associated with ROWs, communications sites, and renewable energy, which are discussed in their respective sections.

Withdrawals, Classifications, and Segregations

Under Alternative E, the BLM pursues withdrawals from locatable mineral entry on a total of 1,764,321 acres in the Planning Area (Map 13), including withdrawals in priority greater sage-grouse habitat from mineral entry. As with Alternative B, Alternative E would pursue 2,764 acres of land disposals. Table 4-27 summarizes withdrawals by area and type of segregation. Impacts from withdrawals that close areas to operation of the public land laws would be similar to Alternative A, but to a greater extent because Alternative E pursues withdrawals on the largest area of any alternative.

Alternative F

Land Tenure Adjustments

Alternative F identifies the same total as Alternative D in the Planning Area for locatable mineral withdrawals (Map 12) and disposals by sale, exchange, or other means (Map 54) for community expansion, exchanges, and other purposes, subject to the disposal criteria (Appendix M). Also as in Alternative D, Alternative F identifies the remaining land base of 3,121,558 acres of BLM-administered surface ownership for retention (Map 54). Table 4-28 lists acreages associated with retention and disposal under each alternative.

Like Alternative D, Alternative F has more area identified for disposal than Alternative B, but less than alternatives A and C, and identifies more area for retention than alternatives A and C, but less than Alternative B.

Impacts from retention and disposal of lands would be less than Alternative A.

Under Alternative F, considering DLE applications for unclassified lands on a case-by-case basis would result in the same impacts as Alternative A. Management of land tenure adjustments for the Cody Industrial Park, under Alternative F would be the same as Alternative B, and impacts to the lands and realty program would be the same as Alternative B.

Alternative F pursues the same conservation easements associated with areas managed as VRM Class I and II as Alternative D, and impacts to the lands and realty program would be the same as Alternative D. Similar to Alternative E, Alternative F pursues conservations easements to benefit greater sage-grouse habitat, and effects would be similar to those described under Alternative E.

Land Use Authorizations

Under Alternative F, the BLM would consider land use authorizations on a case-by-case basis, consistent with other resource objectives. Impacts to lands and realty from land use authorizations would result primarily from management actions associated with ROWs, communications sites, and renewable energy, which are discussed in their respective sections in this chapter.

Withdrawals, Classifications, and Segregations

Withdrawals, classifications, and segregations under Alternative F are the same as Alternative D, and impacts would be the same as Alternative D (see Table 4-27).

4.6.2 Renewable Energy

This section describes potential impacts to renewable energy development from implementing the alternatives. The BLM approves renewable energy facilities for wind, solar, and biomass through ROW authorizations. Therefore, the descriptions of impacts to ROWs and corridors in this chapter (including restrictions and avoidance and exclusion areas) apply to renewable energy development. This section focuses on management specific to renewable energy development in the alternatives that would increase, limit, or prohibit renewable energy development (in addition to that discussed in Section 4.6.3 *Rights-of-Way and Corridors*). Wind energy is the only type of anticipated renewable energy development in the Planning Area. Therefore, this section primarily describes impacts to wind-energy development. Map 56 shows wind-energy development potential in the Planning Area based on wind power class ratings. Impacts to geothermal resources are discussed in Section 4.2.4 *Leasable Minerals – Geothermal*.

Adverse impacts to renewable energy include management that limits or prohibits the development of renewable energy resources. Beneficial impacts to renewable energy result from management actions and resource uses that increase the potential for renewable energy development. Conversely, adverse impacts to renewable energy development result from actions or uses that decrease such development potential.

Direct impacts to renewable energy include management actions that designate renewable or ROW energy avoidance and exclusion areas. Other examples of direct impacts include resource uses that conflict with or prohibit the development of renewable energy, such as development of a surface mine in an area with a high wind-power-class rating. Indirect impacts to renewable energy include management actions that result in subsequent restrictions, such as management for resource values that require mitigation, relocation, or denial of authorizations for renewable energy. Impacts to renewable energy would be long-term.

4.6.2.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Wind energy is the most likely type of renewable energy to be developed in the Planning Area; however, due to emerging research and technology, other types of renewable energy development may increase during the life of the plan.
- With advances in technology, lands with moderate (Class 2 to 3) potential may become more attractive for renewable energy development.
- Wind-energy demand and development is expected to increase during the life of the plan related directly to energy prices, national and state policy involving renewable energy, and other factors that encourage demand for and development of renewable energy resources.
- Wind-energy development will be in accordance with the BLM Final Programmatic EIS on Wind Energy Development on BLM-Administered Lands in the Western United States, IM 2009-043 (Wind Energy Development Policy) and any future BLM policy or guidance for wind-energy development.
- Increased development of wind-energy turbines (or other renewable energy) also would increase the demand for ROW authorizations for transmission lines to distribute produced energy to the grid.
- The potential for wind-energy development in the Planning Area will be in direct relation to wind power classification ratings (Map 56), proximity to transmission lines, and impacts to other resources or resource uses (such as visual resources).
- For analysis purposes, the percentage of electrical energy generated from wind would increase from 0.8 percent of total generation in 2007 to 2.5 percent by 2030 (EIA 2009).
- Because the BLM authorizes facilities and infrastructure associated with wind, solar, and biomass development through ROW grants, the location and development of renewable energy facilities relates directly to the ability of the lands and realty staff to process ROW authorizations.
- Management objectives for other resources and resource uses may limit the location and development of wind-energy infrastructure in the Planning area.
- Mapping of renewable energy potential (wind power classifications) is based on a large-scale nationwide mapping (BLM 2005a). Site-specific monitoring and testing may indicate areas with higher (or lower) wind-energy potential than previously identified.

- Wind-energy development would likely occur in areas open to wind-energy development more than in areas avoided to wind-energy development.
- Any wind-energy development would require site-specific NEPA review.

4.6.2.2 Summary of Impacts by Alternative

Impacts to renewable energy development would result from restrictions that limit or prohibit renewable energy development, including the designation of renewable energy avoidance and exclusion areas. Each alternative proposes restrictions on renewable energy development to a varying degree of intensity.

Under Alternative A, no specific renewable energy avoidance or exclusion areas are identified. Alternative E includes the most restrictions and constraints to renewable energy development, with 1,945,204 acres managed as exclusion areas and 988,459 acres managed as avoidance areas. Alternative E also includes the most constraints to renewable energy development in ACEC areas, followed by alternatives B, F, D, and C, respectively. Alternative B is the second most constraining alternative, with 1,244,948 acres managed as renewable energy exclusion areas and 1,691,663 acres managed as avoidance areas. Alternative C is the least constraining to renewable energy development, with 148,416 acres managed as renewable energy exclusion areas and 1,611,040 acres managed as avoidance areas. Management under all alternatives would seek to minimize impacts to other resources from renewable energy development, which may result in adverse impacts through siting and design requirements and mitigation that could limit development (such as limits on allowable surface disturbance in priority greater sage-grouse habitat under alternatives D, E, and F).

4.6.2.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Under all alternatives, the development of renewable energy would consider the management and objectives of other resources. Considering the management of other resource objectives could restrict the development of renewable energy in certain areas or impose siting and design requirements or other mitigation that could limit the potential for development.

Government-to-government consultation with potentially affected Tribes could further limit or restrict the development of renewable energy in the Planning Area. However, consultation with Tribes could also increase the potential for successful renewable energy development by establishing communication with Tribes to allow for more effective and collaborative planning of projects.

Under all alternatives, WSAs are closed to renewable energy development, which would result in long-term adverse impacts by prohibiting the development of renewable energy in these areas.

Alternative A

Under Alternative A, no specific renewable energy avoidance or exclusion areas are identified. Renewable energy projects are considered on a case-by-case basis. However, exclusion and avoidance areas for ROWs would apply to the development of wind-energy (and solar and biomass) facilities. Wind-energy development also is constrained by existing management policies and prohibitions involving lands with high resource values. Case-by-case permitting of renewable energy projects increases the processing timeframe and costs associated with these facilities. Case-by-case permitting

of renewable energy could also result in a distributed pattern of renewable energy development and require additional ROW authorizations to support required infrastructure such as transmission lines to distribute the energy.

Management actions for ROW authorizations would have long-term impacts to renewable energy development. Management actions that restrict ROW authorizations in areas of high potential for wind energy (Map 56) would limit the potential for development in these areas. Additionally, management for ROWs that limits or restricts the development of ROWs (including transmission lines) in areas needed to connect renewable energy facilities to the electrical grid would also adversely impact renewable energy development.

Under Alternative A, all management for ROW exclusion and avoidance applies to renewable energy, except that renewable energy is open in the following areas, all of which are ROW avoidance areas:

- Brokenback/Logging Road RMZ
- South Bighorns area
- Canyon Creek area
- Basin Gardens Play Area
- Basin Gardens

Alternative A manages only the fossil concentration area in the Big Cedar Ridge ACEC and the Heart Mountain Relocation Center National Historic Landmark as ROW exclusion areas.

Requiring a visual contrast rating worksheet in VRM Class I areas for projects would affect renewable energy development in these areas; wind turbines cause a high degree of visual impact because of their size. A visual contrast rating worksheet may reveal visual impacts of renewable development and result in mitigation to meet VRM objectives in VRM Class I areas, or the BLM may prohibit development if visual impacts cannot be adequately mitigated.

Alternative B

Under Alternative B, a total of 251,203 acres is open to renewable energy development (area not included in renewable energy avoidance or exclusion areas). Identifying areas open to renewable energy development would reduce the potential for adverse impacts associated with case-by-case permitting described under Alternative A.

Under Alternative B, a total of 1,691,663 acres are managed as renewable energy avoidance areas. Managing renewable energy avoidance areas would create long-term adverse impacts by limiting the development of renewable energy in these areas and potentially placing additional constraints, mitigation, monitoring, or other stipulations on development approved in avoidance areas. Under Alternative B, the Chapman Bench, Foster Gulch Paleontological Area, McCullough Peaks South Paleontological Area, Rainbow Canyon, and Sheep Mountain ACECs are managed as renewable energy avoidance areas.

Under Alternative B, a total of 1,244,948 acres are managed as renewable energy exclusion areas. Allocation of renewable energy exclusion areas would result in long-term adverse impacts by prohibiting the development of renewable energy in these areas. Under Alternative B, the Clarks Fork Basin/Polecat Bench, Clarks Fork Canyon, and Rattlesnake Mountain ACECs are managed as renewable energy exclusion areas.

Under Alternative B, all management for ROW exclusion and avoidance applies to renewable energy except that renewable energy is excluded in the Brokenback/Logging Road RMZ, which is a ROW avoidance area.

Designation of ACECs under Alternative B would create adverse impacts to renewable energy as these areas are all managed as renewable energy avoidance or exclusion areas. Renewable energy development would be limited or prohibited in these areas.

Avoiding wind-energy development in big game winter ranges, raptor concentration areas, and mitigating wind-energy development for the protection of greater sage-grouse nesting, brood-rearing, and winter concentration areas would result in long-term adverse impacts to renewable energy by limiting development in these areas.

Managing areas within 5 miles of trails and eligible NRHP and TCP sites as exclusion areas for wind-energy development (unless screened from the site by intervening topography) would result in long-term adverse impacts to renewable energy by prohibiting facilities in these areas.

Requiring a visual contrast rating worksheet in VRM Class I, II, or III areas and requiring a visual simulation and design mitigation for all areas viewable from VRM Class I and II areas would create adverse impacts to renewable energy development. Wind turbines are large structures and these VRM requirements prior to project approval may limit wind-energy development in these areas or necessitate certain design requirements that make projects infeasible.

Alternative C

Under Alternative C, a total of 1,428,360 acres are open to renewable energy development (area not included in renewable energy avoidance or exclusion areas). Identifying areas open to renewable energy development would reduce the potential for adverse impacts associated with case-by-case permitting described under Alternative A. Implementation of Alternative C would result in an approximate 469 percent increase in area open for renewable energy development compared to Alternative B.

Under Alternative C, a total of 1,611,040 acres are managed as renewable energy avoidance areas. Long-term impacts would be similar to those described for Alternative B, although to a lesser extent because Alternative C allocates less acreage.

Under Alternative C, a total of 148,416 acres are managed as renewable energy exclusion areas. Impacts would be the same as for Alternative B, although to a lesser extent because Alternative C allocates less acreage.

Managing areas within 5 miles of trails and eligible NRHP and TCP sites as avoidance areas for wind-energy development (unless screened from the site by intervening topography) would create adverse long-term impacts to renewable energy by limiting facilities in these areas. If renewable energy is allowed in these areas, it may require substantial siting and design requirements and other BMPs to ensure the protection of cultural resources.

Requiring a visual contrast rating worksheet in VRM Class I areas would result in the same impacts to renewable energy development as those described under Alternative A, although to a lesser extent because of exemptions in allocated ROW corridors.

Alternative D

Under Alternative D, a total of 1,315,309 acres are open to renewable energy development (area not included in renewable energy avoidance or exclusion areas). Identifying areas open to renewable energy development would reduce the potential for adverse impacts associated with case-by-case permitting described under Alternative A. Alternative D would result in approximately 424 percent more area open for renewable energy development than Alternative B and approximately 8 percent less than Alternative C.

Alternative D manages a total of 1,500,395 acres as renewable energy avoidance areas. Long-term impacts would be similar to Alternative B, although to a lesser extent because Alternative D allocates less acreage as avoidance areas. Similar to Alternative B, Alternative D designates the Chapman Bench area and the Sheep Mountain ACEC as a renewable energy avoidance area.

Alternative D manages a total of 372,110 acres as renewable energy exclusion areas. Impacts would be the same for Alternative B, although to a greater extent because Alternative D allocates more acreage as exclusion areas.

Collocating renewable energy ROWs where possible in the Southern Bighorns ERMA may result in long-term impacts to renewable energy development by limiting the location of renewable energy facilities and related infrastructure (e.g., roads and transmission lines) in this area.

Avoiding wind-energy projects in big game winter range, raptor concentration areas, and greater sage-grouse PHMAs would result in long-term impacts to renewable energy similar to Alternative B. Avoidance in these areas would constrain the development of wind resources.

Avoiding surface-disturbing activities (including renewable energy development) up to 3 miles from important cultural sites and requiring the use of BMPs to avoid, minimize and/or compensate adverse impacts would result in lesser long-term adverse impacts to renewable energy than those described under alternatives B and C. If renewable energy development is allowed in these areas, authorization may require substantial siting and design requirements and other BMPs to protect important cultural sites.

Requiring a visual contrast rating worksheet in VRM Class I areas would result in the same impacts to renewable energy development as those described under Alternative A.

Alternative E

Under Alternative E, a total of 254,151 acres are open to renewable energy development (areas not included in renewable energy avoidance or exclusion areas), which is slightly more than Alternative B (251,203 acres), and impacts to renewable energy development would be similar to those described under Alternative B.

Under Alternative E, a total of 988,459 acres are managed as renewable energy avoidance areas and 1,945,204 acres are managed as renewable energy exclusion areas (Map 60). Alternative E allocates additional acreage (700,256 acres) as renewable energy exclusion areas in comparison to Alternative B. The single largest contributing factor to the increase in renewable energy exclusion areas under Alternative E, compared to Alternative B, is the management of the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). The amount of renewable energy exclusion areas (61 percent of the BLM-administered surface in the Planning Area) may affect the ability of project proponents to site renewable energy on BLM-administered surface lands. In addition, Alternative E manages 24 percent of BLM-administered surface lands as a ROW avoidance area, potentially adversely affecting the ability of

proponents to develop on inholdings and other non BLM-administered lands that would require a BLM ROW for access or new electrical transmission to move generated power off-site. However, wind-energy potential is generally low across the Planning Area (66 percent is classified as "poor" and 25 percent "marginal"), and the BLM anticipates that even with these additional restrictions, renewable energy development on BLM-administered land would be approved at the same rate as Alternative B, and impacts would be similar to Alternative B.

Management for cultural sites, VRM, and other considerations that could affect the development of renewable energy under Alternative E is the same as Alternative B, and impacts to renewable energy would be the same as Alternative B.

Alternative F

Under Alternative F, a total of 607,429 acres are open to renewable energy development (areas not included in renewable energy avoidance or exclusion areas). Identifying areas open to renewable energy development would reduce the potential for adverse impacts associated with case-by-case permitting described under Alternative A. Alternative F would manage more area open for renewable energy development than alternatives B and E, but less than alternatives C and D.

Under Alternative F, a total of 2,507,581 acres are managed as renewable energy avoidance areas, the most of any alternative. Alternative F allocates 292,949 acres as renewable energy exclusion areas, which is more than Alternative C, but less than alternatives E, B, and D, respectively (Map 61). Alternative F manages habitat (including big game winter ranges and raptor concentration areas) consistent with Alternative D, except that Alternative F manages the Greater Sage-Grouse PHMAs ACEC as a renewable energy avoidance area. Within the Greater Sage-Grouse PHMAs ACEC, the BLM only authorizes new applications for wind power development where a proponent could demonstrate that no declines in greater sage-grouse PHMA populations would occur. In addition, proponents are not permitted to exceed one disturbance per 640 acres or disturb more than 3 percent of sagebrush habitat in PHMAs. Long-term impacts under Alternative F would be similar to Alternative D, except that additional "no decline" requirements and stricter surface disturbance restrictions in priority greater sage-grouse habitat would place additional limitations on the ability to develop renewable energy resources. Unlike Alternative E, Alternative F allows new ROWs, subject to applicable surface disturbance restrictions, to access private and state inholdings, reducing potential adverse effect on renewable energy development in these non BLM-administered lands. However, as noted under Alternative E, because wind-energy potential is generally low across the Planning Area, the effects of additional restrictions on renewable energy may be limited.

Management for cultural sites, VRM, and other considerations that could affect the development of renewable energy under Alternative F are the same as Alternative D, and impacts to renewable energy would be the same as Alternative D.

4.6.3 Rights-of-Way and Corridors

This section describes the potential impacts to ROWs and corridors from implementation of the alternatives. ROWs are for infrastructure and facilities that are in the public interest and require authorization for location over, under, on, or through BLM-administered land. A ROW grant is a land use authorization for a specific area of public land for certain types of projects, such as developing roads, pipelines, transmission lines, and communication sites. Renewable energy facilities (wind, solar, biomass) are also authorized through a ROW, and impacts discussed in this section apply to ROW

authorizations for renewable energy. However, specific impacts to renewable energy from management under the alternatives are discussed in Section 4.6.2 *Renewable Energy*. This section focuses on how management actions could impact ROWs and corridors by increasing, limiting, or preventing the potential for these authorizations.

The most common type of adverse impact to ROWs results from restrictions that limit or prohibit the location of ROWs or corridors because of other resource values and objectives. Adverse impacts result from implementing management actions that influence or modify the location, size, or design of a ROW authorization, require substantial mitigation, or, in some cases, preclude approval of the application. Beneficial impacts to ROWs and corridors result from management actions that increase the area available for ROWs and reduce restrictions on ROW authorizations. Direct impacts to ROWs and corridors can result from management actions that allocate an area for ROW avoidance or exclusion, or management actions that designate specific ROW corridors or concentration areas. Indirect impacts to ROWs and corridors can result from management that results in subsequent restrictions on ROW authorizations, such as management for resource values or uses that require mitigation, relocation, or denial of ROW authorizations. All impacts to ROWs would be long-term.

4.6.3.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- ROW grants will be directly proportional to the development of other resources and resource uses in the Planning Area.
- In terms of major utility lines, companies would focus first on the maintenance and upgrading of existing lines before undertaking new construction of major utility lines in the Planning Area.
- New construction of major infrastructure and utility facilities will be based on public need and demand.
- ROWs will be granted to qualified individual, business, or government entities in a manner which protects natural resources associated with public lands and adjacent lands, whether administered by the government or a private entity (43 CFR 2801).
- At ROW renewal, existing ROWs would be allowed to continue without cost prohibitive restrictions, where appropriate. In general grants would be allowed to continue under existing constraints.
- Existing ROWs and communication sites would be managed to protect valid existing rights.
- If the current rate of ROW development continues, designated corridors should adequately meet future needs over the life of the plan. Under this rate of development, corridors may eventually be more intensely used, but unsafe or unreliable conditions are not anticipated.
- ROW corridors and communication site concentration areas are designated as the preferred future locations for ROWs.
- ROW authorizations would require the appropriate level of site-specific environmental analysis.

4.6.3.2 Summary of Impacts by Alternative

Impacts to ROWs and corridors would result from management actions that limit, prohibit, or increase the potential for ROWs and include the management of ROW avoidance and exclusion areas, ROW corridors, and resource specific restrictions and stipulations on surface-disturbing activities and ROW authorizations. ROW avoidance and exclusion areas would both result in adverse impacts by prohibiting

or limiting the development of ROWs and potentially resulting in additional constraints, mitigation, and other stipulations. ROW avoidance and exclusion areas are the greatest under alternatives E (2,933,608 acres) and B (2,936,142 acres) followed by alternatives D and F (2,449,464 acres), Alternative C (1,180,748 acres), and Alternative A (1,002,090 acres). Alternative A includes the most area allocated for ROW corridors (787,618 acres) which would reduce the potential for resource conflict and additional mitigation or modification of ROW facilities, followed by alternatives D and F (131,852 acres), and alternatives B, C, and E allocating the least (133,184 acres). Overall, Alternative C has the lowest level of constraints that would prohibit ROW authorizations and may result in the greatest number of new ROWs and communication sites. Alternative E includes the most constraints that would limit or prohibit ROW authorizations and would result in the fewest new ROWs and communication sites.

4.6.3.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Withdrawing areas from locatable mineral entry or closing areas to oil and gas development may reduce requests for ROWs and other land use authorizations. However, closure of these areas may concentrate ROWs in other parts of the Planning Area that are open to mineral exploration and development.

All alternatives include limitations and restrictions on surface-disturbing activities, including ROWs. Restrictions on surface-disturbing activities result in long-term adverse impacts to ROWs by limiting or prohibiting the authorization of ROWs or corridors to meet other resource objectives. Limitations and restrictions on ROWs may also require modification of the location, size, or design of facilities associated with a ROW grant. Management of ROWs in areas with limitations on surface-disturbing activities may require additional mitigation and monitoring to ensure ROW development and operation is in accordance with established resource management objectives.

Managing ROW exclusion areas would result in long-term impacts to ROWs and corridors by prohibiting or limiting ROWs in these areas. Management of ROW exclusion areas may prohibit the location of ROWs along the most direct route for the intended purpose (for linear infrastructure such as transmission lines). This may result in increased potential for additional ROW authorizations in other locations.

Allocating ROW avoidance areas would increase mitigation costs to ensure that development is consistent with management objectives for other resources. Managing ROW avoidance areas would result in long-term adverse impacts to ROWs by limiting the development of ROWs in these areas and potentially placing additional constraints, mitigation, monitoring, and other stipulations on any ROWs that are approved in avoidance areas. All alternatives manage the following areas as ROW avoidance areas:

- Areas having a 25 percent slope or greater
- Cave and karst areas
- The Spanish Point Karst ACEC
- WSAs

Under all alternatives, providing reasonable access through ROW authorizations on BLM-administered land for access to private land would result in long-term beneficial impacts by allowing ROW authorizations to private landowners and preventing potential trespass and illegal access issues.

Requiring on-the-ground surveys, resource inventories, and site-specific NEPA analysis prior to any surface-disturbing activity (including ROW authorizations) could require modification to the location, size, or design of facilities and infrastructure or, in some cases, preclude approval of the proposal. These adverse impacts would primarily occur from the implementation of management actions designed to protect resources and limit impacts to those resources from surface-disturbing activities. Management that results in the relocation or redesign of proposed ROWs would increase processing timeframes related to ROW authorizations. This impact would be further increased if relocation resulted in longer linear routes or placement of ROWs in areas that are difficult to develop. If avoidance of sensitive resources is not possible, other mitigation measures would be required, such as application of height and color specifications that serve to redesign ROWs to meet the goals and objectives for other resources.

Management of recreation management areas (SRMAs and ERMAs) and special designations including ACECs and WSRs would affect ROW authorizations in these areas by applying restrictions and stipulations on surface-disturbing activities and ROW development consistent with management objectives. Management prescriptions in these areas generally limit the location of ROWs or prescribe mitigation, BMPs, or monitoring to minimize adverse impacts from development and operation.

Mitigation measures, surface use restrictions, and timing limitations on surface disturbance in wildlife, threatened and endangered species, and riparian habitat would have long-term impacts to ROWs by prohibiting or limiting the potential for ROW authorizations in these areas. Limiting or prohibiting ROW authorizations in these areas may induce ROW authorizations in other areas to meet public use and demand. Seasonal timing limitations for surface-disturbing activities (including ROWs) in wildlife habitat could cause additional adverse impacts to ROWs by requiring construction activities to start and stop at certain times of the year; which could increase costs associated with ROW development.

Management to meet VRM objectives could affect the location, route, height, and color of proposed ROWs and associated facilities. Additional effort would be required to design projects to meet the objectives of the specific VRM class designation of an area in which a ROW is proposed. Because ROWs would generally be compatible with VRM Class IV objectives, this classification would allow increased opportunities for ROW authorizations. This is also true for VRM Class III objectives; however, some additional project planning may be necessary in VRM Class III areas to ensure that the landscape is partially retained. Surface-disturbing activities in areas managed as VRM Class II and VRM Class I would be limited or would require mitigation to minimize visual contrasting elements of projects. Under all alternatives, VRM objectives would be considered before authorizing land uses that may affect the visual character of the landscape. VRM class allocations by alternative would potentially limit or prevent ROW authorizations and are discussed below under each alternative.

Designating ROW corridors could benefit ROW authorizations associated with minerals development and major utility projects. ROW development would benefit from placement in a corridor where land use conflicts have been eliminated or reduced. Designated corridors are intended to reduce resource and land use conflicts as much as possible; which could reduce the potential for modification, or mitigation needed to approve a ROW and develop infrastructure and facilities. Designating and preferring the location of ROW authorizations in corridors could also create adverse impacts to ROWs by preventing the location of ROWs along the most direct route for the intended purpose, or preventing additional ROW authorizations in a corridor that may compromise system safety and reliability. This may result in increased potential for additional ROW authorizations and additional resource surveys and site-specific environmental analysis; which could increase costs and timeframes for ROW authorization and development.

Alternative A

Resource Uses

Under Alternative A, a total of 787,618 acres of BLM-administered surface are designated for ROW corridors (Map 63). Designating ROW corridors would result in impacts similar to those described under *Impacts Common to All Alternatives*.

Under Alternative A, a total of 940,943 acres are managed as ROW avoidance areas (Map 63). Allocation of ROW avoidance areas would result in long-term adverse impacts by limiting ROW authorizations in these areas. Under Alternative A, the BLM designates a total of 61,147 acres as ROW exclusion areas (Map 63). Managing ROW exclusion areas can result in long-term adverse impacts by prohibiting ROW authorizations in these areas.

Under Alternative A, authorization of communication site facilities would occur on a case-by-case basis, and encourage development within designated areas, while co-locating new communication sites where possible. Avoiding the placement of aboveground facilities such as powerlines along major transportation routes would result in long-term impacts to ROWs by limiting the location of aboveground facilities along already disturbed areas. Therefore, ROW authorizations may be more likely to be developed in previously undisturbed areas, which may require additional resource inventories and surveys before ROW authorization, and depending on the presence of resources, additional mitigation and monitoring.

Under Alternative A, a case-by-case development of renewable energy could result in a distributed pattern of renewable energy development and require additional ROW authorizations to support required infrastructure, such as transmission lines, to distribute the energy.

Special Designations

Management of ROW avoidance and exclusion areas in ACECs and other special management areas would result in adverse impacts to ROWs by limiting or prohibiting ROW authorizations in these areas. Under Alternative A, the BLM manages the fossil concentration area of the Big Cedar Ridge ACEC as a ROW exclusion area and management in ACECs would result in 67,727 acres of ROW avoidance areas. Prohibiting surface-disturbing activities (including construction and development of ROWs) above cave and cave passages in the Sheep Mountain Anticline ACEC would result in adverse impacts to ROWs by prohibiting authorizations in these areas.

Avoiding surface-disturbing activities within ¼ mile of the Nez Perce NHT would result in adverse impacts to ROWs by limiting ROW authorizations in these areas. Avoiding surface-disturbing activities in the immediate vicinity of important cultural resources and canals and in view within ¼ mile of significant segments of the Bridger Trail and the Fort Washakie to Meeteetse to Red Lodge Trail would also result in adverse impacts to ROWs by limiting ROW authorizations in these areas.

Resources

Prescribing specific timing limitations under Alternative A could eliminate the potential for discretionary seasonal limitations when reviewing and approving ROW authorizations. Additionally, avoiding or excluding surface-disturbing activities (including ROWs) during portions of the year may limit the development of ROWs in these areas by creating start/stop cycles in construction and operation that may make projects infeasible. Under Alternative A, the following areas include timing limitations for ROW avoidance or exclusion:

- Big game crucial winter range (1,324,371 acres) from November 15 through April 30
- Greater sage-grouse nesting and early brood-rearing habitats within 2 miles of occupied greater sage-grouse leks (834,543 acres) or in identified greater sage-grouse nesting and brood-rearing habitat outside the 2-mile buffer from March 15 to July 15 (February 1 to July 31 in CYFO)
- Greater sage-grouse winter concentration areas from November 15 to March 14
- Within ¾-mile radius of any active raptor nest sites (337,662 acres) from February 1 through July 31

Managing VRM Class I (141,127 acres) and VRM Class II (340,784 acres) areas may result in adverse impacts to ROWs by limiting development that would not meet associated VRM objectives or may require specific design or mitigation guidelines for ROW authorization.

Alternative B

Resource Uses

Under Alternative B, a total of 133,184 acres of BLM-administered surface are designated for ROW corridors (Map 64). Management of ROW corridors would result in similar impacts as under Alternative A, although to a lesser extent because Alternative B would designate 654,434 fewer acres as ROW corridors compared to Alternative A.

Alternative B manages a total of 2,710,695 acres as ROW avoidance areas (Map 64). Managing ROW avoidance areas would result in adverse impacts similar to Alternative A, although to a greater extent because Alternative B manages 1,769,752 more acres as ROW avoidance areas than Alternative A. Alternative B manages a total of 225,447 acres as ROW exclusion areas (Map 64). Managing ROW exclusion areas would result in adverse impacts similar to Alternative A, although to a greater extent because Alternative B manages 164,300 more acres as ROW exclusion than Alternative A.

Under Alternative B, prohibiting communication sites in all avoidance and exclusion areas and requiring the co-location of sites would create long-term impacts to ROWs. ROW avoidance and exclusion areas comprise a large portion (2,936,142 acres) of the Planning Area under Alternative B, and prohibiting communications sites in these areas could prevent the location of these sites in operator-preferred locations. As a result, additional ROWs and associated facilities may be required in less than optimal locations, from an operator's perspective, to meet the goals and objectives of a project and meet community expansion and telecommunications needs. Additionally, a closure of Tatman Mountain for emergency communications would adversely impact the dispatch abilities of Big Horn County emergency services (i.e., ambulance, fire, search and rescue, and law enforcement).

Concentrating aboveground facilities along major transportation routes would have long-term impacts on the lands and realty program by encouraging ROW development in already disturbed areas, which may decrease potential mitigation and monitoring and reduce processing time. Conversely, preferring concentration of aboveground facilities in these areas, along with prohibiting construction in ROW

exclusion areas and limiting these facilities in ROW avoidance areas, may prevent the location of aboveground facilities along the most direct route for the intended purpose. This may result in increased potential for additional ROW authorizations, and associated resource surveys and site-specific environmental analysis, which could increase costs and time for ROW authorization and development.

Considering night skies in the evaluation of ROW applications and applying BMPs as appropriate could increase the processing time and costs for ROWs and potentially limit the approval of ROW authorizations when impacts cannot be adequately mitigated.

Special Designations

Managing ROW avoidance and exclusion areas in ACECs and other Management Areas would result in adverse impacts similar to Alternative A, although to a greater extent because Alternative B would designate more ACECs. Under Alternative B, management in ACECs would result in 56,942 acres of ROW exclusion areas and 245,480 acres of ROW avoidance areas. Alternative B includes more ROW avoidance and exclusion areas in ACECs compared to Alternative A. Prohibiting surface-disturbing activities (including construction and development of ROWs) above cave and cave passages in the Sheep Mountain Anticline ACEC would result in the same adverse impacts as those described under Alternative A. Managing all lands with wilderness characteristics specifically to preserve their wilderness characteristics under Alternative B would result in long-term impacts to ROWs by avoiding or prohibiting surface-disturbing activities in these areas.

Management for NHTs and Other Historic Trails would result in adverse impacts to ROWs similar to Alternative A, although to a greater extent because Alternative B avoids surface-disturbing activities in a larger area (within 5 miles of the Nez Perce NHT and Other Historic Trails). Exempting existing utility corridors from this restriction within 5 miles of other trails may reduce adverse impacts to ROW corridors compared to Alternative A.

Under Alternative B, avoiding surface-disturbing activities in view within 5 miles of Heart Mountain Relocation Center National Historic Landmark would result in adverse impacts by limiting ROW authorizations in these areas or requiring mitigation or other stipulations to minimize impacts to Heart Mountain.

Prohibiting surface-disturbing activities in all WSR suitable waterway segments would result in adverse impacts to ROWs by preventing ROW authorizations in these areas.

Resources

Mitigation measures, surface-use restrictions, and timing limitations on surface disturbance in wildlife, threatened and endangered species and riparian habitat would result in impacts similar to Alternative A, although to a greater extent because Alternative B places more restrictions on surface-disturbing activities in these areas and has more areas with restrictions.

Alternative B manages big game crucial winter range (1,324,371 acres) as ROW avoidance areas. There would be more adverse impacts to ROWs in these areas than under Alternative A because Alternative B avoids areas year-round.

Under Alternative B, impacts to ROWs from management of greater sage-grouse would be similar to Alternative A, although to a greater extent because Alternative B has more year-round restrictions. Alternative B manages the following areas as ROW mitigation or exclusion areas:

- Within 0.6 mile of occupied greater sage-grouse leks (117,398 acres)
- Within 3 miles of occupied greater sage-grouse leks (1,526,277 acres) or in identified nesting and early brood-rearing habitat outside the 3-mile buffer from February 1 through July 31
- Greater sage-grouse winter concentration areas
- Greater sage-grouse Key Habitat Areas (1,232,583 acres)

Timing limitations for the protection of nesting raptors would result in impacts similar to Alternative A, although to a greater extent because Alternative B includes larger buffer areas associated with timing limitations.

Managing the Absaroka front as a ROW avoidance area (130,872 acres) would result in adverse impacts to ROWs by limiting authorizations in this area or requiring mitigation and monitoring to reduce adverse impacts to resource values.

Avoiding surface-disturbing activities (including ROW authorizations) in view within 5 miles of important cultural sites where the integrity of setting is a contributing element of NRHP significance may result in adverse impacts to ROWs, especially major ROWs that have larger surface disturbance and higher potential to affect the integrity of setting. Exempting designated utility corridors from this restriction would reduce impacts to linear ROWs in designated corridors. Under Alternative B, management of cultural resources would have greater adverse impacts to ROWs than Alternative A.

Impacts from VRM would be similar to those under Alternative A, except more area is managed as VRM Class I (154,359 total acres) and VRM Class II (1,784,854 total acres); which would increase the restrictions designed to protect visual resources and would subsequently decrease opportunities for ROW authorizations in these areas.

Alternative C

Resource Uses

Alternative C designates a total of 133,184 acres of BLM-administered surface for ROW corridors (Map 65). Impacts to ROWs from the designation of ROW corridors would be similar to those described under Alternative B, because Alternative C designates a similar acreage of ROW corridors.

Alternative C manages a total of 1,173,162 acres as ROW avoidance areas and 7,586 acres as ROW exclusion areas (Map 65). Managing ROW avoidance would result in impacts similar to Alternative A, although to a greater extent because Alternative C manages 232,219 more acres as ROW avoidance areas. Conversely, Alternative C manages 53,561 less acres as ROW exclusion areas compared to Alternative A, reducing impacts to ROWs from this management compared to that alternative. Alternative C manages more area as ROW avoidance areas and less area as ROW exclusion areas than Alternative A, and fewer avoidance and exclusion areas than alternatives B and D.

Avoiding the placement of aboveground facilities such as powerlines along major transportation routes under Alternative C would result in the same long-term impacts as Alternative A. Under Alternative C, the authorization of communication site facilities would be the same as Alternative A, and would result in the same impacts as Alternative A.

Special Designations

Management of ACECs would result in adverse impacts similar to Alternative A by limiting authorizations in these areas, although to a lesser extent because Alternative C manages only two ACECs. Management in the Spanish Point Karst ACEC would create 6,298 acres of ROW avoidance area, the least ROW avoidance and exclusion areas in ACECs compared to the other alternatives.

Avoiding surface-disturbing activities within ¼ mile of the Nez Perce NHT would result in impacts similar to Alternative A. Avoiding surface-disturbing activities in view within ¼ mile of other trails would result in impacts similar to Alternative A, although to a greater extent. Alternative C includes all regionally important prehistoric and historic trails (i.e., Other Historic Trails); Alternative A includes only significant segments of the Bridger Trail and the Fort Washakie to Meeteetse to Red Lodge Trail. Exempting existing utility corridors from this restriction would further reduce adverse impacts compared to Alternative A. Management of NHTs and other trails would result in fewer adverse impacts to ROWs than alternatives A and B.

Resources

Exempting Oil and Gas Management Areas (Map 24) and ROW corridors (Map 65) from seasonal stipulations would have long-term beneficial impacts to ROWs and corridors by increasing the potential for authorizations in these areas, allowing year-round construction, and eliminating the potential for discretionary seasonal limitations applied to ROW authorizations in these areas. Mitigation measures, surface use restrictions, and timing limitations on surface disturbance in wildlife, threatened and endangered species, and riparian habitat would result in fewer impacts than Alternative A because Alternative C includes fewer restrictions in these areas.

Adverse impacts to ROWs from management of greater sage-grouse under Alternative C would be similar to under Alternative A, except that shorter periods associated with certain seasonal limitations could reduce impacts from project delay and disruption to a greater extent under this alternative.

Under Alternative C, there would be fewer adverse impacts to ROWs from management of raptor nests than under the other alternatives because Alternative C includes a smaller buffer area (¼ mile) associated with seasonal restrictions.

Managing cultural resources would result in adverse impacts to ROWs similar to Alternative B, although to a lesser extent because Alternative C reduces the avoidance area to a ¼-mile buffer. Under Alternative C, there would be fewer adverse impacts to ROWs from managing cultural resources than under any other alternative.

Under Alternative C, impacts from VRM would be similar to Alternative A, except Alternative C manages slightly less area as VRM Class I (140,976 acres) and VRM Class II (333,027 acres). This could decrease the level of restrictions designed to protect visual resources and may increase opportunities for ROW authorizations in the Planning Area.

Alternative D

Resource Uses

Alternative D manages a total of 131,852 acres of BLM-administered surface for ROW corridors (Map 66). Alternative D would result in impacts to ROWs from the designation of ROW corridors similar to those described under Alternative B, because the alternatives designate similar amounts of area for ROW corridors. Alternative D has more area designated for ROW corridors than alternatives B and C, but less than Alternative A.

Alternative D manages a total of 2,408,662 acres as ROW avoidance areas (Map 66). Designating these avoidance areas would cause adverse impacts similar to Alternative A, although to a greater extent because Alternative D designates 1,467,719 more acres than Alternative A.

Alternative D manages a total of 40,802 acres as ROW exclusion areas. Managing these exclusion areas would result in impacts similar to Alternative A, although to a lesser extent because Alternative D designates 20,345 fewer acres than Alternative A.

Avoiding the placement of aboveground powerlines in the areas identified under Alternative D would result in adverse impacts to linear ROWs by limiting these authorizations in the identified areas. If the BLM authorizes aboveground powerlines in these areas, specific design guidelines and mitigation may be required to reduce adverse impacts to resource values. Under Alternative D, the authorization of communication site facilities would be the same as Alternative A, and would result in the same impacts as Alternative A.

Considering night skies in the evaluation of ROW applications would result in the same impacts as Alternative B.

Special Designations

Managing ROW avoidance and exclusion areas in ACECs and other management areas would result in adverse impacts similar to Alternative A, although to a greater extent because Alternative D includes more ACECs and other management areas and more acreage of these areas. Under Alternative D, management in ACECs would result in 13,619 acres of ROW exclusion areas and 81,765 acres of ROW avoidance areas. ACEC designations under Alternative D would result in more ROW avoidance and exclusion areas compared to alternatives A and C, but less than Alternative B. Allowing minor ROW authorizations and other minor surface-disturbing activities in the Clarks Fork Basin/Polecat Bench West Paleontological ACEC and the Foster Gulch Paleontological ACEC only if preceded by a paleontological survey may result in adverse impacts by limiting ROW authorizations in these areas. Designating the Chapman Bench Management Area would result in 3,425 acres of ROW avoidance area. Prohibiting surface-disturbing activities (including ROW construction and development) above caves and cave passages in the Sheep Mountain Anticline ACEC would result in adverse impacts similar to Alternative A.

Prohibiting development with a moderate or strong contrast in the viewshed of the Heart Mountain Relocation Camp would result in adverse impacts similar to Alternative B, although to a greater extent because Alternative B only avoids surface-disturbing activities in view within 5 miles of the Heart Mountain National Historic Landmark. However, under Alternative D, the BLM may authorize more ROWs that could result in less than moderate contrast in this area compared to Alternative B.

Avoiding surface-disturbing activities up to 3 miles from the NHT (and 2 miles from Other Historic Trails) where the setting is an important aspect of the trail would cause impacts to ROWs similar to Alternative B, although to a lesser extent because Alternative D includes less acreage (distance from NHT and Other Historic Trails). Similar to alternatives B and C, exempting these restrictions in existing utility corridors would reduce these impacts in ROW corridors. Under Alternative D, management of NHTs and historic trails would result in greater adverse impacts to ROWs than alternatives A and C, but less than Alternative B.

Resources

Impacts to ROWs from management of big game crucial winter range would be similar to Alternative A, although to a lesser extent because of the exemption of Oil and Gas Management Areas from discretionary big game seasonal limitations.

Impacts to ROWs from management of greater sage-grouse would be greater than under Alternative A, because Alternative D includes more restrictions and timing limitations inside and outside greater sage-grouse PHMAs. Alternative D only authorizes major overhead powerlines in greater sage-grouse PHMAs if they are constructed within 0.5 miles of existing 115 kV or greater powerlines or within a designated corridor, which could increase the costs and complexity of utility projects by limiting development to specific corridors where construction, maintenance, and repairs must be coordinated with other utility owners.

Management of raptor nests would result in similar adverse impacts to ROWs as under Alternative A, although to a lesser extent because Alternative D includes less acreage associated with restrictions and seasonal limitations. Under Alternative D, there would be more impacts from management of raptor nests than under Alternative C, but less than under alternatives A and B.

Managing the Absaroka Front Management Area with measures to protect wildlife habitat would cause adverse impacts similar to Alternative B.

Management of cultural resources would result in adverse impacts to ROWs similar to Alternative B, although to a lesser extent because Alternative D includes less avoidance area (3 miles). Under Alternative D, adverse impacts to ROWs from management of cultural resources would be less than Alternative B, but greater than Alternative C.

Impacts from VRM would be similar to those under Alternative A, except that Alternative D manages more area as VRM Class II (731,812 total acres), which may increase the restrictions designed to protect visual resources and would subsequently decrease opportunities for ROW authorizations in these areas. Compared to the other alternatives, Alternative D includes more area designated as VRM Class I and VRM Class II than alternatives A and C, but less than Alternative B.

Alternative E

Resource Uses

Alternative E includes the same ROW corridors Alternative B (a total of 133,184 acres of BLM-administered surface), and impacts would be similar to Alternative B. However, under Alternative E, in greater sage-grouse Key Habitat Areas the BLM only allows below ground ROWs in designated ROW corridors and only allows new ROWs in corridors containing existing authorizations if the entire footprint of the new ROW is within the existing ROW footprint. These additional requirements may require modification of the location, size, or design of facilities associated with ROW corridors, which could affect the ability of proponents to use these areas for new ROW placement compared to alternatives A or B. In addition, the BLM relocates existing designated ROW corridors crossing greater sage-grouse Key Habitat Areas without authorized ROWs or undesignates the entire corridor. Undesignating corridors would limit future potential routes for ROWs and could limit the ability to access renewable energy or other resources to a greater extent than under other alternatives.

Alternative E manages a total of 2,933,608 acres as ROW avoidance and exclusion areas, which is 1,931,518 acres more than Alternative A. Impacts from managing ROW avoidance and exclusion areas would be similar to Alternative B. However, Alternative E would allow new ROWs where needed to access valid existing rights, with a preference toward the re-use of existing access routes, thus decreasing adverse effects on valid existing rights. Any new access routes would be subject to the 3 percent cap on disturbance, and reclamation to remediate other existing disturbance would be implemented before new ROW-related disturbances would be permitted in areas that exceed that cap.

Communication site management under Alternative E is similar to Alternative B, and impacts would be similar to Alternative B, but to a greater extent because more area is managed as ROW avoidance and exclusion areas.

Management for aboveground facilities, night skies evaluations, and other resource use considerations that could affect ROW development under Alternative E would be the same as Alternative B.

Special Designations

Management of ROWs in special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC, would be the same as Alternative B, and impacts would be similar to those described under Alternative B. In the Greater Sage-Grouse Key Habitat Areas ACEC, the BLM would pursue opportunities to remove, bury, or modify existing powerlines and would amend existing ROW grants during the ROW renewal process to require features that enhance sage-grouse habitat security. This ACEC-specific management would place additional constraints and mitigation stipulations on existing ROW grants, which would produce adverse impacts.

Resources

Alternative E would manage wildlife habitat, cultural sites, and other resource considerations consistent with Alternative B, except that Alternative E would manage the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres) as a ROW energy exclusion area and allows only below ground ROWs in designated ROW corridors within this ACEC.

Alternative F

Resource Uses

Alternative F includes the same ROW corridors as Alternative D (a total of 131,852 acres of BLM-administered surface), and impacts would be similar to Alternative D. However, in PHMAs, the BLM places timing restrictions on the construction or new transmission line ROWs in ROW corridors. These additional requirements may require modification of facility construction timing that could affect ROW development in those corridors. In addition, the BLM relocates existing designated ROW corridors crossing greater sage-grouse PHMAs without authorized ROWs or undesignates the entire corridor. Undesignating corridors would limit future potential routes for ROWs and could limit the ability to access renewable energy or other resources. Under Alternative F, the BLM manages 2,315,730 acres as ROW avoidance and 133,734 acres as ROW exclusion areas; 1,374,787 and 72,587 acres more than Alternative A, respectively. Impacts from managing ROW avoidance and exclusion areas would be similar to Alternative D; however, Alternative F would manage 92,932 acres of stock driveways as ROW exclusion areas whereas Alternative D would manage the same areas as ROW avoidance areas.

However, Alternative E would allow new ROWs where needed to access valid existing rights, with a preference toward the re-use of existing access routes, thus decreasing adverse effects on valid existing rights. Any new access routes would be subject to the 3 percent cap on disturbance.

Under Alternative F, the authorization of communication site facilities would be similar to Alternative A, and would result in similar impacts, but to a greater extent because more area is managed as ROW avoidance and exclusion areas than under Alternative A.

Management for aboveground facilities and other resource use considerations that could affect ROW development under Alternative F are the same as Alternative D, and impacts would be the same as described under Alternative D. Management for night skies evaluations under Alternative F are the same as Alternative B, and impacts would be the same as described under Alternative B.

Special Designations

Management of ROWs in special designations under Alternative F, except in the Greater Sage-Grouse PHMAs ACEC, is the same as Alternative D, and impacts would be similar to Alternative D. In the Greater Sage-Grouse PHMAs ACEC, the BLM allows the maintenance and continued operation of existing communications towers and other structures but could stipulate additional upgrades (e.g., installing anti-perching devices, minimizing wires and other collision hazards, and retrofitting existing towers to discourage use by raptors) where needed to protect greater sage-grouse. Such requirements could increase costs for ROW grantees but would not preclude continued use of the ROW. Like Alternative E, Alternative F allows only below ground ROWs in designated ROW corridors within the Greater Sage-Grouse PHMAs ACEC.

Resources

Alternative F manages wildlife habitat, cultural sites, and other resource considerations consistent with Alternative D within greater sage-grouse priority habitat managed as part of the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). In the Greater Sage-Grouse PHMAs ACEC, proponents are not permitted to exceed one disturbance per 640 acres or disturb more than 3 percent of sagebrush habitat in PHMAs; reclamation to remediate existing disturbance would need to be implemented before new ROW-related disturbances would be permitted in areas that exceed the disturbance cap. Long-term impacts under Alternative F would be similar to Alternative D, except that these stricter surface disturbance restrictions in greater sage-grouse PHMAs (35 percent of BLM-administered surface lands) would limit the ability to develop, or increase the cost and difficulty of siting new ROWs compared to alternatives A and D through a large portion of the Planning Area.

4.6.4 Comprehensive Travel and Transportation Management

This section describes potential impacts to access and travel management from managing other resources or resource uses. The CTTM program operates as a support program, rather than a resource in and of itself, because it supports other management activities in the Planning Area. The CTTM program addresses planning for OHV activities and other motorized vehicle use, and the travel needs for all BLM-administered resource management programs for such activities as mineral extraction, livestock grazing, habitat enhancement projects, and recreation. The program responds to a need to maintain an adequate transportation system to provide access to and use of public land resources. Travel designations for motorized travel (open, limited, closed) include off-road vehicles.

For the purposes of this analysis, adverse impacts to travel and transportation management are those that restrict travel (e.g., managing areas as closed or limited to motorized travel, or road closures). In general, adverse impacts to CTTM are greater when areas are closed to motorized travel than when travel is limited. Management limiting motorized travel to designated roads and trails is more restrictive than limiting travel to existing roads and trails and would therefore result in greater adverse impacts to CTTM. Limiting travel to designated roads and trails only allows motorized vehicle use in areas defined with specific signage or areas identified in travel management plans. Beneficial impacts result from management that increases the number or quality of roads and trails, or that provides opportunities for access on- or off-road using motorized, mechanized, equestrian, or foot travel. Beneficial impacts also include improvements to travel that reduce potential health and safety concerns associated with travel and transportation use in the Planning Area.

This section does not address the adverse or beneficial impacts of travel and transportation management on other resources and resource uses. While impacts from travel and transportation

management to other program areas do occur and are considered as part of travel management planning, in this RMP, these types of impacts are described under the resource or resource use affected by this management. For example, Section 4.4.6 *Wildlife* addresses the impacts to elk from seasonal closures in elk crucial winter range, while this section addresses the impacts of this restriction to access and travel across BLM-administered lands.

Direct impacts to CTTM include actions that restrict or enhance road or trail use in the Planning Area. Direct impacts include closures or rerouting of trails and roads due to safety concerns such as shooting ranges and H_2S-related health concerns. Indirect impacts result from management that limits, restricts, or enhances development or activities that require travel and transportation use and access (e.g., ROW development, recreation, withdrawals).

4.6.4.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- The analysis assumes OHV designations are to be fully implemented 5 years after approval of this RMP.
- The greater the area of authorized roads open to motorized vehicles, the greater the benefit to travel management. Reductions to road density result in beneficial impacts to some resources (e.g., big game, soils), but may require additional effort for users (e.g., longer travel routes).
- Demand for new ROWs or access is expected to decrease because there is existing infrastructure. ROW applications for energy related transportation facilities (e.g., roads, pipelines) are expected to increase with the number of RFDs.
- Existing ROWs granted to other parties for access across the public lands are not affected by this RMP.
- The average road width is 12 feet.

4.6.4.2 Summary of Impacts by Alternative

Impacts to CTTM would result from travel designations that open, limit, or close areas to travel. Additional impacts would result from management that affects the number or quality of roads and trails, or management that affects opportunities for access on- or off-road using motorized, mechanized, equestrian, or foot travel.

Alternative C would result in the most new road and trail development, primarily due to the larger acreage open to cross-country motorized travel, followed by alternatives D and F, B, A, and E. Under alternatives D and F, the BLM specifically establishes the most new trails and roads for motorized, mechanized, and primitive recreational uses, but it does not manage as many acres as open to cross-country motorized travel as under Alternative C.

ROW exclusion areas would prohibit all ROW actions including the construction of new roads that could be used for motorized vehicle use under Alternative E, unless they can be co-located with existing ROWs only to access valid existing rights. ROW exclusion areas would restrict the development of new travel routes most under alternatives E and B, followed by alternatives F, A, D, and C.

Alternatives B and E include the most limitations on and closures to motorized and mechanized vehicle use for resource protection. Therefore, these alternatives would cause the greatest adverse impacts to access opportunities for motorized vehicle use, followed by alternatives F, D, A, and C.

Alternatives B and E limit the most acreage to designated roads and trails in the Planning Area (2,416,378 acres), followed by alternatives F (1,820,427 acres), D (1,159,557 acres), C (1,020,748 acres), and A (797,077 acres). The area limited to existing roads and trails is greatest under Alternative A (2,137,574 acres) followed by alternatives C (2,137,574 acres), D (1,955,943 acres), F (1,295,072 acres), E (592,742 acres), and B (592,563 acres). Alternatives E and B close the largest area to motorized vehicle use (170,253 acres), followed by Alternative A (68,115 acres), alternatives D and F (61,010 acres), and C (9,274 acres). Due to the size of the Planning Area and the limited number of new projected roads, restrictions on motorized and/or mechanized travel on existing routes may have a greater effect on travel and transportation management than the miles or location of new road development.

Overall, Alternative C would cause the fewest adverse impacts (and the most benefits) to CTTM, followed by alternatives D, A, F, B, and E.

4.6.4.3 Detailed Analysis of Alternatives

Each of the alternatives includes an increase in the level of travel management planning to improve travel management in the Planning Area. Certain resource management actions would result in adverse impacts to CTTM by placing limitations on the development of new routes or limiting access to portions of the Planning Area in ways that affect the ability to meet multiple-use objectives.

Impacts Common to All Alternatives

Management of resources and resource uses that affect travel and transportation management include mineral resources, recreation, special designations, soil, water, cave and karst resources, fish and wildlife resources, special status species, cultural resources, and paleontological resources. Appendix R includes a travel designation matrix that describes specific travel management designations by area. Unless otherwise specified, motorized vehicle use on BLM-administered land is limited to existing roads and trails on an interim basis until completion of travel management planning. Terms "interim existing roads and trails" or "existing roads and trails" are used throughout the document to identify areas of low travel management planning priority. Interim existing roads and trails may be maintained for continued access until completion of a travel management plan.

Increased development for oil and gas and other minerals would modify the road network by creating new travel routes, which would provide new travel and access opportunities throughout the Planning Area. Under Alternative A, approximately 50 percent of anticipated new road development would be oil and gas related (Appendix T), and this development would increase access and provide opportunities for recreational travel, particularly for OHVs. Routine and emergency maintenance of these roads would be required to maintain access and to ensure that the roads are maintained and used in accordance with other resource objectives. After mineral activities conclude and a road is no longer needed for the authorized purpose, a review would determine if the road meets BLM travel management objectives. If the road does not meet the needs and objectives of the BLM transportation system in the Planning Area or does not provide access for multiple use or administrative use, the operator would be required to reclaim the road. The development of mineral resources may adversely impact CTTM by creating hazardous conditions, noxious odors, and dangerous gas (such as H_2S).

Management for other resources including vegetation, cultural resources, special status species, and paleontological resources may result in adverse impacts to CTTM by restricting trails or limiting use for the protection of resource values. Some special designations (such as ACECs) and areas with important resource values (such as some educational trails or special status species habitat) restrict motorized

vehicle use and other forms of travel under all the alternatives. Such restrictions would generally result in adverse impacts to CTTM by limiting or restricting travel in these areas.

Limiting motorized travel to designated roads and trails would limit travel to areas specifically designated for travel through appropriate signage or other methods. Although limiting motorized travel to designated roads and trails would result in greater adverse impacts to CTTM than limiting travel to existing roads and trails, travel would still be allowed in these designated areas. Under all alternatives, motorized vehicle use is limited to designated roads and trails in the following areas:

- Over important caves or cave passages
- Medicine Lodge and Upper Renner Wildlife Habitat Areas (with a seasonal closure)
- Essential and recovery habitat for threatened or endangered species
- Areas containing important cultural and paleontological resources
- Bald Ridge Area (with a seasonal closure)
- Twin Creek Trail (with a seasonal closure)
- Carter Mountain area (with a seasonal closure)
- Little Mountain area (with a seasonal closure on a portion of the area)
- The Brown/Howe Dinosaur Area ACEC
- Upper Nowood and South Brokenback areas
- LU Sheep Company cooperative area
- Rattlesnake Mountain
- McCullough Peaks Area

Closing areas to motorized vehicle use would cause the greatest adverse impacts to travel and transportation use compared to other travel limitations (limited to existing, limited to designated, seasonal restrictions) by prohibiting use in certain areas. Under all alternatives, the following areas are closed to motorized vehicle use:

- Spanish Point Karst ACEC
- Duck Swamp-Bridger Trail Environmental Education Area
- Salt Lick Trail
- Gooseberry Badlands Interpretive Trail
- Paint Rock Trail
- Lone Tree Trail
- Canyon Creek Access Trail
- Bald Ridge Area (seasonal)
- Cottonwood Creek Trail
- Pete's Canyon Trail
- Five Springs Road (beyond the locked gate in the CYFO)

Under all alternatives, travel designations, closures, or routing of roads and trails in areas that pose health and safety risks would result in long-term impacts to CTTM. Areas closed year-round to motorized and mechanized vehicle use to protect visitor safety include the Lovell shooting range, the rifle range west of Worland, and the Cody Archery Range.

Under all alternatives, implementing existing travel management plans in the following areas would benefit CTTM by providing site-specific travel designations that accommodate appropriate access while considering resource protection and user safety:

- Carter Mountain ACEC
- Little Mountain
- Upper Nowood
- South Brokenback
- Renner (Upper and Lower) Wildlife Habitat Management Units
- Medicine Lodge Wildlife Habitat Management Units
- Paint Rock Area
- Cooperative Management Agreement between Bureau of Land Management, Worland District, LU Sheep Company, the Wyoming Game and Fish Department, and the Wyoming State Board of Land Commissioners (LU Management Agreement)
- Rattlesnake Mountain

Under all alternatives, LAUs are closed to over-snow travel, which would result in adverse impacts to CTTM by restricting travel in these areas.

Implementing the site-specific management documented in travel management plans would benefit the specific goals described in these documents, such as minimizing impacts to resources (e.g., soils) or protecting the characteristics of specially designated areas (e.g., WSAs). Travel management plans developed subsequent to this RMP would benefit CTTM by addressing the maintenance and use of roads and trails considering site-specific conditions.

Allowing pedestrian and equestrian travel on or off roads and trails, except for limited seasonal restrictions for the protection of resources in the Bald Ridge Area, would benefit CTTM by allowing these types of travel throughout the Planning Area.

Restrictions and limitations on surface-disturbing activities associated with water quality, watershed, and soils management, would result in adverse impacts to CTTM by restricting or limiting the development of new roads for the protection of these resources.

Alternative A

Resource Uses

Alternative A would result in approximately 847 miles (1,233 acres) of new road and trail creation due to user-pioneered routes in areas open to cross-country motorized travel and new BLM-created routes. Additionally, the BLM anticipates 1,351 miles (1,966 acres) of short-term road creation, of which 675 miles (983 acres) is anticipated to remain in the long term following reclamation (Appendix T). These roads would primarily result from ROW authorizations related to mineral and other facility developments under this alternative.

New recreational roads and trail development and improvements to the existing travel network would result in beneficial impacts by increasing opportunities for motorized recreational use and maintaining or improving the quality of existing routes. Specific new road and trail management actions that would result in beneficial impacts include developing scenic driving loops in the Badlands SRMA, and access improvements in the Trapper Creek, Paint Rock, South Bighorns, and Canyon Creek areas, which

includes road and trail maintenance, and possible new trail and route construction to enhance access. Alternative A opens 1,311 acres to off-road motorized vehicle use.

Management of ROW avoidance and exclusion areas would result in long-term impacts to travel and transportation management by limiting or restricting the development of roads authorized through a ROW permit, and by restricting the routing of new roads. Alternative A manages 940,943 acres as ROW avoidance areas and 61,147 acres as ROW exclusion areas.

Recreation management areas would result in long-term impacts to travel and transportation by prescribing travel designations in these areas. Under Alternative A, motorized vehicle use in SRMAs and ERMAs is generally limited to existing or designated roads and trails (see Appendix R). The WSAs in the Badlands SRMA are the only recreation-related management areas closed to motorized vehicle use managed for their wilderness characteristics (e.g., outstanding opportunities for solitude, and primitive and unconfined recreation) that may not be compatible with motorized vehicle use.

Special Designations

Alternative A restricts motorized travel to protect resources and values in special designations (ACECs, WSAs, WSRs, NHTs). These restrictions limit motorized vehicle use in these areas or close all or certain portions of an area, which would affect CTTM.

Of the nine ACECs designated under this alternative, seven limit motorized vehicle use to designated roads and trails (with a seasonal closure in the Carter Mountain ACEC); Alternative A limits motorized travel in the Big Cedar Ridge ACEC to existing roads and trails, and the Spanish Point ACEC is closed to motorized use. Four WSAs are closed to motorized vehicle use, with use limited to existing primitive routes in the Cedar Mountain and Honeycombs WSAs, and limited to designated primitive routes in the Alkali Creek, McCullough Peaks, Medicine Lodge, and Trapper Creek WSAs. Most of the WSR eligible waterway segments are managed to limit motorized vehicle use to designated roads and trails or close the areas to motorized vehicle use. Management under Alternative A includes avoidance of surface-disturbing activities in view within ¼ mile of the Nez Perce (Neeme-poo) NHT and Other Historic Trails, which would restrict the construction of new roads, but does not specifically close motorized use (managed as limited to existing roads and trails).

Resources

Travel designations (e.g., seasonal restrictions) and mitigation measures to protect wildlife resources and threatened and endangered species and important habitats would restrict the timing of surface-disturbing and other disruptive activities, which would limit or restrict the development of new roads.

Under Alternative A, requiring the closure of spur roads after completion of timber management practices and limiting motorized vehicle use to designated roads and trails in areas with fragile soil, which may require the closure of some existing, undesignated routes in these areas, would result in adverse impacts to CTTM. The closure of spur roads may limit opportunities for new access if they occur in areas where routes did not previously exist.

Proactive Management

Beneficial impacts to CTTM under Alternative A would result from allowing open cross-country motorized vehicle use on 1,311 acres and over-snow travel on a case-by-case basis, and managing most of the Planning Area as limited to existing roads and trails (2,137,574 acres). The BLM manages for or tolerates cross-country motorized travel in several locations across the Planning Area, including the Worland OHV area, the Bentonite Hills area, the Lovell Lakes "Motocross" area, hill climbing areas near Cowley, the Rattlesnake Ridge area, and the Basin Gardens area. Allowing cross-country travel in these

areas and the continued management of most of the Planning Areas as limited to existing roads and trails would provide motorized and other non-motorized travel opportunities across most of the Planning Area. In addition, travel restrictions and limitations in the Paint Rock area, Dry Farm Road area, and LU Sheep Company cooperative area, and implementation of the travel management plans in the South Brokenback, Renner Units, Medicine Lodge, Upper Nowood, McCullough Peaks, and Little Mountain areas would clarify routes available for travel and help to target management to meet the desired outcomes for these areas.

Allowing off-road motorized (OHV) and/or mechanized (mountain bike) vehicle use outside of the open areas to provide access for big game retrieval and campsite access would be beneficial impacts because it would increase access.

Alternative B

Resource Uses

Compared to Alternative A, Alternative B would result in fewer new roads from ROW authorizations and fewer new roads in locales open to cross-country motorized travel or from BLM road and trail creation. Alternative B would result in 1,908 miles (2,776 acres) of new road and trail creation due to user-pioneered routes in areas open to cross-country motorized travel and new BLM-created routes (Appendix T). Primarily the result of ROW authorizations, Alternative B would result in an additional 845 miles (1,229 acres) of short-term road creation, of which 422 miles (615 acres) is anticipated to remain in the long term following reclamation (Appendix T).

Alternative B would benefit CTTM through new recreational road and trail development similar to Alternative A, but to a greater extent. Alternative B includes motorized touring loops in the Trapper Creek RMZ (connecting with the Paint Rock RMZ and Bighorn National Forest), the Paint Rock RMZ (connecting with the Bighorn National Forest and the Brokenback/Logging Road RMZ), and the Brokenback/Logging Road RMZ (connecting with the aforementioned areas). Alternative B also includes more new trailheads and trails development for recreational use, such as new trails in the Canyon Creek and Horse Pasture SRMAs, to enhance mechanized and primitive forms of travel. Alternative B would result in greater beneficial impacts to CTTM from the establishment of new motorized, mechanized, and primitive travel routes than Alternative A.

Impacts to CTTM from ROW management would result in impacts similar to Alternative A, although to a greater extent because Alternative B manages more area as ROW avoidance and exclusion areas. As a result, Alternative B would result in greater adverse impacts to CTTM from restrictions and limitations on new roads and routes authorized through ROWs, compared to Alternative A.

Alternative B limits most motorized vehicle use in SRMAs and ERMAs to designated roads and trails (see Appendix R). Alternative B would close the Wild Badlands RMZ (in the Badlands SRMA), and the Horse Pasture, Beck Lake, and Newton Lake Ridge SRMAs to motorized vehicle use. Closing the Rattlesnake Ridge area, which contains high levels of H_2S gas from oil and gas development that poses a substantial health risk to trail users, would cause long-term impacts to CTTM. Although the BLM would construct more trailheads and access routes under this alternative compared to Alternative A, management of recreation areas under Alternative B would limit or close more areas to motorized travel, which would cause greater adverse impacts to CTTM.

Special Designations

Managing special designations under Alternative B would result in the greatest adverse impacts to CTTM compared to Alternative A. Although the types of impacts would be similar to those under

Alternative A, Alternative B places more restrictions on motorized travel to protect resources in areas with special designations. Overall, motorized travel restrictions in special designations under Alternative B would result in greater adverse impacts to access opportunities. Adverse impacts would include new constraints on access to areas that were previously accessible to motorized vehicles.

Of the 17 ACECs designated under this alternative, 14 limit motorized vehicle use to designated roads and trails (with a seasonal closure in the Carter Mountain and Rattlesnake Mountain ACECs and partial closures in the Clarks Fork Canyon and Sheep Mountain ACECs). Alternative B closes most WSR suitable waterway segments to motorized and mechanized vehicle use. The alternative closes all ACECs and WSR suitable waterway segments to over-snow motorized travel, which may adversely affect other resource programs. For example, closing the Dry Medicine Lodge WSR suitable waterway segment to motorized vehicle use would adversely affect the ability of the WGFD and others to access the Medicine Lodge Wildlife Habitat Management Area. Alternative B manages all lands with wilderness characteristics specifically to preserve their wilderness characteristics and limits motorized vehicle use to designated roads and trails in these areas, which have no specific travel designations under Alternative A.

Motorized vehicle use in areas in view within 5 miles of the Nez Perce (Neeme-poo) NHT and Other Historic Trails is limited to designated roads and trails, which would restrict the use of non-designated routes near the NHT more than Alternative A.

Resources

Under Alternative B, the emphasis of resource protection over resource use would result in more restrictions on motorized vehicle use compared to Alternative A. Increased restrictions that limit or close motorized travel would result in adverse impacts to CTTM.

Travel designations (e.g., seasonal restrictions) and mitigation measures to protect wildlife resources, special status species, and important habitats would result in impacts to CTTM similar to Alternative A, although to a greater extent because Alternative B includes more restrictions in these areas. Limiting motorized vehicle use to designated roads and trails (with seasonal closures) in big game crucial winter range would restrict access to and opportunities for travel in these areas. Seasonally closing greater sage-grouse Key Habitat Areas from March 15 to June 31 would adversely affect travel in these areas by restricting the use of some routes or eliminating opportunities for travel through some areas during a portion of the year to a considerably higher degree than under Alternative A. Under Alternative B, partially closing the Absaroka Front Management Area (130,872 acres) to motorized vehicle use and limiting use to designated roads and trails in the remainder of the area would result in adverse impacts to CTTM in the area by limiting travel opportunities.

Under Alternative B, closing roads used for timber access and hauling that are not required for existing uses would result in adverse impacts to CTTM by reducing available routes and access for travel.

Limiting motorized vehicle use to designated roads and trails for the protection of cultural resources in the Gebo/Crosby Area would result in adverse impacts to CTTM in this area by limiting travel opportunities.

Prohibiting off-road motorized (OHV) (and/or mechanized [mountain bike]) vehicle use for big game retrieval or dispersed campsites in areas with limited travel designations would substantially restrict access in these areas, adversely affecting CTTM more than Alternative A.

Proactive Management

Beneficial impacts to CTTM under Alternative B would result from allowing open cross-country motorized vehicle use on 3,132 acres and limiting motorized vehicle use to existing roads and trails (592,563 acres). Overall, Alternative B includes more restrictions and fewer beneficial proactive management actions for motorized vehicle use than Alternative A. Under Alternative B, over-snow vehicle use would be subject to more restrictive requirements (e.g., an average of 12 inches of snow) before it would be allowed, with the special designations and wildlife habitat areas discussed previously closed entirely to this type of travel. The beneficial impacts to winter, over-snow motorized vehicle use under Alternative A would not be realized under Alternative B.

Alternative B would implement and maintain the current travel management plans identified under *Impacts Common to All Alternatives* and implement new travel management plans that will cover the remaining areas managed as Designated Roads and Trails. Alternative B closes 150 percent more area to motorized vehicle use on BLM-administered public lands than Alternative A. Therefore, Alternative B would cause greater adverse impacts to CTTM by limiting or closing more areas to motorized travel than under Alternative A.

Alternative C

Resource Uses

Compared to the other alternatives, Alternative C would result in the greatest area of new roads from ROW authorizations and new roads in locales open to cross-country motorized travel or from BLM road and trail creation. Based on projected long-term surface disturbance, Alternative C would result in 8,873 miles (12,907 acres) of new road and trail creation due to user-pioneered routes in areas open to cross-country motorized travel and new BLM-created routes (Appendix T). Primarily the result of ROW authorizations, Alternative C is projected to result in 3,188 miles (4,638 acres) of short-term road creation, of which 1,594 miles (2,319 acres) would remain in the long term following reclamation (Appendix T).

Alternative C would result in similar types of beneficial impacts to motorized travel and opportunities for access from new recreational road and trail development as the other alternatives, but to a lesser extent. Alternative C establishes hiking trails in developed recreation areas and an access road at Rainbow Canyon; however, overall management under this alternative would result in the establishment of fewer new recreational travel routes compared to the other alternatives. Alternative C may result in the greatest amount of new user-pioneered roads and trails because it contains the greatest area open to cross-country motorized travel.

Impacts to CTTM from ROW management would be similar to those described under Alternative A. Alternative C includes more area designated as ROW avoidance and exclusion compared to Alternative A, but less than alternatives B and D. As a result, adverse impacts to CTTM from ROW management would be less than alternatives B and D, but greater than Alternative A.

Most motorized vehicle use in the Planning Area is limited to existing roads and trails under Alternative C, whereas the alternative manages the Rattlesnake Ridge SRMA and the Basin Gardens Play Area ERMA as open for cross-country travel.

Special Designations

Overall, motorized travel restrictions in special designations under Alternative C would result in the fewest adverse impacts to CTTM. Though the types of impacts would be similar to those described

under Alternative A, Alternative C places the fewest restrictions on motorized travel to protect resources in areas with special designations. Alternative C designates only two ACECs, the Brown/Howe Dinosaur Area and Spanish Point Karst ACECs, and travel management in these areas does not vary across alternatives. Motorized vehicle use is limited to designated primitive routes in all WSAs in Alternative C, with impacts similar to those described under Alternative A.

Motorized vehicle use in areas in view within ¼ mile of the Nez Perce NHT and Other Historic Trails is limited to designated roads and trails, which would limit motorized vehicle use in areas proximate to these trails more than Alternative A, but less than Alternative B.

Resources

Under Alternative C, the emphasis of resource use over resource protection would result in decreased restrictions on motorized vehicle use compared to the other alternatives. As a result, Alternative C includes the most area open and limited to existing or designated roads and trails; which would benefit CTTM in the Planning Area by maximizing travel opportunities.

Stabilizing heavily eroded or washed out roads and trails, and allowing timber management spur roads to remain open to meet travel and other resource goals, would benefit CTTM by increasing the accessibility of BLM-administered land.

Management and restrictions in wildlife, special status species, and crucial habitat would result in less adverse impacts to CTTM compared to Alternative B. Travel management in the Absaroka Front Management Area would be less restrictive than Alternative B resulting in increased travel and access opportunities in this area.

Under Alternative C, as in Alternative A, allowing off-road motorized (OHV) and/or mechanized (mountain bike) vehicle use off of existing roads and trails to provide access for big game retrieval and campsite access would be beneficial because it would increase access.

Proactive Management

Beneficial impacts to CTTM under Alternative C would result from allowing the most open cross-country motorized vehicle use on 14,830 acres and allowing over-snow travel, unless precluded by other resource needs, and managing most of the Planning Area as limited to existing roads and trails (2,137,574 acres).

Overall, Alternative C includes the fewest restrictions and the greatest amount of beneficial proactive management actions that allow opportunities for motorized and mechanized vehicle access to BLM-administered lands. Under Alternative C, the BLM would maintain any previously implemented site-specific travel management plans; impacts would be similar to those described under Alternative A. Allowing off-road motorized (OHV) and/or mechanized (mountain bike) vehicle use for big game retrieval and accessing dispersed campsites would result in impacts similar to those described under Alternative A. Overall, the motorized travel restrictions for the Planning Area under Alternative C would result in the least adverse impacts to CTTM compared to the other alternatives.

Alternative D

Resource Uses

Alternative D would result in the same amount of new roads from ROW authorizations as Alternative A and the second-most new roads in locales open to cross-country motorized travel or from BLM road and trail creation. Based on projected surface disturbance, Alternative D would result in 4,001 miles (5,820

acres) of new road and trail creation due to user-pioneered routes in areas open to cross-country motorized travel and new BLM-created routes (Appendix T).

Alternative D would benefit CTTM from new recreational road and trail development similar to Alternative B, but to a greater extent. Under Alternative D, the BLM would develop the same motorized touring loops, trails, and trailheads in SRMAs and RMZs as Alternative B. Alternative D opens 5,885 acres to off-road motorized vehicle use, the second most among the alternatives.

Impacts to CTTM from ROW management would be similar in type but greater in extent than those under alternatives A and C and less than under Alternative B. Under Alternative D, the BLM would manage the third-largest acreage as ROW avoidance areas and exclusion areas among the alternatives.

Adverse impacts from restricting motorized vehicle use in recreation areas would be similar to those under Alternative B, but to a lesser extent. Under Alternative D, the BLM would place fewer restrictions on motorized vehicle use in the Basin Gardens area and the McCullough Peaks, Beck Lake, Newton Lake Ridge, and Horse Pasture SRMAs than under Alternative B, but more than under alternatives A and C. Alternative D opens 4,421 acres to cross-country motorized vehicle use in the Basin Gardens Play Area SRMA, which would benefit CTTM.

Special Designations

The types of impacts to CTTM from the management of special designations would be similar to those described under Alternative A; however, special management criteria for routes within sage-grouse PHMAs would be implemented in subsequent travel management planning efforts under Alternative D. Due to more motorized vehicle use restrictions to limit access, management of special designations under Alternative D would result in a greater adverse impact to CTTM than alternatives A and C, but less than Alternative B. Alternative D designates all nine ACECs designated under Alternative A with similar restrictions on motorized and mechanized vehicle use. Additionally, Alternative D designates the PETM, Clarks Fork Canyon, and Sheep Mountain ACECs, but there would be fewer restrictions on motorized and mechanized vehicle use in these areas than under Alternative B.

Restrictions on motorized vehicle use in WSAs would result in impacts to CTTM similar to Alternative A. Impacts to CTTM may be to a lesser extent because designated primitive routes in WSAs may include the primitive routes inventoried during the initial WSA assessment, generally expanding access. However, impacts to CTTM may be to a greater degree because CTTM planning may designate only those routes inventoried during the initial WSA assessment, or even close those routes. Limiting motorized vehicle use to existing roads and trails in view within 5 miles of the Nez Perce (Neeme-poo) NHT would cause fewer adverse impacts to CTTM than would restrictions imposed around the NHT under alternatives B and C, but greater than those imposed under Alternative A.

Resources

In general, Alternative D emphasizes resource protection more than alternatives A and C, but less than Alternative B, resulting in proportional access restrictions and adverse impacts to CTTM. Adverse impacts from travel designations (e.g., seasonal restrictions) and mitigation measures to protect wildlife resources, special status species, and important habitats would be similar in type to Alternative A, although to a greater extent than under alternatives A and C and a lesser extent than under Alternative B. Restrictions on motorized vehicle use in the Absaroka Front Management Area would result in impacts similar to Alternative B. Allowing temporary closures of designated roads, trails, or geographic areas within big game crucial winter range would result in impacts similar to Alternative B, although to a lesser extent. Limiting motorized vehicle use to designated roads and trails to protect resource values in

essential and recovery habitat for threatened and endangered species and areas over important caves or cave passages would adversely affect CTTM by limiting access to these areas.

Closing timber haul roads after completion of timber management would result in impacts similar to Alternative A. Restricting off-road motorized (OHV) and mechanized (mountain bike) vehicle use to within 300 feet of established roads in areas with a limited designation (existing or designated roads and trails) would result in impacts similar to Alternative B, although to a lesser extent.

Proactive Management

Beneficial impacts to CTTM under Alternative D would result from allowing the second most open cross-country motorized vehicle use on 5,885 acres and allowing over-snow travel on a case-by-case basis, and managing motorized vehicle use in most of the Planning Area (1,955,943 acres) as limited to existing roads and trails. Alternative D limits motorized vehicle use to designated roads and trails on 61 percent of BLM-administered land, 14 percent more than Alternative C, 46 more than Alternative A, and 52 percent less than Alternative B. Alternative D closes motorized vehicle use on a similar amount of acreage as Alternative A, but would result in greater adverse impacts to CTTM than alternatives A and C by limiting motorized vehicle use to designated roads and trails on more acreage than those alternatives.

Alternative E

Resource Uses

Alternative E would result in a similar number of new roads from ROW authorizations and new roads in locales open to cross-country motorized travel or from BLM road and trail creation as anticipated under Alternative B (839 miles [1,221 acres] of new road and trail creation due to user-pioneered routes and 422 miles [615 acres] from ROW authorizations in the long term) (Appendix T). However, unlike Alternative B, Alternative E contains a Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres) that applies additional restrictions on new road and trail development. Management in that ACEC that limits the allowable surface disturbance, prohibits construction within 4 miles of leks, and restricts the types of routes that can be constructed could limit the BLM's ability maintain a transportation system that meets certain user needs where those needs conflict with the predominant management objective (i.e., the protection of greater sage-grouse habitat).

Management of new recreational road and trail development under Alternative E is the same as Alternative B, and impacts to CTTM would be the same as Alternative B.

Impacts to CTTM from ROW management would be similar to Alternative A, although to a greater extent because Alternative E manages more area as ROW avoidance and exclusion areas. Alternative E includes the largest ROW exclusion area (1,322,879 acres) compared to the other alternatives. As a result, Alternative E would result in the greatest adverse impacts to CTTM from restrictions and limitations on new roads and routes authorized through ROWs. Alternative E prohibits new roads and routes authorized through a ROW permit unless they can be co-located with existing ROWs only to access valid existing rights.

Alternative E limits motorized vehicle use to designated roads and trails in the same areas and imposes the same seasonal closures (March 15 through June 30) as Alternative B (Map 73), and impacts to CTTM would be the same as Alternative B.

Special Designations

Special designations under Alternative E are the same as Alternative B, with the exception of the additional Greater Sage-Grouse Key Habitat Areas ACEC. Managing special designations under Alternative E would result in the greatest adverse impacts to CTTM compared to the other alternatives. Although the types of impacts would be similar to those under Alternative B, Alternative E places more restrictions on motorized travel to protect resources in areas with special designations than any other alternative. Overall, motorized travel restrictions in special designations under Alternative E would result in the greatest adverse impacts to access opportunities.

Resources

Management of wildlife habitat, forest products, harvest and vegetation treatments, cultural sites, and other resource considerations under Alternative E is the same as Alternative B, and impacts to CTTM from restrictions to protect resources would be the same as Alternative B. Like Alternative B, the emphasis of resource protection over resource use would result in more restrictions on motorized (OHV) and mechanized (mountain bike) vehicle use under Alternative E, compared to the other alternatives. Restrictions of Alternative E that limit or close motorized travel would result in proportional adverse impacts to CTTM.

Proactive Management

Alternative E allows open cross-country motorized vehicle use on the same amount of acreage as Alternative B, and the resulting beneficial impacts to CTTM would be the same as Alternative B. Alternative E also closes the same amount of acreage to motorized vehicle use as Alternative B, and adverse impacts to CTTM would be the same as Alternative B.

Similar to Alternative B, Alternative E would implement and maintain the current travel management plans identified under *Impacts Common to All Alternatives* and would implement new travel management plans that cover the remaining areas managed as Designated Roads and Trails. Under all alternatives, the BLM would designate routes on all BLM-administered land within the Planning Area. Alternative E limits motorized vehicle use to designated roads and trails on 2,416,378 acres. Notably, Alternative E prioritizes the conservation of greater-sage grouse Key Habitat Areas (1,232,583 acres) above other uses, potentially leading to greater route limitations in this area than under other alternatives. However, authorized or permitted uses that specify allowable access would not be affected by travel management designations.

Alternative F

Resource Uses

Alternative F would result in a greater amount of new roads from ROW authorizations (461 miles [672 acres]) than alternatives B and E, but fewer than alternatives A, C, and D. Alternative F also allows the third-most new roads in locales open to cross-country motorized travel or from BLM road and trail creation. Based on projected surface disturbance, Alternative F would result in 2,693 miles (3,917 acres) of new road and trail creation due to user-pioneered routes in areas open to cross-country motorized travel and new BLM-created routes (Appendix T).

Management of new recreational road and trail development, areas open to off-road motorized vehicle use (OHV play areas), and motorized vehicle use in recreation management areas (Special Recreation Management Areas [SRMAs], Resource Management Zones [RMZs], and Extensive Recreation

Management Areas [ERMAs]) under Alternative F is the same as under Alternative D, and impacts to CTTM would be the same as Alternative D.

ROW management under Alternative F is similar to Alternative D, and impacts to CTTM would be the same as Alternative D.

Special Designations

Special designations under Alternative F are the same as Alternative D, with the exception of the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres). The types of impacts to CTTM from special designations management under Alternative F would be similar to Alternative D. However, due to additional limitations on motorized vehicle use in the Greater Sage-Grouse PHMAs ACEC from limiting travel to designated roads and trails, Alternative F would result in a greater adverse impact to CTTM than alternatives A, C, and D, but less than alternatives B and E.

Resources

Management of wildlife habitat, forest products, vegetation treatments, cultural sites, and other resource considerations under Alternative F are the same as Alternative D, and impacts to CTTM from restrictions to protect resources would be the same as Alternative D. Like Alternative D, Alternative F emphasizes resource protection more than alternatives A and C, but less than alternatives B and E, resulting in proportional access restrictions and adverse impacts to CTTM.

Proactive Management

Alternative F allows open cross-country motorized vehicle use on the same amount of acreage as Alternative D, and the resulting beneficial impacts to CTTM would be the same as Alternative D. Alternative F also closes the same amount of acreage to motorized vehicle use as Alternative D, and adverse impacts to CTTM would be the same as Alternative D.

Under all alternatives, the BLM would designate routes on all BLM-administered land within the Planning Area. Alternative F would limit motorized vehicle use to designated roads and trails on more acreage (1,820,427 acres) of the Planning Area than alternatives A, C, and D (Map 74), and subsequently would result in greater overall adverse impacts to CTTM than alternatives A, C, and D. Alternative F would limit motorized vehicle use to existing roads and trails on less acreage (1,295,072 acres) of the Planning Area than Alternative D (1,955,943 acres). However, authorized or permitted uses that specify allowable access would not be affected by travel management designations.

4.6.5 Recreation

This section describes potential impacts to recreational uses of public lands under the alternatives in terms of direct, indirect, short-term, and long-term impacts.

Direct impacts to recreation affect the recreational resources, settings, experiences, and ultimately the desired beneficial outcomes from uses on public lands, including hunting, motorized travel (including OHV use), target shooting, wildlife viewing, camping, and other activities. Direct impacts also include impacts to recreational facilities such as campsites. Certain resource development or management actions (e.g., oil and gas development, fire and fuels management) will interfere with realizing desired beneficial outcomes, which will displace recreational users from their desired setting-specific areas, resulting in direct adverse impacts to recreation. Indirect impacts occur when competing uses of the land adversely affect natural recreational resources or recreational setting character conditions (RSCC) that no longer support desired experiences and beneficial outcomes. For example, impacts to wildlife

habitats from competing land uses that result in a decrease in big game populations will therefore decrease the hunting (recreational) opportunities, and impact the experiences and beneficial outcomes.

Beneficial impacts to recreational resources include actions that improve the desired RSCC, increase recreational opportunities, contribute to better recreational experiences, and ultimately contribute to increase realized beneficial outcomes from recreational use of the public lands. Managing areas as SRMAs and ERMAs benefit recreation by managing for the desired RSCC, and marketing (niche matching) based on identified desired settings, activities, experiences, and benefits. Adverse impacts are those that degrade the desired RSCC, reduce the amount of recreation opportunity, and detract from the recreation experience, resulting in unrealized desired beneficial outcomes for recreational users.

4.6.5.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- The impact of RAMPs will be assessed following completion of the RMP revision.
- The SRMAs will be managed for the Niche, Management Objective, desired RSCC, experiences, and benefits, and Activity Planning Framework specified in the alternatives.
- Traditional recreational uses of Planning Area lands will continue, despite new recreational activities based on new technologies occurring in the area.
- The demand for fishing, floating, camping, OHV use, mountain biking, and new technology-based recreation is expected to increase. The number of hunters will fluctuate with the size of herds and other indirect factors, but because of less interest by younger generations, the number of hunters will decrease (Outdoor Foundation 2009).
- The incidence of resource damage and conflicts between OHV users and nonmotorized recreationists will increase as OHV use increases.
- Visitation throughout the Planning Area will continue to increase as resource availability and conditions allow. As the population of both neighboring states and the local area continues to grow, the need or search for less crowded or more remote recreational opportunities will continue to bring more people to the public lands in Wyoming.

4.6.5.2 Summary of Impacts by Alternative

Management for surface disturbance, land tenure adjustments, areas closed to mineral development, special designations, proactive recreation management actions, and other resource management actions form the basis for comparing impacts to recreation among the alternatives. Proactive management under alternatives B and E would most enhance facilities and amenities to meet niche demands for recreation while minimizing potential user conflict, followed by alternatives F, D, A, and C. Alternatives B and E would enhance the recreational experience of users expecting a more primitive recreational experience and opportunities for solitude the most, followed by alternatives F, D, A, and C. Dispersed motorized recreation opportunities would be limited to designated areas the most under alternatives B and E, which may result in the greatest adverse impacts to motorized recreation use compared to the other alternatives, followed by alternatives F, D, C, and A. Alternative C would result in the most opportunities for dispersed motorized recreation, but primitive forms of recreation and opportunities for solitude would not be a priority and may diminish as OHV use increases over the planning cycle. Alternative F manages the second-most area for off-road motorized vehicle use, but also

restricts motorized vehicle use to designated roads and trails in the second-most acreage that would limit recreation opportunities for motorized travel.

Special designations and management for resource protection in ACECs and WSRs that maintain their recreation settings for scenery and wildlife viewing would result in the greatest benefit to recreationists under Alternative E, followed by alternatives B, F, A, D, and C.

Alternatives E and B would result in the least amount of surface disturbance, minerals development, ROW authorizations, and other conflicting resource uses that would displace recreation and potentially degrade the recreation setting, followed by alternatives F, D, A, and C. Alternatives B and E would benefit recreational settings the most because these alternatives manage the most areas as SRMAs for desired recreation settings to benefit outcome objectives, activities, experiences, and benefits, followed by alternatives F, D, A, and C. However, alternatives B and E would also result in the greatest impacts to desired experiences and beneficial outcomes through seasonal closures on the greatest acreage among the alternatives; seasonal restrictions on travel could limit the ability of certain recreational users to access some desired recreation areas and sites (e.g., recreation sites in greater sage-grouse Key Habitat Areas) during certain times of the year.

Alternative C manages the fewest areas as SRMAs and would result in the greatest adverse impacts to the desired settings, opportunities, activities, experiences, and beneficial outcomes in areas with substantial recreation values. Alternatives F and D manage more acreage in SRMAs than Alternative A, and while managing these areas for the realization of benefits by maintaining the desired recreational setting character condition (RSCC), SRMAs would result in more beneficial impacts to recreation experiences than under Alternative A.

4.6.5.3 Detailed Analysis of Alternatives

The NHTs and Other Historic Trails, National Back Country Byways, and CTTM sections describe impacts to these resource areas that are often used for recreation. This analysis focuses on impacts to recreational opportunities, experiences, and benefits for users, which often are associated with the recreation setting. Recreation management matrices in Appendix O identify the primary market strategy, niche, recreation management objective, desired RSCC, experiences, and beneficial outcomes, and implementation strategy/actions for each SRMA.

Impacts Common to All Alternatives

Surface Disturbance

Under all alternatives, activities that result in surface disturbance (e.g., facilities construction, clearing land, prescribed fires, and drilling activities related to minerals exploration and development) would result in adverse impacts by displacing recreationists from degrading the desired RSCC, opportunities, experiences, and desired beneficial outcomes for the life of the disturbance, or until the area is reclaimed or recovers. Surface disturbance would more intensively affect areas where the desired RSCC necessitates a high degree of naturalness (i.e., back country). Adverse impacts from surface disturbance would be less intensive in areas where the desired RSCC allows for moderately dominant alterations to the natural setting (i.e., middle country and front country). Development activities that improve legal access to public lands, establish new and improve existing roads, and increase opportunities for motorized travel may benefit recreational experiences. Refer to Appendix O for descriptions of the desired RSCCs throughout the Planning Area. Management actions limiting surface-disturbing activities

in identified SRMAs would benefit recreational experiences by ensuring the maintenance of the recreational setting.

Resource Uses

Under all alternatives, minerals leasing and development would further alter supplemental values important for recreation such as scenic quality and natural, social, and administrative settings, and open previously limited areas to recreational use. The industrialized character associated with oil and gas activity would introduce new contrasting elements affecting the scenic quality of the recreation setting, interfering with recreationists' experiences and beneficial outcomes, which will displace recreationists from their desired settings to alternative areas. Travel off existing roads for "necessary tasks" associated with minerals management and other programs may generate new primitive routes for recreation opportunities, but the proliferation of roads and trails may threaten the recreation setting of certain areas and adversely affect such values as scenic quality, solitude, and wildlife. Hazards associated with road use would be proportional to the amount of mineral activity plus the historical recreational use. Minerals development would cause mostly adverse impacts to recreation under all of the alternatives.

Locatable mineral exploration and mineral materials disposal may result in adverse impacts to recreation. Mining activities may displace recreational activities and have an adverse impact on the desired recreation settings by altering the viewshed of some areas, and associated supplemental values such as wildlife and habitat, resulting in indirect impacts to recreation. Mining activities can also disrupt wildlife and alter habitat resulting in indirect impacts to recreation. Mitigation measures would minimize impacts to recreation resources from surface disturbance, but no mitigation would be applied to locatable mining activities to minimize adverse impacts to scenic qualities. The development of mineral resources may adversely affect recreation management due to hazardous conditions, noxious odors, and dangerous gas (such as H_2S) (see Section 4.8.3 *Health and Safety*). Post-mining reclamation is planned and implemented on a case-by-case basis. Regardless of the measure of success of post-mining reclamation, the landscape, viewshed, habitat, topography, and potentially other desired recreation settings would not be restored to original conditions at a reasonable expense.

Land tenure adjustments, including acquisition and disposal of land, generally benefit recreation if the adjustment considers recreational values. Acquisitions can result in beneficial impacts by improving public access in areas with intermingled land ownership and facilitating increased or improved access to recreation areas and resources such as WSAs and river access points. Private land that fragments BLM-administered land may interfere with recreationists' access, goals, activities, experiences, and benefits, and affect local and regional tourism. Acquiring and consolidating BLM-administered land and disposing of inholdings of private or state land would result in beneficial impacts to recreation, especially in SRMAs, WSAs, and other areas managed for specific recreation experiences. The acquisition of access easements can also increase recreational use across the Planning Area and would generally result in beneficial impacts to recreation.

Development activities associated with ROW authorizations would include renewable energy development, utility/transportation systems development, and communication site development. These developments, especially wind-energy facilities, may have a substantial impact on the recreation setting and recreationists' goals, experiences, and benefits by altering the scenic quality of open space and displacing users.

Under all alternatives, motorized and mechanized travel may enhance some recreationists' goals, experiences, and realize desired beneficial outcomes by allowing greater access to BLM-administered land while impairing those recreation users seeking a nonmotorized recreation experience. Therefore,

impacts from motorized and mechanized travel are likely to be site-specific. The BLM would address these impacts in more detail in assessing RAMPs.

The presence of livestock in a landscape setting is probably not detrimental to the experience of most recreationists; however, on a site-specific level, high levels of livestock use and facilities associated with grazing (e.g., water developments) may degrade recreationists' experiences due to noise, odor, and damage to vegetation. Such impacts would be more likely to occur around campgrounds, picnic areas, and trailheads. Off-road motorized vehicle use to support livestock management activities (e.g., round-ups) may affect the desired recreation settings by introducing new trails that may be used by other motorized travelers introducing new conflicting uses, as well as further augmenting the contrasting elements to the scenic characteristics, all of which would further interfere with recreationists' goals, experiences, and benefits.

Special Designations

Management actions in special designations under all alternatives would maintain legal public access and natural qualities that will maintain the recreational setting characteristics and continue to provide for recreation opportunities and experiences. These actions include continuing the Red Gulch/Alkali Road National Back Country Byway designation and developing educational materials and facilities to enhance the knowledge of the Red Gulch/Alkali Road National Back Country Byway; closing WSAs to renewable energy development and mineral leasing; and various resource protection measures in the Spanish Point Karst ACEC. Resource protection measures also would preclude other forms of recreation, such as motorized travel. Impacts to special designations and the values for which they are designated are discussed in their respective sections of this chapter.

Resources

Management to protect soils and water quality and watershed management actions such as avoidance, mitigation, or application of BMPs (Appendix L) would protect water sources for campground facilities and would enhance recreation opportunities by providing potable water. Water and watershed management activities indirectly protect existing flow conditions and water quality that benefit activities and opportunities such as fishing and other river-related recreational activities, and maintains and enhances other related recreational resources.

Caves provide recreational opportunities but must also be protected for their unique and fragile biological and paleontological resources. Actions that restrict or limit access to caves for resource protection would result in adverse impacts to recreational use in these areas.

Short-term impacts to recreation from fire and fuels management would result in temporary closure of areas during and after fire events (including prescribed burns) and mechanized fuel treatments, which would displace recreationists. Long-term impacts from wildland fire may degrade the recreation setting and displace recreationists.

Temporary recreation displacement would occur during commercial timber harvest activities because of a change in recreation settings, such as increased traffic, dust, noise, and loss of solitude. Logging operations that degrade the physical setting of naturalness may displace visitors. The intensity of the displacement would vary with the change in setting. Allowing harvests of minor wood products would provide recreation opportunities such as fuel wood gathering for campfires and may improve the recreation setting by improving forest health.

Vegetation management actions in riparian, wetland, and upland areas may displace recreationists from closed areas undergoing vegetation treatments (e.g., noxious weed control). In the long term, managing vegetation to meet the *Wyoming Standards for Healthy Rangelands* would, overall, maintain or improve

the desired natural recreational resources and recreation setting conditions, thus improving desired opportunities, activities, experiences, and a realization of desired beneficial outcomes.

Fish and wildlife management decisions affect the habitat and health of fish and wildlife populations. Many recreation activities, such as hunting, wildlife viewing, bird watching, and fishing, would benefit from the presence of healthy and abundant wildlife habitats and populations. Spatial and temporal restrictions (e.g., CSU, TSL), and BMPs and mitigation to protect and improve habitat would benefit recreation under all alternatives, although the extent of these impacts varies by alternative. Management actions to protect or improve wildlife habitat that restrict certain activities, such as OHV use, may adversely affect some recreationists. Under all alternatives, the construction of new recreation facilities is prohibited in greater sage-grouse PHMAs unless the development would result in a net conservation gain or is required for visitor or resource protection. Combined with other restrictions on recreation and OHV use in PHMAs, management of these areas would generally favor nonmotorized forms of recreation.

Wild horse management actions would protect, maintain, and control viable, healthy herds while retaining their free-roaming nature and providing opportunities for public viewing of wild horses. These actions would maintain a quality recreation setting and provide for unique supplemental values, opportunities, and experiences.

Management actions for cultural resources may require the relocation of potential recreation facilities in areas where the integrity of the setting contributes to NRHP eligibility. Areas containing important cultural and paleontological resources may restrict certain recreational access or activities such as OHV use. However, developing cultural resource interpretive sites and making use of scenic overlooks, signs, and walking trails would increase recreation opportunities in these areas. Such actions may minimally impact recreation opportunities by moving facilities or rerouting access, displacing recreationists to other potentially less desirable areas.

Management of visual resources would maintain the overall integrity of the Planning Area's scenic qualities while allowing for development of existing and future uses. Limiting the visual impacts of management actions in VRM Class I and II areas would retain the recreation setting, whereas VRM Class III and IV areas would allow more modification of the natural environment that may detract from the recreation setting. Altering the recreation setting would influence recreational activities and may displace some recreationists seeking a back country recreation setting. Managing WSAs as VRM Class I areas under all alternatives would benefit recreationists seeking back country settings.

Proactive Management

Recreation management provides opportunities for outdoor recreation activities at both developed sites and dispersed areas. Under all alternatives, the BLM would manage recreation to provide for visitor health and safety, coordinate with other programs to minimize conflicts and adverse impacts to recreation opportunities, protect resources, maintain the desired RSCC, and enhance recreation by managing for realization of desired beneficial outcomes. Proactive management actions that would benefit recreation under all alternatives include continuing a withdrawal from appropriation under the mining laws in the Castle Gardens Scenic Area; maintaining an easement across private land for public access to Rainbow Canyon; retaining recreational access in the Bighorn River HMP/RAMP area; and mitigating surface-disturbing and disruptive activities associated with constructing, maintaining, and using roads, campgrounds, interpretive sites, and other recreation facilities, as described in Appendix H. Short-term benefits from proactive recreation management actions would preserve or increase visitor satisfaction by maintaining recreational settings, opportunities, and experiences. Long-term benefits would result from sustained recreation activity and realization of beneficial outcomes.

Managing areas as SRMAs would result in beneficial impacts to recreation in the Planning Area. The BLM manages the respective areas to provide specific "structured" recreation systems (i.e., identified settings, activities, experiences, and beneficial outcomes) based on identified desirable outcomes in areas containing unique recreational resources. SRMA management focuses on meeting outcome objectives developed in response to identified desired activities, experiences, and benefits. Recreation settings are prescribed to achieve the outcome objectives and guide allowable use decisions and management actions. In areas managed as ERMAs, recreation is not the predominant resource use, but recreation is recognized as one of the many uses on public lands. ERMA management actions are custodial in nature to address visitor health and safety, user conflicts, resource protection, and local planning issues. Management actions in ERMAs would result in a lower amount of recreational related focus such as niche-matching, marketing, and desired RSCC than the SRMAs. Table 4-29 summarizes ERMAs and SRMAs by alternative.

Table 4-29. Recreation Management Areas by Alternative

Area	Recreation Management Designation (acres)			
	Alternative A	**Alternatives B and E**	**Alternative C**	**Alternatives D and F**
Absaroka Foothills	SRMA (72,130)	SRMA (72,130)	Not an RMA	SRMA (42,615)
Absaroka	Not an RMA	Not an RMA	Not an RMA	ERMA (28,998)
Bighorn River	SRMA (15,256)	SRMA (15,113)	Not an RMA	SRMA (2,496) ERMA (1,522)
Badlands	SRMA (213,981)	SRMA (220,687)	Not an RMA	SRMA (211,561)
Tour de Badlands	Included within Badlands SRMA	RMZ (122,616)	Not an RMA	RMZ (111,051)
Wild Badlands	Included within Badlands SRMA	RMZ (51,158)	Not an RMA	RMZ (51,155)
Tatman Mountain	Included within Badlands SRMA	RMZ (46,912)	Not an RMA	RMZ (49,354)
West Slope (CYFO)	Managed as one West Slope SRMA (375,888)	SRMA (129,771)	Not an RMA	SRMA (129,766)
West Slope (WFO)	Managed as one West Slope SRMA (375,888)	SRMA (276,538)	Not an RMA	SRMA (190,928)
Trapper Creek	Included within West Slope (WFO) SRMA	RMZ (83,806)	Not an RMA	Included within Canyons RMZ
Paint Rock	Included within West Slope (WFO) SRMA	RMZ (45,017)	Not an RMA	Included within Canyons RMZ
Canyons	Included within West Slope (WFO) SRMA	Included within Trapper Creek and Paint Rock RMZ	Not an RMA	RMZ (141,603)
Brokenback/Logging Road	Included within West Slope (WFO) SRMA	RMZ (63,725)	Not an RMA	RMZ (49,325)
South Bighorns	Included within West Slope (WFO) SRMA	RMZ (83,991)	Not an RMA	ERMA (69,325)

Table 4-29. Recreation Management Areas by Alternative (Continued)

Area	Recreation Management Designation (acres)			
	Alternative A	Alternatives B and E	Alternative C	Alternatives D and F
Canyon Creek	Not an RMA	SRMA (3,677)	Not an RMA	SRMA (3,675)
Middle Fork of the Powder River SRMA	Not an RMA	Part of South Bighorns RMZ	Not an RMA	SRMA (14,644)
Red Canyon Creek	Not an RMA	SRMA (8,435)	Not an RMA	ERMA (8,435)
The Rivers	SRMA (18,247)	SRMA (18,247)	Not an RMA	SRMA (6,047)
Historic Trails	SRMA (12,065)	Not an RMA	Not an RMA	Not an RMA
Worland Caves	SRMA	ERMA	Not an RMA	Not an RMA
McCullough Peaks	Not an RMA	SRMA (160,838)	Not an RMA	SRMA (160,838)
Basin Gardens	Not an RMA	SRMA (19,771)	Not an RMA	Not an RMA
Basin Gardens Play Area	Not an RMA	RMZ (1,821)	ERMA (4,421)	SRMA (4,421)
Basin Gardens	Not an RMA	RMZ (17,949)	ERMA (15,349)	Not an RMA
Horse Pasture	Not an RMA	SRMA (144)	Not an RMA	SRMA (144)
Rattlesnake Ridge	Not an RMA	Not an RMA	SRMA (7,996)	ERMA (7,996)
Beck Lake	Not an RMA	SRMA (6,483)	Not an RMA	SRMA (6,473)
Newton Lake Ridge	Not an RMA	SRMA (1,997)	Not an RMA	SRMA (1,949)
Total Acreage SRMA/ERMA	**707,567/2,322,174**	**933,831/0**	**7,996/19,770**	**775,557/116,276**

Source: BLM 2013a

ERMA Extensive Recreation Management Area
RMA Recreation Management Area
RMZ Recreation Management Zone
SRMA Special Recreation Management Area

Alternative A

Surface Disturbance

Under Alternative A, a total of 136,253 acres of short-term and 15,646 acres of long-term surface disturbance is projected (Appendix T), most of which would result in adverse impacts to recreation. A portion of this disturbance would result from new facilities development (campsites, interpretive areas) and roads that may benefit recreation, but most would result in short- and long-term adverse impacts by displacing recreation and impairing the recreation setting for those seeking undisturbed landscapes. The intensity of impacts to recreation would depend on the location of surface disturbance in relation to the desired RSCC in the area being disturbed (see *Impacts Common to All Alternatives*). Alternative A manages the third most acreage in SRMAs, and it does not manage for the realization of desired outcomes and benefits to the same degree in these areas as alternatives B and D. Therefore, under Alternative A surface disturbance may limit the realization of benefits to recreationists more than alternatives B and D.

Resource Uses

Oil and gas development in areas of moderate potential (where most development is anticipated) is expected to add 1,184 new federal wells (Appendix T) resulting in 3,552 acres of short-term surface disturbance during the planning cycle (Appendix T). The additional oil and gas facilities, equipment, noise, dust, vehicles, night lighting, pipelines, and human activity would alter the recreation setting to an industrial setting in certain areas, which would interfere with recreationists' goals, and influence their opportunities, activities, experiences, and benefits. Under Alternative A, 3,122,944 acres of BLM-administered surface are available for locatable mineral entry and 10,000 acres of long-term surface disturbance are projected from locatable mining activities. Minerals development would result in adverse impacts by displacing recreation opportunities in areas with degraded scenic qualities. The potential increase in the visitor concentration in alternate recreation settings may detract from the quality of recreational experiences in those areas, especially for those seeking solitude.

Acquisitions and land tenure adjustments under Alternative A may increase recreation opportunities and enhance recreationists' experiences as described under *Impacts Common to All Alternatives*. Considering acquisitions for public access in areas such as the Bighorn and Greybull rivers and in SRMAs could result in beneficial impacts to recreation by increasing recreation opportunities in these areas.

Pursuing withdrawals results in beneficial impacts to recreation by reducing surface-disturbing activities associated with mining, protecting the scenic quality, and maintaining the recreation setting. Alternative A withdrawals of 174,228 acres, including the Beck Lake Scenic Area, result in a direct beneficial impact by preserving the recreation setting of this area.

The BLM considers renewable energy development, including wind-energy development, on a case-by-case basis throughout the Planning Area under Alternative A. Due to the lack of management actions to facilitate its consolidation, wind-energy development may result in adverse impacts to recreation opportunities and scenic values important to the desired RSCC and associated opportunities, experiences, and benefits under Alternative A. The designation of ROW corridors would concentrate ROW authorizations and result in adverse impacts in and around these areas. However, concentrating ROWs in designated areas and avoiding or excluding ROW development in areas may result in beneficial impacts to recreation by prohibiting or limiting ROW infrastructure that can detract from the desired RSCC, opportunities, experiences, and benefits. Alternative A manages 940,943 acres as ROW avoidance and 61,147 acres as ROW exclusion areas.

Alternative A places few restrictions on motorized vehicle use and most of the Planning Area is limited to existing roads and trails, which would result in beneficial impacts by facilitating access for recreation opportunities. Allowing OHV use for big game retrieval would result in beneficial impacts to hunting and recreation. Alternative A, however, opens the smallest area to off-road use, limiting recreation opportunities in this regard. In the 15-mile and Rattlesnake Ridge areas, where cross-country motorized travel is allowed or tolerated, recreationists would have off-road opportunities, though the use of these areas may result in adverse impacts to the cultural and recreational opportunities along some Other Historic Trails (see Chapter 3, Section 3.6.4 *Comprehensive Travel and Transportation Management* for additional information). Allowing OHV use for big game retrieval, dispersed campsite access, and other "necessary tasks" may result in route proliferation and alterations to the scenic qualities of the landscape, which would affect the recreation setting and experience of those desiring solitude or primitive forms of recreation.

Closing Bighorn River tracts and campgrounds to livestock grazing, and managing livestock grazing for the protection and enhancement of other resource values, would maintain the recreation setting and

minimize the potential for the displacement or impairment of recreation opportunities or experiences in these areas.

Special Designations

Special designations under Alternative A would affect the desired RSCC, opportunities, experiences, and realization of beneficial outcomes to recreationists in the Planning Area. Alternative A designates nine ACECs, seven of which have recreation values that include scenery, spelunking, hunting, and camping. Placing various restrictions on activities (e.g., mineral development, motorized vehicle use) that threaten the scenic values and natural setting in these areas would benefit these recreation values. Avoiding surface-disturbing activities and applying an NSO restriction within ¼ mile of the Nez Perce (Neeme-poo) NHT and Other Trails would preserve the recreation setting of these areas.

Managing WSR eligible waterway segments to protect their free-flowing conditions and ORVs, including prohibiting water impoundments, limiting various mineral development activities, preventing an increase in grazing, and managing segments as VRM Class I or II would preserve the recreation setting and would maintain or enhance the primitive and recreational experiences and opportunities these segments provide. Under Alternative A, there are 12 WSR eligible waterways in the West Slope SRMA, and the Clarks Fork of the Yellowstone segment is in The Rivers SRMA. Prohibiting water impoundments, major diversions, or hydroelectric power facilities; pursuing a withdrawal from appropriation under the mining laws; applying NSO restrictions, and limiting geophysical exploration to foot access on various WSR eligible segments would provide beneficial impacts by helping to maintain the desired setting and experiences in these areas. However, closing segments to recreational dredging would adversely affect recreation management by eliminating recreational opportunities in these areas and opening the Middle Fork of the Powder River, Dry Medicine Lodge Creek, and Paint Rock Creek Unit segments to various mineral activity (e.g., leasing, geophysical exploration).

Allowing motorized vehicle use in WSAs may adversely affect recreationists seeking a natural setting and solitude, although recreationists seeking opportunities for motorized travel in remote areas would benefit. The lack of management prescriptions in lands with wilderness characteristics under Alternative A also would threaten the natural setting and opportunities for recreationists seeking solitude in lands with wilderness characteristics. Prior to impacting or impairing wilderness characteristics in lands with wilderness characteristics, however, Alternative A requires project specific reviews that could help reduce the potential for adverse impacts to wilderness characteristics and associated recreational values.

Resources

Impacts from water quality, watershed, and soils management would be similar to those discussed in the *Impacts Common to All Alternatives* section, except for the action authorizing surface discharge of produced water from oil and gas development. The surface discharge of produced waters would change the physical hydrology of receiving waters and may affect water quality and create additional temporary water sources or evaporation/infiltration reservoirs that would require reclamation upon project completion. Changes in water quality in recreational fisheries may alter aquatic habitats, as described under Section 4.4.5 *Fish and Wildlife Resources – Fish*, and cause adverse impacts to fishing and other recreation opportunities provided by functioning and healthy aquatic habitat. Under Alternative A, the BLM allows recreational use of Spirit Mountain cave and manages cave and karst resources under the Worland Caves SRMA to provide for recreation opportunities. Although not requiring a minimum group size in caves may increase safety risks for recreationists, management actions under this alternative would primarily benefit users of caves for recreation.

Wildland fire management actions would allow wildland fire to play its natural role and would be used for resource benefit when appropriate. Short-term localized impacts to recreation from fire and fuels management, including prescribed fire and mechanical fuels treatments, would result in temporary closure of areas during and after fire events and activities, which would displace recreationists to other areas. Prescribed fires may result in long-term impacts from the displacement of some recreationists because of the altered recreation setting, but would prevent larger catastrophic fires that would displace recreation for a longer time and create long-term safety hazards (e.g., tree fall) for recreationists. Stabilization and rehabilitation activities after a wildfire may prohibit recreational use in the short term while the area recovers, but would reduce the potential for future fires and result in long-term benefits to recreation.

Forest management would use a full range of methods in a manner that protects and benefits watershed, wildlife, and riparian/wetland habitat values to improve forest health. Timber harvesting activities (projected to affect 30,000 acres under Alternative A [Appendix T]) would temporarily displace recreationists because of a change of recreation settings, such as increased traffic, dust, noise, and loss of solitude; these activities would also cause a loss of recreation opportunities during logging operations. Timber harvesting, when completed, would alter recreation settings, which would influence recreational opportunities and experiences. In the long term, closing timber access and haul roads, although eliminating potential motorized recreational use, would provide non-motorized access into areas for other recreational opportunities, activities, and experiences.

Short-term impacts from vegetation treatments would temporarily displace recreationists from treated areas to other areas. The long-term impacts would be to enhance the recreation setting and recreational experiences by improving vegetation health and wildlife habitat.

Management actions under Alternative A that benefit fish and wildlife would benefit recreational activities such as fishing, hunting, bird watching, and general wildlife viewing. However, management actions that restrict public access to protect wildlife or its habitat from disturbance (e.g., restricting OHV use in areas with fragile soils) would limit access for motorized recreation opportunities. These management actions would interfere with some recreationists' goals and experiences, but would enhance the experiences and benefits for those pursuing non-motorized related activities and experiences.

Impacts from management of cultural resources would be similar to those described under the *Impacts Common to All Alternatives* section.

VRM Class allocations for the Planning Area under Alternative A would result in beneficial impacts by preserving or retaining scenic qualities vital to the recreation setting in VRM Classes I and II (see Chapter 2). Requiring a VRM contrast rating worksheet in VRM Class I areas would help preserve the scenic characteristics of the landscape in these areas to be enjoyed by recreationists. However, limiting motorized vehicle use to designated roads and trails in VRM Class I and II areas would reduce access for those seeking recreational motorized travel in these areas. The BLM manages many areas popular for recreational activities and opportunities as Classes III and IV, which allows for noticeable and observable changes in the landscape. These changes, or unnatural contrasts introduced to the landscape, would impact the desired settings, which would interfere with recreationists' goals, experiences, and realized beneficial outcomes.

Proactive Management

Recreation Sites

Recreation management of developed sites would enhance recreation experiences and opportunities by prohibiting surface-disturbing activities (except those related to development of recreation facilities or wildlife habitat) and applying an NSO restriction in fishing and hunting access areas, the Five Springs Falls Campground, the Cody Archery Range, and the R&PP lease area for the Lovell Rod and Gun Club shooting range.

Recreation Management Areas (SRMAs, ERMAs)

Under Alternative A, the BLM manages seven areas as SRMAs (Table 4-29). The remainder of the Planning Area is in the Cody ERMA or Worland ERMA (identified as ERMAs in prior Recreation Planning guidance; the new recreation guidance does not recognize the remainder of the Planning Area as a recreation management area). The *Impacts Common to All Alternatives* section describes the benefits of designating SRMAs. The Recreation Management Area Matrix (Appendix O) provides a summary of management actions under each alternative in areas with specific recreation management designations. This section focuses on recreation management areas and proactive management actions under Alternative A that limit or prohibit resource uses and activities and result in beneficial impacts to recreation by maintaining or enhancing recreation settings, opportunities, experiences, and realization of beneficial outcomes.

Applying NSO restrictions on all or part of the Absaroka Foothills, Bighorn River, The Rivers, and Historic Trails SRMAs and the Canyon Creek area would help maintain the recreational setting and experience in these areas by limiting surface access to oil and gas and other leasable minerals. Additionally, mitigation through activity-level planning on mineral leases in the following areas would minimize potential impacts to the recreation setting: the Badlands, Bighorn River, Absaroka Mountain Foothills, and West Slope SRMAs, and the Red Canyon Creek and Horse Pasture areas.

Closing the Bighorn River SRMA to surface-disturbing activities, such as geophysical exploration and salable mineral exploration, would maintain the recreation settings important for river related activities such as fishing, hunting, and boating.

Managing the Bighorn River, West Slope, and The Rivers SRMAs as ROW avoidance areas would help prevent recreation displacement by preserving the desired RSCC, opportunities, experiences, and beneficial outcomes. All SRMAs are open to renewable energy development under Alternative A; however, limitations on ROW authorizations would apply to the development of renewable energy and may restrict development or require mitigation to minimize adverse impacts to recreation. Wind-energy development would result in adverse impacts to recreation by diminishing the recreation setting.

Although limiting motorized vehicle use to designated roads and trails would restrict opportunities for motorized recreational travel, recreationists seeking naturalness and more primitive forms of recreation would benefit in the following areas: the Bighorn River (CYFO only), Absaroka Mountain Foothills, and West Slope SRMAs, and Red Canyon Creek areas; the North and South Forks of the Shoshone and the Clarks Fork of the Yellowstone rivers; and portions of the McCullough Peaks and Newton Lake Ridge areas. Motorized vehicle use is limited to existing roads and trails in other recreation areas, with off-road use tolerated in the Basin Gardens Play Area and Rattlesnake Ridge area to maximize recreation opportunities for activities such as motocross and hill climbing. Allowing unrestricted, motorized access to the Rattlesnake Ridge area poses a health and safety risk by exposing recreationists to high levels of H_2S gas in the area.

SRMAs are generally managed as VRM Classes IV, III, and II under Alternative A, retaining the existing character of the landscape to preserve the recreation setting, but allowing management activities and facilities development to respond to recreational needs. Managing areas such as the Red Canyon Creek area, areas in the West Slope, Absaroka Mountain Foothills, and Badlands SRMAs as VRM Class II would retain the scenic characteristics of this area, benefitting recreationists seeking a natural setting.

Alternative B

Surface Disturbance

Under Alternative B, a total of 73,940 acres of short-term and 10,893 acres of long-term surface disturbance is projected (Appendix T), most of which would result in adverse impacts to recreation. A portion of this disturbance would result from new facilities development and roads that may benefit recreation, but most would result in short- and long-term adverse impacts by displacing recreation and impairing the recreation setting for those seeking undisturbed landscapes. Alternative B would result in less adverse impacts to recreation from surface disturbance compared to Alternative A. The intensity of impacts to recreation would depend on the location of surface disturbance in relation to the desired RSCC in the area being disturbed (see *Impacts Common to All Alternatives*). Under Alternative B, the BLM would manage more acres in SRMAs (Table 4-29) to maintain the desired RSCC than Alternative A, which would minimize the impacts of surface-disturbing activities where they would most adversely affect recreational experiences.

Resource Uses

Oil and gas development in areas of moderate potential (where most development is anticipated) is expected to add 502 new federal wells resulting in 1,506 acres of short-term surface disturbance during the planning cycle (Appendix T). Adverse impacts from oil and gas development under Alternative B would be similar to Alternative A, although to a lesser extent because Alternative B includes more restrictions on development. Under Alternative B, 2,919,360 acres of BLM-administered surface are available for locatable mineral entry (see Chapter 2) and the BLM projects 5,000 acres of long-term surface disturbance from mining activities. Adverse impacts from locatable mineral development would be similar to Alternative A, although to a lesser extent because Alternative B includes more mineral withdrawals (and less area open to mineral entry).

Acquisitions and land tenure adjustments under Alternative B would benefit recreation similar to Alternative A, although to a greater extent. Emphasizing acquisitions for public access in the Bighorn and Greybull rivers and recreation management areas would result in beneficial impacts similar to Alternative A, although to a greater extent because Alternative B considers more areas for acquisition for public access. Working collaboratively with landowners to identify opportunities for acquisitions under Alternative B also may increase the potential for adjustments that would increase recreational access and opportunities. Under Alternative B, as in Alternative A, pursuing a withdrawal in the Beck Lake Scenic Area would benefit recreation by maintaining the recreation setting and public access in the area.

Alternative B manages a total of 2,710,695 acres as ROW avoidance and 225,447 acres as ROW exclusion areas, resulting in similar impacts to those under Alternative A, but to a greater extent due to the consolidation of ROWs that would preserve the RSCC more than Alternative A. Reducing and consolidating potential renewable energy development under Alternative B, especially wind-energy facilities, would decrease the potential for recreation displacement and visual impacts to recreation settings relative to Alternative A.

Alternative B places more restrictions on motorized vehicle use than Alternative A and limits most of the Planning Area to designated roads and trails. Restricting motorized vehicle use under this alternative would benefit recreation opportunities for solitude, natural settings, and primitive forms of travel more than under Alternative A. Impacts to motorized forms of recreation would be more adverse under Alternative B than Alternative A due to the seasonal closure (March 15 through June 30) of greater sage-grouse Key Habitat Areas to motorized access. The seasonal closure would impact desired recreational opportunities, experiences, and beneficial outcomes by repudiating motorized access within Key Habitat Areas as well as limiting access to other areas that require travel through Key Habitat Areas. Many areas of the Bighorn Basin are remote and difficult to access without the use of a motorized vehicle. Activities that may be adversely impacted by this seasonal closure include antler shed hunting, hiking, motorized touring and OHV use, caving, camping, sightseeing and wildlife viewing, rock hounding, environmental education, and general touring throughout the Bighorn Basin. Certain activities, such as cougar and bear hunting, would be available during fall, but not spring hunts within Key Habitat Areas. Desirable recreational areas that would be affected by the seasonal closure include, but are not limited to, portions of the McCullough Peaks, public lands south of Cody, Wyoming, portions of the West Slope of the Bighorns, the Red Gulch/Alkali Road National Back Country Byway, Castle Gardens Scenic Area, and portions of the Absaroka Front and the foothills. Alternative B, however, opens a larger area to off-road use than Alternative A, providing more recreation opportunities in this regard. Prohibiting OHV use for big game retrieval, dispersed campsite access, and other "necessary tasks" would benefit recreationists seeking solitude and primitive forms of recreation, but would adversely affect recreationists seeking more accessibility for certain activities (e.g., big game retrieval or dispersed campsites). Restricting over-snow vehicle use to areas with a minimum average of 12 inches of snow or groomed trails would limit recreation opportunities for snowmobilers and public access for other recreational uses, such as hunting.

Under Alternative B, the BLM would close crucial winter range for elk and bighorn sheep and greater sage-grouse Key Habitat Areas to livestock grazing. This action may indirectly benefit hunters and wildlife viewers, but would also adversely impact livestock grazing permittees. Livestock grazing may impact wildlife habitat due to competition for forage. Improper grazing management can lead to a lack of residual forage for big game winter use. However, proper management of livestock grazing can be beneficial to certain wildlife species.

Special Designations

Under Alternative B, the BLM would manage special designations for the desired RSCC, opportunities, experiences, and realized beneficial outcomes for recreationists in the Planning Area. Alternative B designates 17 ACECs, 11 of which have recreation values that include scenery, nature viewing, spelunking, hunting, and camping. The benefits of these designations would be similar to Alternative A, but to a greater extent because Alternative B includes more special designations that cover a greater area. Managing all lands with wilderness characteristics specifically to preserve their wilderness characteristics, including where they overlap the Absaroka Mountain Foothills (11,193 acres), West Slope (CYFO and WFO, not including RMZs) (17,230 acres), Bighorn River (3,052 acres), McCullough Peaks (42,371 acres), and The Rivers (4,030 acres) SRMAs and the Tatman Mountain RMZ (24,008 acres), may result in beneficial impacts to recreation experiences in areas managed for back country desired RSCCs.

Designating the Hyattville Logging Road and the Hazelton Road as Back Country Byways and managing these areas for responsible recreation would increase opportunities for recreation in the Planning Area; however, designation may increase the use of these routes enough to diminish solitude and recreation setting and experiences. Avoiding surface-disturbing activities in view within 5 miles and applying an

NSO restriction within 3 miles of the Nez Perce (Neeme-poo) NHT and Other Historic Trails would preserve the recreation setting of these areas to a greater extent than management under Alternative A.

Under Alternative B, the West Slope (CYFO and WFO) SRMA contains six WSR suitable segments and The Rivers SRMA contains one. Desired outcomes in the West Slope (CYFO and WFO) SRMA include experiencing the landscape and developing a greater awareness of outdoor aesthetics in back country and middle country natural settings. Desired outcomes in The Rivers SRMA include developing a closer relationship with the natural world in areas with a rural natural setting, and enjoying risk-taking adventure and increasing local tourism revenue. In addition to the actions restricting minerals development under Alternative A, Alternative B closes WSR suitable segments to mineral leasing and geophysical exploration. This would provide additional benefits by protecting the desired RSCC in these areas. However, prohibiting surface-disturbing activities in all WSR suitable segments may adversely affect recreational experiences, especially in The Rivers SRMA, where facilities may need to be upgraded or expanded to accommodate more visitors.

Benefits from management actions in WSR suitable segments would be similar to Alternative A, although to a greater extent. Under Alternative B, all WSR eligible segments are recommended as suitable for inclusion in the NWSRS, closing these areas to activities (e.g., surface-disturbing activities, ROW authorizations) that would degrade their free-flowing conditions and ORVs. Prohibiting surface-disturbing activities in WSR suitable segments would preclude recreation facilities development that may enhance the recreational experience in some areas. Under Alternative B, 14 of the 20 WSR suitable waterways would be closed to motorized vehicle use, preserving the natural setting and enhancing the experience for nonmotorized, primitive recreation in these areas.

Allowing maintenance on pre-FLPMA (grandfathered) range improvement projects may affect recreationists seeking a natural setting and solitude in WSAs. Closing all WSAs to motorized vehicle use under Alternative B, though eliminating motorized recreation opportunities, would enhance opportunities for solitude and unconfined, primitive recreation. Acquiring inholdings and/or lands or interest in lands in WSAs would also enhance the recreation setting for solitude and unconfined, primitive recreation in these areas and increase access. Under Alternative B, the BLM manages all lands with wilderness characteristics specifically to preserve their wilderness characteristics. Because many lands with wilderness characteristics are adjacent to WSAs, this management action would buffer the WSAs from activities that threaten the wilderness setting sought by recreationists in these areas.

Resources

Beneficial impacts from soils, water quality, and watershed management under Alternative B would be similar to those under Alternative A, although to a greater extent. Cooperating with local governments to develop watershed improvement practices that would reduce sediment in streams, rivers, lakes, and reservoirs and address impaired waterbodies on the state of Wyoming 303d list would preserve water quality for recreational uses of these resources. Prohibiting the discharge of produced water would eliminate the associated impacts described under Alternative A. Stabilizing or relocating heavily eroded or washed out roads would also benefit water quality for recreational uses and motorized recreation opportunities.

Under Alternative B, the BLM allows commercial recreational use of Spirit Mountain cave and manages cave and karst resources under a separate cave and karst ERMA that would emphasize resource protection, address user conflicts, public health and safety, and maintain the desired RSCC. Requiring a minimum group size in caves may decrease safety risks for recreationists, but would also limit recreation opportunities in caves. Recreation opportunities also would be restricted during critical times for bats

and when the safety of users is at risk. Management actions under this alternative would provide less structured recreation prescriptions for caves than under Alternative A.

Fire and fuels management actions under Alternative B would result in impacts similar to Alternative A, although to a lesser extent because Alternative B includes less fuels treatments. Short-term impacts to recreation from disturbance associated with prescribed fire and treatments would be less than under Alternative A. Because Alternative B includes less fuels treatments, the risk of fuels buildup and larger catastrophic fires may be greater under this alternative. Fuels buildup and larger catastrophic fires may cause more long-term adverse impacts to recreation compared to Alternative A.

Impacts to recreation from forest management would be similar to Alternative A, although to a lesser extent. The BLM uses a full range of methods in a manner that protects and benefits watershed, wildlife, and riparian/wetland habitat values, but only harvests timber on approximately 20,000 acres (Appendix T) during the planning cycle where natural processes are unable to accomplish forest health goals. Improved forest health would benefit the recreation settings and supplemental values, which in turn would influence overall recreation opportunities. As the forest declines in health, there may be adverse impacts to wildlife (e.g., big game) populations, resulting in adverse impacts to recreational experiences. Closing timber access and haul roads would result in the same impacts as Alternative A.

Impacts from vegetation treatments would be similar to Alternative A, although to a lesser extent because the BLM treats less acreage under Alternative B. In treated areas, managing toward achieving the reference state plant community (based on the ESD for the site) in grassland and shrubland communities and DPC in riparian/wetland areas may result in additional indirect benefits to recreationists by improving wildlife habitat to a greater extent than Alternative A.

Management actions under Alternative B that would benefit fish and wildlife would enhance recreational activities such as fishing, hunting, bird watching, and general wildlife viewing more than the other alternatives. However, these management actions also would restrict public access and limit opportunities for motorized recreational travel more than under Alternative A.

Impacts to recreation from management of cultural resources would be similar to those noted under the *Impacts Common to All Alternatives*, although to a greater extent. For example, to minimize issues such as looting, limiting motorized vehicle use to designated roads and trails in the Bighorn Slope, Bridger, Owl Creek, and Absaroka Foothills areas would adversely affect opportunities for motorized recreation.

VRM Class allocations for the Planning Area under Alternative B would result in impacts similar to Alternative A, although to a greater extent. Pursuing conservation easements on lands adjacent to areas managed as VRM Classes I and II and requiring a contrast rating worksheet for proposed actions in areas managed as VRM Classes I, II, and III would result in additional benefits to recreation experiences by maintaining the recreation setting in these areas. Closing VRM Class I areas to motorized vehicle use would eliminate motorized recreation opportunities over a large area (154,359 acres) and cause adverse impacts to motorized recreational use.

Proactive Management

Recreation Sites

Recreation management of developed sites would result in impacts similar to Alternative A, although to a greater extent. More acreage would receive high priority recreation management under Alternative B than Alternative A, which may result in greater realized beneficial outcomes from specifically targeting the desired RSCC to enhance activities and experiences. In addition, management of popular recreation sites in the Planning Area (e.g., Castle Gardens, Duck Swamp, and Nowater OHV Trail System) would result in beneficial outcomes, without the additional prescriptions from management as an SRMA, as

ERMAs would receive the recreation management needed to address conflicts, health and safety, and resource protection.

Recreation Management Areas (SRMAs, ERMAs)

This section focuses on recreation management areas and proactive management actions under Alternative B that limit or prohibit resource uses and activities and result in beneficial impacts to recreation by maintaining or enhancing recreation settings, experiences, and opportunities. The Recreation Management Area Matrix (Appendix O) summarizes management actions under each alternative in areas with specific recreation management designations.

Under Alternative B, the BLM would manage 13 areas as SRMAs, including expansions of the Badlands and West Slope (CYFO and WFO) SRMAs (Table 4-29). The *Impacts Common to All Alternatives* section describes the benefits of managing SRMAs. Within the 13 SRMAs, the BLM will manage nine RMZs for distinct recreational products strategically targeted to meet market demand and to manage for realized beneficial outcomes. RMZs may result in more benefits than solely SRMA designations by meeting specific niche demands, activities, opportunities, experiences, and benefits.

The BLM manages the Tour de Badlands RMZ in the Badlands SRMA, the Trapper Creek, Paint Rock, Brokenback/Logging Road, and South Bighorns RMZs in the West Slope (WFO) SRMA, and the Red Canyon Creek and The Rivers SRMAs for motorized and non-motorized recreation opportunities such as hiking, wildlife viewing, and fishing. The BLM emphasizes primitive, non-motorized recreation opportunities in the Wild Badlands and Tatman Mountain RMZs in the Badlands SRMA, and the Canyon Creek, McCullough Peaks, Horse Pasture, Beck Lake, and Newton Lake Ridge SRMAs. Limiting motorized vehicle use to designated roads and trails in most of these areas would result in beneficial impacts to recreation experiences by reducing the potential for user conflicts. Closing the Beck Lake and Newton Lake Ridge SRMAs to motorized vehicle use would adversely affect opportunities for motorized recreation, but would benefit less intensive recreation opportunities such as mountain biking, hiking, and wildlife viewing. Unrestricted, off-road motorized recreation is consolidated in the Basin Gardens Play Area RMZ to maintain an undisturbed recreation setting and benefit recreation opportunities for primitive uses and solitude in other areas of the Planning Area. The Rattlesnake Ridge area is closed due to health and safety hazards associated with H_2S emissions from oil and gas development. This would interfere with motorized recreation and displace these users to other areas, potentially creating new conflicts.

Alternative B includes more proactive management actions to retain the landscape characteristics of areas with recreational value to maintain the desired RSCC than Alternative A. These actions include applying an NSO restriction in all SRMAs, closing all SRMAs to surface-disturbing activities, and managing all SRMAs as ROW avoidance or exclusion areas.

In addition to placing greater restrictions on incompatible uses to preserve the recreation setting in SRMAs, the BLM also expands recreation facilities and amenities in SRMAs and RMZs to a greater extent than under Alternative A to enhance the experience of primary recreation users. For example, adding designated trailheads and hiking trails in areas managed for non-motorized uses (e.g., Canyon Creek SRMA), and vehicle touring loops in areas managed for motorized recreation opportunities as well (e.g., the Trapper Creek, Paint Rock, and Brokenback/Logging Road RMZs), would beneficially impact the recreational experiences in these areas while minimizing the potential for user conflict.

The BLM manages VRM Classes in SRMAs and RMZs consistent with their identified desired RSCC under Alternative B. All SRMAs and RMZs with substantial scenic values that are important to the recreational experience are managed as VRM Class II to retain the existing character of the landscape, while the

Basin Gardens Play Area, where the recreational experience requires opportunities for off-road motorized recreation that partially alter the existing landscape, is managed as VRM Class III.

Although managing recreation more proactively under Alternative B to strategically targeted demands would enhance recreation opportunities and experiences in most areas, restricting recreation opportunities (especially dispersed motorized recreation) in some areas may result in localized adverse impacts to recreationists.

Alternative C

Surface Disturbance

Under Alternative C, a total of 245,642 acres of short-term and 41,485 acres of long-term surface disturbance is projected (Appendix T), most of which would result in adverse impacts to recreation. A portion of this disturbance would result from new facilities development and roads that may benefit recreation, but most would result in short- and long-term adverse impacts by impairing the recreation setting, which would displace those seeking undisturbed landscapes to more suitable areas. Alternative C would result in the greatest adverse impact to recreation from surface disturbance compared to the other alternatives. The intensity of impacts to recreation would depend on the location of surface disturbance in relation to the desired RSCC in the area being disturbed (see *Impacts Common to All Alternatives*). Although the custodial management actions in ERMAs would result in limited benefits to recreational experiences, Alternative C manages the least acreage as SRMAs and pursues the least marketing and maintenance of the desired RSCC. Therefore, surface disturbance may affect benefits to recreationists the most under this alternative.

Resource Uses

Oil and gas development in areas of moderate potential (where most development is anticipated) is expected to add 1,304 new federal wells resulting in 3,912 acres of short-term surface disturbance during the planning cycle (Appendix T). Adverse impacts to recreation from oil and gas development under Alternative C would be similar to Alternative A, although to a greater extent because Alternative C includes more projected development. Under Alternative C, 4,155,119 acres of BLM-administered surface are available for locatable mineral entry (see Chapter 2) and 10,000 acres of long-term surface disturbance are projected from mining activities. Adverse impacts from locatable mineral development would be similar to Alternative A, although to a greater extent because Alternative C makes available more area to locatable mineral entry and pursues withdrawals in the least amount of area. Overall, minerals development under Alternative C would result in the greatest adverse impacts to recreation compared to the other alternatives.

Acquisitions and land tenure adjustments under Alternative C would result in impacts similar to Alternative A, although to a lesser extent. Alternative C identifies more area for disposal than Alternative A. In addition, under Alternative C, the BLM would consider acquisition in recreation areas primarily to address use and user conflicts and not to meet management objectives and desired recreation settings and opportunities in these areas. Under Alternative C, the BLM would not actively pursue acquisitions for public access to enhance recreational opportunities in the Bighorn River. This would place recreational access to the river as a low priority, which would affect both recreational opportunities and experiences, and the benefits of recreation to local tourism.

Under Alternative C, the BLM would not pursue a withdrawal from appropriation under the mining laws in the Beck Lake Scenic Area, which may cause adverse impacts to recreation by allowing mining activities that potentially displace recreationists or diminish their experiences in this area.

Under Alternative C, the BLM would manage a total of 1,173,162 acres as ROW avoidance areas and 7,586 acres as ROW exclusion areas, resulting in similar impacts to those under Alternative A, but to a lesser extent due the smaller area of ROW exclusion (the most restrictive ROW designation). Alternative C opens a total of 1,428,360 acres to renewable energy development. Alternative C may consolidate renewable energy development, such as wind-energy facilities, more than Alternative A, but not as much as Alternative B, resulting in correlated impacts from displacing recreationists and from visual impacts that may impair recreationists' experiences. A complete list of recreation areas and their respective acreages is located in Table 4-27 and Appendix O, *Recreation Management*.

Alternative C places similar restrictions on motorized vehicle use as Alternative A, but more area is limited to designated roads and trails and open to off-road use. Limiting motorized recreation to designated roads and trails in more area would result in a lower potential for user conflict between motorized and primitive recreationists. However, allowing motorized vehicle use across the largest area and closing the least area under this alternative would cause greater adverse impacts to recreation opportunities for solitude, natural settings, and primitive forms of travel than the other alternatives. The greater accessibility for motorized vehicle use under Alternative C may adversely affect adjacent private lands by increasing the potential for recreationists to trespass. New route development from off-road use also would cause the greatest potential for altering the recreation setting for users seeking undisturbed landscapes. As under Alternative A, allowing cross-country motorized use in the 15-mile and Rattlesnake Ridge areas would provide opportunities for recreationists interested in riding off-road, but may result in adverse impacts to the cultural and recreational opportunities along some Other Historic Trails (see Chapter 3 *Comprehensive Travel and Transportation Management* for additional information). Allowing OHV use for big game retrieval, dispersed campsite access, and other "necessary tasks" would result in impacts similar to Alternative A.

Livestock grazing management under Alternative C would result in impacts similar to Alternative A. However, under Alternative C, the BLM does not manage livestock grazing to protect and enhance other resource values, which may result in greater potential adverse impacts to recreational experiences where grazing practices conflict with recreational values, such as opportunities for solitude or back country settings.

Special Designations

Special designations under Alternative C would affect the opportunities, experiences, and settings available to recreationists less than the other alternatives. Alternative C designates no additional ACECs to those designated under all alternatives. Therefore, only the Spanish Point Karst and Brown/Howe Dinosaur Area ACECs would result in beneficial impacts by providing recreation opportunities for rock climbing, caving, and hiking and maintaining the scenic qualities of the area. No additional back country byways would be designated under this alternative to benefit recreation. Surface disturbance and NSO restrictions around the Nez Perce (Neeme-poo) NHT and Other Historic Trails would result in similar beneficial impacts to those described under Alternative A. However, more utility corridors may affect the recreational setting of the trails under this Alternative.

Under Alternative C, the BLM would not apply any special management actions to WSR eligible waterway segments. Allowing other uses in these areas (e.g., oil and gas leasing, geophysical exploration) would result in the greatest potential adverse impact to recreational opportunities, settings, and experiences in these areas compared to the other alternatives. Back country and more primitive forms of recreational opportunities available in these waterway segments, such as hunting, fishing, camping, hiking, and sightseeing, would be adversely impacted, which would result in non-

realization of beneficial outcomes. Such impacts may also result in adverse impacts to local tourism and its associated benefits.

Impacts from WSAs would be similar to those under Alternative A. However, the BLM limits motorized vehicle use to designated roads and trails in the Honeycombs and Cedar Mountain WSAs under Alternative C, which may result in fewer opportunities for motorized recreationists but would enhance the experience for those seeking solitude and primitive recreation. The converse would be true in the remainder of the WSAs, where Alternative C allows motorized vehicle use to a greater extent than Alternative A. Potential impacts to recreationists from the lack of management prescriptions in lands with wilderness characteristics would be similar to those under Alternative A.

Resources

Beneficial impacts from soils, water quality, and watershed management under Alternative C would be similar to those under Alternative A, although to a lesser extent because Alternative C includes fewer restrictions. Addressing impaired waterbodies on the state of Wyoming 303d list may enhance water quality for both recreational resources and recreational uses of these resources, but a lack of watershed improvement practices would result in the greatest potential for sedimentation in waterbodies that have recreational values. Allowing the discharge of produced water would result in impacts similar to Alternative A. Stabilizing heavily eroded or washed out roads would benefit water quality for recreational uses.

Under Alternative C, the BLM would not manage cave and karst resources under a specific cave and karst ERMA, but instead would manage cave and karst areas consistent with resource objectives. As a result, beneficial impacts could be reduced for recreational users of cave and karst resources under Alternative C compared to alternatives A and B, which both manage cave and karst resources as a separate recreation management area. This management may also result in a greater potential for recreational user conflicts under Alternative C in the absence of specific management determining access to and use of cave and karst areas. Under Alternative C, the BLM encourages commercial caving tours of Spirit Mountain cave, which would enhance opportunities for tourists but may diminish experiences or reduce opportunities for local recreationists. Encouraging tourism may also affect cave and karst resources by exceeding the Limits of Acceptable Change and Carry Capacity. These impacts can degrade physical characteristics, which may result in adverse impacts to recreational experiences and benefits.

Fire and fuels management under Alternative C would result in impacts similar to Alternative A, although to a greater extent because Alternative C includes more prescribed fire and mechanical fuels treatments. Short-term localized impacts to recreation from prescribed fire and fuels treatments would be greatest under Alternative C. Due to increased fuels treatments under Alternative C, the risk of fuels buildup and larger catastrophic fires may decrease under this alternative. Decreased fuels buildup and larger catastrophic fires may result in greater long-term benefits to recreation compared to the other alternatives.

Impacts to recreation from forest management would be similar to Alternative A, although to a greater extent. The BLM uses a full range of timber harvesting methods to maximize forest products. Timber harvesting on approximately 40,000 acres during the planning cycle would have the greatest potential to displace recreation or adversely affect the recreation setting in the long term (Appendix T). However, using a full range of silviculture techniques to manage insect and disease may help prevent the spread of infestations and preserve the recreation setting. Allowing timber access and haul roads to remain open for new recreational purposes would result in increased accessibility and new recreation opportunities,

but also may impact the recreation setting in remote areas by altering scenic characteristics or the recreation experience for those seeking solitude.

Impacts from vegetation treatments under Alternative C would be similar to those under Alternative A, although to a greater extent because the BLM treats more acreage under Alternative C. Not managing habitat such as crucial winter range to meet DPC objectives most beneficial for the identified species may result in fewer indirect benefits to recreationists through improving vegetative health for wildlife habitat.

Management actions under Alternative C that would benefit fish and wildlife would enhance recreational activities such as fishing, hunting, bird watching, and general wildlife viewing; however, benefits impacts would be the least under Alternative C compared to the other alternatives. These management actions would permit public access and create opportunities for motorized recreational travel the most compared to the other alternatives. Semi-primitive settings would be affected by this management, and recreationists desiring those settings would not achieve a realization of beneficial outcomes and may seek those benefits in other areas.

Impacts from cultural resources management under Alternative C would be similar to Alternative B.

VRM Class allocations for the Planning Area under Alternative C would result in impacts similar to those under Alternative A, although to a lesser extent. Exempting all mineral actions and activities in designated ROW corridors from contrast rating worksheets would make these developments more visible from surrounding areas, increasing adverse impacts to the setting for recreationists seeking natural landscapes. Under Alternative C, the BLM does not limit motorized vehicle use by VRM Class, increasing opportunities for motorized recreation in scenic areas, but also increasing the potential for new trail and route development to alter the recreation setting for more primitive forms of recreation.

Proactive Management

Recreation Sites

Alternative C would involve the least proactive management to maintain or enhance the desired RSCC, enhance recreationists' opportunities and experiences, and to realize beneficial outcomes. Allowing surface-disturbing activities (e.g., geophysical exploration and salable minerals development) in fishing and hunting access areas; the Five Springs Falls Campground; the Cody Archery Range; and the R&PP lease area for the Lovell Rod and Gun Club shooting range may displace recreation and adversely affect the recreation setting. This would be most notable in the Five Springs Falls Campground and other areas where recreationists may seek a generally undisturbed setting.

Recreation Management Areas (SRMAs, ERMAs)

Under Alternative C, the BLM manages only the Rattlesnake Ridge SRMA (Table 4-29). Management actions in ERMAs are less proactive to enhance recreation opportunities or experiences, and are primarily custodial in nature. By designating only one SRMA, Alternative C would result in the fewest proactive measures to manage for desired RSCC, opportunities, activities, experiences, and desired beneficial outcomes.

Alternative C also places the fewest restrictions on resource uses and surface-disturbing activities to maintain the recreation settings in areas managed as SRMAs under Alternative B (Appendix O). In most areas with recreational use, scenic values are important to recreationists' experiences. Allowing activities such as mineral development and ROW authorizations (i.e., wind-energy development) in these areas would result in the highest potential for degradation of generally undisturbed areas that

benefit recreationists' experiences in popular areas such as the Absaroka Foothills, Badlands, West Slope, Red Canyon Creek, and the Bighorn River.

Allowing more development and motorized vehicle use (permitted on existing roads and trails in all recreation areas except the Trapper Creek area in the Spanish Point Karst ACEC under Alternative C) would diminish the desired settings and those setting-dependent resources and opportunities for solitude in several places. Areas such as the Tour de Badlands (as delineated in Alternative B) produce recreation opportunities for motorized travel and sight-seeing, and for solitude in natural landscapes, which would be threatened by unrestricted motorized vehicle use in remote areas. Other areas where expanded motorized vehicle use would threaten opportunities for solitude include the Absaroka Foothills, West Slope, Canyon Creek, and McCullough Peaks areas. Because the BLM expects OHV use to increase throughout the Planning Area, opportunities for primitive forms of recreation and solitude would decrease unless the BLM limited or closed motorized vehicle use in certain areas.

Under Alternative C, the BLM manages most recreation areas as VRM Classes III and IV, allowing for the greatest alteration of the natural landscape in these areas. For example, this alternative manages the Red Canyon Creek area as VRM Class IV, which would result in the fewest measures to protect the scenic qualities that contribute to the recreation setting of this area.

Designating and expanding the Rattlesnake Ridge SRMA for the allowance of off-road motorized vehicle use, despite potential health and safety risks, would enhance opportunities for motorized recreation and meet the niche demand for activities such as all-terrain vehicle and motorbike use.

Alternative D

Surface Disturbance

Under Alternative D, a total of 140,175 acres of short-term and 18,306 acres of long-term surface disturbance is projected (Appendix T), most of which would result in adverse impacts to recreation. Impacts would be similar in type and extent to those under Alternative A. The intensity of impacts to recreation would depend on the location of surface disturbance in relation to the desired RSCC in the area being disturbed (see *Impacts Common to All Alternatives*). Alternative D manages more acreage in SRMAs than Alternative A, and specifically identifies desired outcomes and RSCCs in SRMAs—and applies certain restrictions to better maintain them, which may limit adverse impacts from surface disturbance to recreation management more than Alternative A.

Resource Uses

Oil and gas development in areas of moderate potential (where the most development is anticipated) is expected to add 1,143 new federal wells resulting in 3,429 acres of short-term surface disturbance during the planning cycle (Appendix T). Adverse impacts from oil and gas development under Alternative D would be similar to Alternative A, although to a lesser extent. For example, Alternative D applies a MLP in the Fifteenmile (230,699 acres), Big Horn Front (379,308 acres), and Absaroka Front (253,112 acres) MLP analysis areas which would reduce impacts to the recreational setting from oil and gas-related development activities through CSU, TLS, and motorized use stipulations. Adverse impacts from locatable mineral development would be similar to Alternative A, although may affect a larger area because Alternative D makes more acreage available for locatable mineral entry.

Acquisition and land tenure adjustments under Alternative D would result in impacts similar to Alternative C, although to a greater extent. Alternative D identifies less land for disposal than alternatives A and C. Under Alternative D, the BLM considers acquisitions for public access to enhance recreational opportunities in the Bighorn River more actively than under Alternative C, but less so than

under alternatives A and B. Pursuing a withdrawal from appropriation under the mining laws in the Beck Lake Scenic Area and not issuing an order that opens the land to mineral entry would result in the same, if not slightly improved, benefits as Alternative A.

Renewable energy development and ROW development would result in impacts similar to, but to a greater extent than alternatives A and C (and a lesser extent than Alternative B). Under Alternative D, the total area managed as ROW exclusion or avoidance is larger than under alternatives A and C, which is likely to result in a greater consolidation of ROWs with proportional benefits to the RSCC and recreational opportunities and experiences.

Travel and transportation management under Alternative D would result in impacts similar to those under Alternative A; however, Alternative D places more restrictions on motorized vehicle use, which would result in greater benefits to recreation opportunities for solitude, natural settings, and primitive forms of travel. Alternative D manages the second most acreage as open to cross-country motorized travel, augmenting recreation opportunities in this regard more than alternatives A and B, but less than Alternative C. Restricting off-road motorized vehicle use in areas with limited travel designations to within 300 feet of roads and trails would result in impacts similar to Alternative B, although to a lesser extent.

Livestock grazing management under Alternative D would result in impacts similar to Alternative A.

Special Designations

The ACECs designated under Alternative D would result in impacts similar to Alternative A, although to a greater extent because Alternative D designates three additional ACECs with recreational values. Alternative D also restricts certain resource uses and activities (e.g., minerals development) in the Chapman Bench Management Area to protect sensitive wildlife habitat that may benefit recreational wildlife viewing opportunities, especially bird watching.

Back country byway designations under Alternative D would result in the same benefits as Alternative A. The BLM applies measures to protect the scenic qualities of the Nez Perce (Neeme-poo) NHT and Other Historic Trails in a more discretionary manner under Alternative D than under the other alternatives. The BLM may protect the viewshed in a larger area around the trails than under alternatives A and C, but with the use of mitigation measures and BMPs, may allow more activities that may affect the scenic quality of the trails (e.g., a CSU restriction versus an NSO restriction).

The BLM does not apply any special management actions to WSR eligible segments under Alternative D, and impacts would be similar to Alternative C.

Resources

Beneficial impacts from soils, water quality, and watershed management under Alternative D would be similar to Alternative A, although to a greater extent than alternatives A and C and a lesser extent than Alternative B. Developing watershed improvement practices; cooperating with adjacent landowners, managers, and the Wyoming DEQ to address waterbodies that do not meet state water quality standards; and giving priority to stabilizing or relocating heavily eroded or washed out roads would result in benefits similar to Alternative B.

As under Alternative C, Alternative D would not manage cave and karst resources under a specific cave and karst ERMA, but would instead manage cave and karst areas consistent with resource objectives, resulting in the same as described under Alternative C. Allowing for commercial tours of Spirit Mountain cave would result in impacts similar to Alternative C. Impacts to recreation opportunities in caves from

requiring minimum group sizes and closing caves for critical bat periods and to protect user safety would be similar to Alternative B.

Based on the extent of treatment estimated from the acreage of projected surface disturbance from prescribed fire and mechanical fuels treatments (Appendix T), fire and fuels management under Alternative D would result in impacts similar to Alternative A.

Forest, woodlands, and forest products management under Alternative D would result in 30,000 acres of timber harvest, and similar impacts as Alternative A, except that using the full range of silviculture techniques to manage endemic insect and disease would result in the same benefits as Alternative C.

Based on the acreage of projected surface disturbance (Appendix T), vegetation treatments would result in similar impacts as Alternative A. Managing some grassland and shrubland communities for a higher plant community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable would result in indirect benefits similar to Alternative B.

Management actions under Alternative D would benefit fish and wildlife, and therefore enhance recreational activities such as fishing, hunting, bird watching, and general wildlife viewing, more than alternatives A and C but less than Alternative B. Correspondingly, management actions to protect wildlife habitat would restrict public access and limit opportunities for motorized travel more than alternatives A and C, but less than Alternative B.

Impacts from management of cultural resources would be similar to those described under *Impacts Common to All Alternatives*.

VRM Class allocations under Alternative D would result in impacts to recreation similar to Alternative A, although to a greater extent because Alternative D allocates more acreage in VRM Classes I and II. Not limiting motorized vehicle use by VRM Class would result in similar impacts as Alternative C.

Proactive Management

Recreation Sites

Under Alternative D, the BLM would pursue a greater degree of proactive management to maintain or enhance the desired RSCC in recreation sites than alternatives A and C, but less than Alternative B. Alternative D applies the same NSO restrictions in recreation sites as Alternative B, but allows surface-disturbing activities, similarly to Alternative C, in recreational sites and trails on a case-by-case basis.

Recreation Management Areas (SRMAs, ERMAs)

This section focuses on recreation management areas and proactive management actions under Alternative D that limit or prohibit resource uses and activities and would result in benefits to recreation by maintaining or enhancing recreation settings, experiences, and opportunities. The Recreation Management Area Matrix (Appendix O) summarizes management actions under each alternative in areas with specific recreation management designations.

Under Alternative D, the BLM would manage 13 areas as SRMAs, as compared to the seven SRMAs under Alternative A; however, because the SRMAs vary in size, Alternative D manages the largest total acreage as SRMAs. Under Alternative D, the Absaroka Foothills, Bighorn River, West Slope, and The Rivers SRMAs are smaller than under Alternative A; the Absaroka Foothills SRMA decreases to 42,615 acres because 28,998 acres are managed as an ERMA, the Bighorn River in the WFO is managed as an ERMA (1,522 acres), the West Slope decreases as the South Bighorns is managed as an ERMA (69,325 acres), and Historic Trails and Worland Caves are not managed as SRMAs. On the other hand, under

Alternative D, Canyon Creek (3,675 acres), Middle Fork of the Powder River (14,644 acres), McCullough Peaks (160,838 acres), Basin Garden Play Area (4,421 acres), Horse Pasture (144 acres), Beck Lake (6,473 acres), and Newton Lake Ridge (1,949 acres) are added as SRMAs. The *Impacts Common to All Alternatives* section describes the benefits of managing SRMAs. Alternative D identifies five ERMAs. The *Impacts Common to All Alternatives* section describes impacts from managing ERMAs. Within the 13 SRMAs, the BLM manages five RMZs; see Alternative B for a description of the beneficial impacts of RMZs.

The BLM manages Tour de Badlands RMZ in the Badlands SRMA, the Canyons and Brokenback/Logging Road RMZs in the West Slope (WFO) SRMA, and the Middle Fork of the Powder River, The Rivers, Beck Lake, and Newton Lake Ridge SRMAs for motorized and nonmotorized recreation opportunities such as hiking, wildlife viewing, and fishing. The BLM emphasizes primitive, nonmotorized recreation opportunities in the Wild Badlands and Tatman Mountain RMZs in the Badlands SRMA, and the Absaroka Foothills, Canyon Creek, McCullough Peaks and Horse Pasture SRMAs. Limiting motorized vehicle use to designated roads and trails in these areas, except for the Horse Pasture SRMA and the Wild Badlands RMZ, would result in beneficial impacts to recreation experiences by reducing the potential for user conflicts. Limiting motorized vehicle use to designated roads and trails in the Horse Pasture SRMA would increase the potential for user conflicts and may adversely affect recreation experiences in the area. This impact would be minimal due to the low amount of roads within the area. Designating roads and trails will aid in maintaining the desired settings, activities, and experiences by enhancing the naturalness of the area. Limiting motorized vehicle use in the Beck Lake and Newton Lake Ridge SRMAs would result in impacts similar to Alternative B, although to a lesser extent. Managing the Basin Gardens Play Area SRMA for motorized recreation opportunities would result in impacts similar to Alternative B, but increasing its size under Alternative D would benefit recreation to a greater extent by responding more appropriately to the increasing demand for motorized recreation opportunities. Managing the Rattlesnake Ridge area as a separate ERMA would maintain the current recreational opportunities resulting in benefits similar to Alternative C, although to a lesser extent because the area is not managed as open to cross-country motorized travel, nor will the area be marketed as an OHV area. Management prescriptions specific to this separate ERMA will address the safety concerns (primarily the H_2S hazard) and conflicts due to the oil and gas activities and the motorized recreational activities. Actively addressing these issues will maintain and enhance the desired experiences and beneficial outcomes.

Alternative D includes the second most proactive management actions to retain the scenic landscape characteristics of areas with recreational value to maintain the desired RSCC. Within SRMAs, these actions include applying a CSU stipulation, allowing surface-disturbing activities only if the effects can be avoided or mitigated based on site-specific analysis, and managing most SRMAs as ROW avoidance areas.

However, maintaining the desired RSCC in Alternative D will not be as effective as Alternative B. Managing the SRMAs without an NSO stipulation will allow surface-disturbing activities that may not effectively be mitigated, which will compromise the desired settings. Impacts to the settings within the SRMAs will adversely impact the goals and experiences desired by those visiting the area. These areas are managed for community, destination, and undeveloped strategies, which commits the BLM to effectively manage these areas to address or maintain the outputs (settings, experiences, and benefits), as identified by those who visit and enjoy the SRMAs. Settings compromised by surface-disturbing activities will interfere with visitors' goals and experiences, which will displace visitors to alternative areas. This goal interference and displacement will adversely impact local tourism and will not meet the objectives of the SRMAs.

The beneficial impacts from expanding SRMAs and separate ERMAs would be similar to those under Alternative B, although to a lesser extent because Alternative D manages less acreage of BLM-administered public lands as SRMAs.

VRM Class allocations under Alternative D would result in benefits to the recreation setting similar to Alternative B in the Absaroka Mountain Foothills, Bighorn River, Canyon Creek, and Newton Lake Ridge SRMAs and the Canyons and Brokenback/Logging Road RMZs. Managing the West Slope and Middle Fork of the Powder River SRMAs as VRM Class II and The Rivers SRMA as VRM Class III would result in a greater beneficial impact by preserving the desired RSCC in these areas than under alternatives A and C, but less than under Alternative B. Allocating VRM classes consistent with other resource objectives in the Tour de Badlands and Tatman Mountain RMZs, the Horse Pasture and Beck Lake SRMAs, the South Bighorns and Red Canyon Creek ERMAs, and McCullough Peaks area may cause adverse impacts to the recreation setting. This would be especially true in areas where the desired RSCC depends more on a back country setting, such as the Tatman Mountain RMZ and the Red Canyon Creek and South Bighorns ERMAs.

Alternative E

Under Alternative E, the BLM would designate the same recreation management areas (SRMAs, ERMAs, and RMZs) as Alternative B (see Map 76 and Table 4-29). Management actions to maintain or enhance recreation settings, experiences, and opportunities in these areas and impacts on other resources and resource uses under Alternative E would be the same as Alternative B.

Surface Disturbance

Under Alternative E, a total of 71,829 acres of short-term and 10,802 acres of long-term surface disturbance is projected (Appendix T), most of which would result in adverse impacts to recreation. The intensity of impacts to recreation would depend on the location of the surface disturbance in relation to the desired RSCC in the area being disturbed (see *Impacts Common to All Alternatives*). Surface-disturbing activities and total surface disturbance acreage under Alternative E would be similar to Alternative B, and impacts to recreational experiences would be the similar to Alternative B. However, in greater sage-grouse Key Habitat Areas under Alternative E, disturbances would not be permitted to exceed one disturbance per 640 acres or disturb more than 3 percent of sagebrush habitat, compared to 5 percent under Alternative B. This additional restriction would reduce potential adverse impacts from surface disturbance to recreational experiences, particularly in areas managed for back country desired RSCC, compared to Alternative B.

Resource Uses

Overall, the management of minerals development under Alternative E would result in the least impacts to recreation compared to the other alternatives. Adverse impacts on recreation from locatable mineral development would be similar to Alternative A, but to a lesser extent because Alternative E would withdraw a larger area from locatable mineral entry (1,799,961 acres, the largest area of any alternative). Alternative E would manage leasable minerals development similar to Alternative B, and impacts to recreation would be similar to Alternative B.

Alternative E manages acquisitions and land tenure adjustments for public access similar to Alternative B, and impacts to recreation and public access would be the same as Alternative B. Pursuing a withdrawal from appropriation under the mining laws in the Beck Lake Scenic Area would result in the same benefits as Alternative A.

Alternative E manages a total of 1,610,729 acres as ROW avoidance and 1,322,879 acres as ROW exclusion areas (the most of any alternative), resulting in impacts similar to alternatives A and B, but to a greater extent due to the consolidation of ROWs that would preserve the RSCC more than under those alternatives. Alternative E would also restrict renewable energy development the most of any alternative, resulting in reduced recreation displacement and visual impacts to recreation settings compared to the other alternatives.

Alternative E limits motorized vehicle travel to designated roads and trails in the same areas as Alternative B, and impacts to recreation would be the same as Alternative B. Seasonal travel closures within greater sage-grouse Key Habitat Areas under alternatives B and E may impact recreation from the restriction of motorized access to areas either within Key Habitat Areas, or reached by access through Key Habitat Areas. These seasonal closures may impact desired recreational opportunities, experiences, and beneficial outcomes by repudiating motorized access within Key Habitat Areas, which provide access to many areas within the Bighorn Basin and recreational experiences that require motorized access. Such activities that may be delayed include antler shed hunting, hiking, motorized touring and OHV use, caving, camping, sightseeing and wildlife viewing, rock hounding, environmental education, and general touring throughout the Bighorn Basin. Certain activities, such as cougar and bear hunting in areas within greater sage-grouse Key Habitat Areas would only be available during fall hunting periods, and unavailable during the spring. Desirable recreational areas affected by certain seasonal closures include, but are not limited to, portions of the McCullough Peaks, public lands south of Cody, Wyoming, portions of the West Slope of the Big Horn Mountains, the Red Gulch/Alkali Road National Back Country Byway, Castle Gardens Scenic Area, and portions of the Absaroka Front and the foothills.

Under Alternative E, management of and effects from areas open to cross-country motorized travel, OHV use for big game retrieval and dispersed campsite access, and other "necessary tasks" would be similar to Alternative B.

Effects of closing areas to livestock grazing for the benefit of wildlife, including the Greater Sage-Grouse Key Habitat Areas ACEC, would be the same as Alternative B.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), is the same as Alternative B. The impacts of these designations would be similar to alternatives A and B, but to a greater extent because Alternative E includes more special designations that cover a greater area. In the Greater Sage-Grouse Key Habitat Areas ACEC, the BLM would only issue SRPs with neutral or beneficial effects to priority sage-grouse habitat. That ACEC also restricts surface-disturbing activities and certain resource uses and activities (e.g., minerals development) to protect greater sage-grouse habitat that may benefit recreational wildlife viewing opportunities, especially bird watching. Beneficial impacts would accrue to recreation experiences in areas managed for back country desired RSCCs. Restrictions on motorized travel and new road and trail development under Alternative E would result in similar adverse impacts to motorized recreation use from special designations management as described for Alternative B.

Resources

Beneficial impacts from soils, water quality, and watershed management under Alternative E would be similar to alternatives A and B, although to a greater extent due to the smaller area of surface disturbance allowed, which is the least of any alternative. Reclamation of closed routes in the Greater Sage-Grouse Key Habitat Areas ACEC would provide additional benefits to water quality for recreational

uses and primitive recreation opportunities. Management of the discharge of produced water under Alternative E would result in similar effects as Alternative B.

Alternative E manages cave and karst, cultural, and visual resources the same as Alternative B, and impacts would be the same as Alternative B.

Fire and fuels management and vegetation and silvicultural treatments under Alternative E are similar to Alternative B, and impacts to recreation would be similar to Alternative B. Within the Greater Sage-Grouse Key Habitat Areas ACEC, additional vegetation management designed to enhance greater sage-grouse habitat could result in indirect benefits to recreationists by improving wildlife habitat to a greater extent than under alternatives A and B.

Under Alternative E, management actions that would benefit fish and wildlife while also enhancing recreational activities such as fishing, hunting, bird watching, and general wildlife viewing would be the same as Alternative B. However, additional restrictions within the Greater Sage-Grouse Key Habitat Areas ACEC would restrict public access and limit opportunities for motorized recreational travel more than management under Alternative B or the other alternatives.

Cultural resources management and VRM under Alternative E are the same as Alternative B, and impacts would be the same as Alternative B.

Proactive Management

Under Alternative E, recreation management areas and recreation sites are the same as Alternative B, and impacts would be the same as Alternative B.

Alternative F

Under Alternative F, the BLM designates the same recreation management areas (SRMAs, ERMAs, and RMZs) as Alternative D (see Map 78 and Table 4-29). Management actions to maintain or enhance recreation settings, experiences, and opportunities in these areas and impacts on other resources and resource uses under Alternative F would be the same as Alternative D.

Surface Disturbance

Under Alternative F, a total of 137,064 acres of short-term and 17,663 acres of long-term surface disturbance is projected (Appendix T), most of which would result in adverse impacts to recreation. The intensity of impacts to recreation would depend on the location of the surface disturbance in relation to the desired RSCC in the area being disturbed (see *Impacts Common to All Alternatives*). Surface-disturbing activities and total surface disturbance acreage under Alternative F would be similar to Alternative D, and impacts to recreational experiences would be similar to Alternative D. However, in greater sage-grouse PHMAs under Alternative F, disturbances would not be permitted to exceed one disturbance per 640 acres or disturb more than 3 percent of sagebrush habitat. This additional restriction would reduce potential adverse impacts from surface disturbance to recreational experiences, particularly in areas managed for back country desired RSCC, compared to Alternative D.

Resource Uses

The management of minerals development under Alternative F is similar to Alternative D, and impacts to recreational experiences and settings would be similar to Alternative D. Unlike Alternative D, Alternative F includes an NSO stipulation within 0.6 mile of occupied sage-grouse leks in the proposed Greater Sage-Grouse PHMAs ACEC; however, this additional stipulation would not change the projected

oil and gas development (see Appendix T) to an extent that would alter the projected impacts from Alternative F compared to those under Alternative D.

Management of acquisitions and land tenure adjustments for public access under Alternative F is the same as Alternative D, and impacts to recreation and public access would be the same as Alternative D. Pursuing a withdrawal from appropriation under the mining laws in the Beck Lake Scenic Area and not issuing an order that opens the land to mineral entry would result in the same, if not slightly greater, benefits as Alternative A.

Renewable energy development and ROW development under Alternative F are similar to, but more restrictive than (i.e., larger areas of renewable energy and ROW avoidance/exclusion) management under Alternative D, and impacts would be similar to Alternative D, though to a lesser extent.

Travel and transportation management restrictions under Alternative F would result in impacts similar to Alternative A, but to a greater extent. Alternative F restricts motorized vehicle use in the Greater Sage-Grouse PHMAs ACEC to designated roads and trails but does not impose seasonal closures like those under Alternative E. Travel and transportation management under Alternative F would result in impacts similar to Alternative A; however, Alternative F restrictions on motorized vehicle use would have greater benefits to recreation opportunities for solitude, natural settings, and primitive forms of travel than under alternatives D, C, and A, but less than alternatives B and E. Alternative F manages the same acreage as open to cross-country motorized travel as Alternative D, and impacts would be the same as Alternative D.

Livestock grazing management under Alternative F is the same as Alternative D, and impacts to recreational experiences would be the same as Alternative D.

Special Designations

Management of special designations in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres) under Alternative F is the same as Alternative D. Special designations under Alternative F would result in impacts similar to alternatives A and D, but to a larger extent because Alternative F includes more special designations that cover a greater area. In the Greater Sage-Grouse PHMAs ACEC, the BLM would only issue SRPs with neutral or beneficial effects to priority sage-grouse habitat. This management action may preclude or defer some commercial recreational activities (e.g., OHV race events) currently taking place within the Greater Sage-Grouse PHMAs ACEC. This ACEC also places restrictions on surface-disturbing and resource use activities for the protection of greater sage-grouse that could in turn have beneficial impacts on recreational wildlife viewing opportunities, especially bird watching.

Resources

Beneficial impacts from soils, water quality, and watershed management under Alternative F would be similar to alternatives A and D, although to a greater extent due to the smaller area of surface disturbance allowed under Alternative F in greater sage-grouse PHMAs. Watershed management practices under Alternative F would be the same as Alternative D, and the associated beneficial impacts on recreation would be the same as Alternative D.

Alternative F manages cave and karst the same way as Alternative C, and impacts would be the same as Alternative C.

Fire and fuels management and vegetation and silvicultural treatments under Alternative F are similar to Alternative D, and impacts to recreation would be similar to Alternative D. Within the Greater Sage-Grouse PHMAs ACEC, additional vegetation management designed to enhance greater sage-grouse

habitat could result in indirect benefits to recreationists by improving wildlife habitat to a greater extent than under alternatives A and D.

Under Alternative F, management actions that would benefit fish and wildlife while also enhancing recreational activities such as fishing, hunting, bird watching, and general wildlife viewing are the same as Alternative D. However, greater sage-grouse protective management applied to the Greater Sage-Grouse PHMAs ACEC would restrict public access and limit opportunities for motorized recreational travel to a greater extent than under alternatives A, C, and D, but less so than under alternatives B and E.

Cultural resources management and VRM under Alternative F are the same as Alternative D, and impacts would be the same as Alternative D.

Proactive Management

Under Alternative F, recreation management areas and recreation sites would be the same as Alternative D, and impacts would be the same as Alternative D.

4.6.6 Lands with Wilderness Characteristics

The BLM inventory identified approximately 476,349 acres (in 43 lands with wilderness characteristics) of BLM-administered land with wilderness characteristics in the Planning Area, or approximately 15 percent of total BLM-administered land in the Planning Area. Chapter 3 describes the process used to inventory lands with wilderness characteristics and lists the current key management for each of these areas.

This section presents an analysis of proposed management actions for lands with wilderness characteristics that are likely to result in impacts to other resources, resource uses, and special designations. This section also analyzes the effects of management actions on the wilderness characteristics identified in these areas.

Adverse impacts from management in lands with wilderness characteristics result from actions that restrict resource uses or the management of resources, while beneficial impacts are those that enhance other resource uses or the management of resources. Adverse impacts to lands with wilderness characteristics occur when apparent naturalness, opportunities for solitude, or opportunities for primitive, unconfined recreation (collectively known as wilderness characteristics) are compromised. Beneficial impacts occur when the above conditions are preserved or improved. Direct impacts would result from management actions that affect other resource uses or activities in lands with wilderness characteristics. Indirect impacts to other resources (e.g., soils and vegetation) may result if management actions in lands with wilderness characteristics displace resource uses or activities (e.g., minerals development) to areas outside of these lands, thereby augmenting impacts in other areas.

For a discussion of wilderness characteristics in WSAs, please refer to Section 4.7.6 *Wilderness Study Areas*.

4.6.6.1 Methods and Assumptions

This analysis considers potential effects on wilderness characteristics under each alternative for all inventoried lands with wilderness characteristics (476,349 acres) in the Planning Area, regardless of whether the alternative manages these areas to maintain their wilderness characteristics. All instances of the phrase "lands with wilderness characteristics" in the sections that follow refer to inventoried lands with wilderness in the Planning Area (476,349 acres), except where immediately followed by

"managed for their wilderness characteristics", "managed to maintain their wilderness characteristics", or a similar qualifying phrase. Inventoried lands with wilderness characteristics are the same under all alternatives, but management of these areas differs by alternative. For alternatives B and E, all inventoried lands with wilderness characteristics are managed for their wilderness characteristics.

The analysis considers only present conditions, not the potential for other areas to become lands with wilderness characteristics through restoration or other changes in existing conditions. This analysis includes the following assumptions:

- Lands with wilderness characteristics in the Planning Area are not subject to BLM Manual 6330, *Management of Wilderness Study Areas* (BLM 2012a) or other policies or guidance applicable to WSAs or Wilderness Areas.
- All alternatives recognize valid existing rights on lands with wilderness characteristics. In some cases, the exercise of valid existing rights may be incompatible with protection of wilderness characteristics and may result in impact to wilderness characteristics.
- Management actions that enhance biological or other environmental characteristics would improve the quality of the wilderness characteristics of lands with wilderness characteristics over the long term.
- Management actions that reduce surface disturbance or decrease evidence of human presence in these areas would improve the quality of wilderness characteristics in lands with wilderness characteristics.
- Managing lands with wilderness characteristics to maintain their wilderness characteristics would benefit naturalness, and opportunities for solitude, and primitive and unconfined recreation.

Under Alternative A, decisions on projects in lands with wilderness characteristics would be consistent with current management.

4.6.6.2 Summary of Impacts by Alternative

Under alternatives A, C, and D, no lands with wilderness characteristics are managed to maintain their wilderness characteristics. Therefore, the preservation of wilderness characteristics (e.g., sufficient size, a high degree of naturalness, outstanding opportunities for solitude, or outstanding opportunities for primitive and unconfined recreation) in lands with wilderness characteristics would be least effective under these alternatives. In contrast, lands with wilderness characteristics under alternatives B and E (476,349 acres) are managed to maintain naturalness, outstanding opportunities for solitude or a primitive and unconfined recreation. Although many lands with wilderness characteristics in the Planning Area contain potential resource conflicts that may be inconsistent with retention of wilderness characteristics (see Table 3-51), under alternatives B and E the BLM would apply management to maintain these characteristics to the extent practicable. Such management would be a beneficial impact for wilderness characteristics. Under Alternative F, 49,396 acres (in nine lands with wilderness characteristics) are managed to maintain wilderness characteristics; the remaining lands with wilderness characteristics under Alternative F are not managed to maintain their wilderness characteristics.

Alternatives A and C include the least restrictive management of resource uses that involve surface disturbance or degrade the natural character of the landscape in lands with wilderness characteristics. Alternative C would result in the greatest adverse impacts to these lands due to the greater intensity of resource uses and the amount of surface disturbance under this alternative. Overlapping special designations under alternatives A, D, and F provide some maintenance for wilderness characteristics in

lands with wilderness characteristics. No special designations under Alternative C overlap lands with wilderness characteristics. Under Alternative A, 9,008 acres of WSR eligible waterway segments and 27,231 acres of ACEC designations overlap lands with wilderness characteristics. Under Alternative F, 48,770 acres of lands with wilderness characteristics are overlapped by ACECs.

Alternatives E, B, and F, respectively, would reduce the potential for adverse impacts to wilderness characteristics in lands with wilderness characteristics to the greatest degree by restricting or limiting resource uses and activities that could degrade wilderness characteristics. Management actions under alternatives that maintain wilderness characteristics would restrict, and thereby adversely affect, resource uses and certain activities (e.g., motorized vehicle use) to maintain the naturalness and opportunities for solitude and primitive, unconfined recreation in these areas. However, the comparatively more restrictive management of mineral resources and ROW development under alternatives B, E, and F could benefit other resources and resource uses in areas with wilderness characteristics, such as soils, primitive and back country recreation, and visual resources.

4.6.6.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Under all alternatives, any surface-disturbing activity, including fire and fuels management, paleontological and cultural excavations, ROWs and renewable energy development, and the maintenance of existing facilities may result in adverse impacts to wilderness characteristics in lands with wilderness characteristics. Hazardous fuels treatment and activities to control wildland fire, such as the construction of fire breaks, create surface disturbance that may result in adverse impacts to wilderness characteristics in lands with wilderness characteristics. Motorized vehicle use can disturb vegetation and contribute to the spread of invasive species that degrade native vegetation communities and diminish wilderness characteristics. Livestock, wild horse, and wildlife grazing could contribute to the spread of invasive species, and concentrated grazing by any species can compact soils and degrade riparian/wetland areas. Facilities maintenance can require the use of mechanized equipment and vehicles and can alter the natural state of vegetation and affect wilderness characteristics.

Alternative A

Surface Disturbance

Management actions under Alternative A are projected to result in approximately 136,253 acres of short-term and 15,646 acres of long-term surface disturbance on BLM-administered land over the life of the plan (Table 4-1). Most surface-disturbing activities are not specifically prohibited in lands with wilderness characteristics under Alternative A, and could therefore result in adverse impacts to these lands by compromising wilderness characteristics.

Resource Uses

Alternative A does not manage lands with wilderness characteristics to maintain their wilderness characteristics; however, management for other resource uses that overlap lands with wilderness characteristics under Alternative A may cause impacts to wilderness characteristics. Table 4-30 provides a summary of acreages and allocations associated with resources and resource uses in those lands that have the potential to affect wilderness characteristics. Management under Alternative A includes the second largest amount of area open to mineral materials disposal and available for mineral leasing, the second largest amount of area open to ROW authorizations, and the greatest amount of area where

motorized vehicle use is limited to existing roads and trails. Opening lands with wilderness characteristics to mineral development, managing areas as open to ROWs and renewable energy authorizations, and allowing motorized vehicle use on existing roads and trails may result in adverse impacts to wilderness characteristics in these areas. In general, because of the intensity and extent of allowable resource uses under Alternative A, management under this alternative would result in adverse impacts to wilderness characteristics. Although the wilderness characteristics of these areas have been maintained since the last wilderness review 30 years ago, they do not guarantee continued maintenance of these wilderness characteristics in response to potential changes in land use and development interest that may occur during the planning period.

Special Designations

Special designations that overlap lands with wilderness characteristics may result in beneficial impacts to these lands by restricting resource uses and surface-disturbing activities that can degrade wilderness characteristics, or by requiring additional mitigation for allowable activities. ACECs, WSRs, and NHTs and Other Historic Trails overlap some lands with wilderness characteristics under Alternative A, and some of these specially designated areas include management that would reduce adverse impacts to wilderness characteristics (e.g., VRM, management of surface-disturbing activities, travel designations, etc.). Resource protections provided by the management of these areas would be beneficial to wilderness characteristics in certain lands, though these impacts would vary by location and designations. Under Alternative A, 9,088 acres of WSR eligible waterway segments and 27,231 acres of ACEC designations overlap lands with wilderness characteristics.

Table 4-30. Acres of Management in Inventoried Lands with Wilderness Characteristics by Alternative

Alternative	Mineral Closures (acres)		Rights-of-Way (acres)			Visual Resource Management Class (acres)				Travel Management (acres)					Lands with Wilderness Characteristics Managed to Maintain their Wilderness Characteristics
	Minerals Material Closure	Closed to Mineral Leasing	Exclusion	Avoidance	Open	Class I	Class II	Class III	Class IV	Closed	Limited to Designated	Limited to Existing	Open	Seasonal Restrictions	
Alternative A[1]	14,355	33,603	12,902	116,045	347,402	6	106,900	106,899	278,969	5,714	145,392	325,236	0	17,725	0
Alternative B[2]	471,584	471,727	26,459	449,873	17	4,884	470,975	164	20	9,049	467,282	3	0	182,983	476,349
Alternative C[1]	7,201	3,422	659	103,017	372,674	<6	90,760	113,932	271,345	3,184	179,892	293,258	0	17,717	0
Alternative D[1]	96,174	46,712	5,428	336,636	134,285	6	166,405	141,856	168,049	3,186	302,899	170,251	0	17,748	0
Alternative E[2]	471,707	471,727	169,554	306,778	17	4,884	470,975	164	20	9,137	467,194	3	0	182,983	476,349
Alternative F[2]	33,313	48,996	4,860	44,537	0	6	49,372	2	0	3,149	46,069	180	0	11,042	49,396

Sources: BLM 2009a; BLM 2013a

[1]Alternatives A, C, and D do not contain specific management for any identified lands with wilderness characteristics; however, the areas identified as lands with wilderness characteristics was a finding in the inventory conducted for this Resource Management Plan Revision Project and do not reflect a land use classification.
[2]Acreages are based on BLM-administered lands managed for wilderness characteristics.

Note: Due to variations in data coverage, acreages within each management category may not add to the total acreage for lands with wilderness characteristics in the Planning Area.

< Less than

Resources

Fire and fuels management may result in adverse impacts if mechanical fuels treatments and prescribed fire result in surface disturbance or changes in the structure of vegetation that degrades wilderness characteristics. However, fuels treatments and prescribed fire may reduce the potential for future larger-scale wildfires that would result in adverse impacts to primitive and unconfined recreation in lands with wilderness characteristics before an area recovers. The adverse impacts to wilderness characteristics in these lands would increase with the amount of treatment.

Under Alternative A, the BLM manages visual resources in lands with wilderness characteristics primarily as VRM Class IV (Table 4-30). In areas managed as VRM Class IV, modification of the natural environment would be allowed (via increased tolerance for surface disturbance and fewer requirements related to facility location and other types of mitigating design modifications) and there could be adverse impacts to the identified wilderness characteristics of the areas.

Proactive Management

Under Alternative A, the BLM does not manage lands with wilderness characteristics to maintain their wilderness characteristics; these areas would be managed consistent with management for other resources and resource uses.

Alternative B

Surface Disturbance

Under Alternative B, the acreage of surface disturbance in lands with wilderness characteristics is likely to be substantially less than under Alternative A. Management actions under Alternative B are projected to result in approximately 30 percent less long-term surface disturbance on BLM-administered land than Alternative A (Table 4-1). Restrictions on minerals, ROWs, vegetative treatments, and other resource uses in lands with wilderness characteristics under Alternative B would further reduce the potential for adverse impacts from surface disturbance in these areas relative to Alternative A by leaving these areas in a more natural, unmodified state.

Resource Uses

Management for lands with wilderness characteristics under Alternative B designed to protect naturalness and outstanding opportunities for solitude and primitive and unconfined recreation could result in adverse impacts to other resource uses as described below, but would be beneficial to the protection of wilderness characteristics. Restrictions on mineral development, timber harvest practices, mechanical vegetation treatments, motorized vehicle use, ROWs, and rangeland improvements under Alternative B would help to maintain wilderness characteristics in these lands. These restrictions may displace some resource uses and activities, such as minerals development or motorized vehicle use, which could potentially adversely affect resources (e.g., wildlife and vegetation) in areas outside of lands with wilderness characteristics.

Under Alternative B, lands with wilderness characteristics are closed to oil and gas and solid mineral leasing and mineral materials disposal. This management would result in greater adverse impacts to these resources than Alternative A (see Table 4-30), particularly in areas with development potential, because new leasing or disposal would be prohibited. The BLM would consider measures to minimize impacts to wilderness characteristics in project level analysis. Lands with wilderness characteristics encumbered with valid existing rights may be impacted where development of those rights is incompatible with protection of wilderness characteristics.

Under Alternative B, lands with wilderness characteristics also are closed to commercial and personal-use wood cutting, which may adversely affect forest products by reducing the area open to timber harvest compared to Alternative A.

Under Alternative B, the BLM limits motorized vehicle use to designated roads and trails in all lands with wilderness characteristics and closes them to over-snow travel. Increased restrictions on motorized vehicle use under Alternative B would adversely affect travel opportunities to a greater extent than Alternative A (see Table 4-30). These lands also are closed to new road construction under Alternative B, which may adversely affect CTTM by restricting the development of new routes if access issues are discovered.

Under Alternative B, the BLM manages lands with wilderness characteristics as ROW avoidance areas, which would result in greater adverse impacts to the ability to grant ROW authorizations on these lands compared to Alternative A (see Table 4-30).

Special Designations

Special designations cover a larger percentage of the Planning Area under Alternative B compared to Alternative A, restricting resource uses that could adversely affect naturalness and outstanding opportunities for solitude and primitive and unconfined recreation. Under Alternative B, the area of WSR suitable waterway segment overlap is the same as under Alternative A, while acres of ACEC and lands with wilderness characteristics overlap would be greater than under Alternative A (79,225 acres). However, because the characteristics of these areas are already protected under Alternative B, the magnitude of the impact would be smaller than under Alternative A.

Resources

Under Alternative B, resources adversely affected by surface-disturbing activities or motorized vehicle use would benefit from the restriction on these activities in lands with wilderness characteristics. Resources that would benefit from management under this alternative include recreation and related opportunities and experiences derived from primitive-based settings, soil, water, wildlife and special status species, and cultural and visual resources. Under Alternative B, the BLM would manage all lands with wilderness characteristics as VRM Class I or II. Alternative B manages for more VRM Class I and II in these lands than Alternative A. A larger area of more restrictive VRM Class I and II areas would affect the design and occurrence of actions that result in surface disturbance, and would provide increased protection for wilderness characteristics compared to Alternative A.

Fire and fuels management would be more restricted in lands with wilderness characteristics under Alternative B than under Alternative A. Although the BLM allows prescribed fire in these lands, it allows mechanical vegetation treatments only to restore natural resource systems. Because fuels reduction through thinning is more restricted than under Alternative A, there may be more risk of catastrophic wildfires in these areas.

Proactive Management

Under Alternative B, the BLM manages all lands with wilderness characteristics to maintain their wilderness characteristics (476,349 acres), which include naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation. As described in the sections above, Alternative B applies specific management actions for lands with wilderness characteristics that, in addition management for other resources that overlaps lands with wilderness characteristics, prohibits or limits resource uses that that could degrade wilderness characteristics.

Alternative C

Surface Disturbance

Surface disturbance would result in impacts to wilderness characteristics in lands with wilderness characteristics similar to Alternative A, although to a greater extent because Alternative C involves more projected surface disturbance. Management actions under Alternative C are projected to result in approximately 80 percent more short-term (245,642 acres) and 165 percent more long-term (41,485 acres) surface disturbance on BLM-administered land than Alternative A. Adverse impacts are likely to increase with the amount of total Planning Area surface disturbance, because lands with wilderness characteristics are not managed to maintain their wilderness characteristics under Alternative C. Adverse impacts to wilderness characteristics from surface disturbance in these lands would be the greatest under Alternative C.

Resource Uses

The impacts from resource uses to wilderness characteristics in lands with wilderness characteristics under Alternative C would generally be similar in extent to Alternative A and would result from the same types of resource use. Table 4-30 summarizes acreages and allocations associated with resources and resource uses in those lands that have the potential to affect wilderness characteristics. Management under Alternative C includes the largest areas open to mineral materials disposal and available for mineral leasing, the largest area open to ROW authorizations, and the second largest area where motorized vehicle use is limited to existing roads and trails. Alternative C is generally the least restrictive alternative in terms of allowable resource uses and resource protection, and although the extent of impacts would be similar to Alternative A, the intensity of these impacts under this alternative may result in the greatest adverse impacts to wilderness characteristics in inventoried lands.

Special Designations

Special designations that overlap lands with wilderness characteristics may result in beneficial impacts to wilderness characteristics by restricting resource uses and surface-disturbing activities or requiring additional mitigation. Due to the limited extent of lands with special designations under Alternative C, the potential beneficial impacts to wilderness characteristics in these lands would be lowest under this alternative. Under Alternative C, 3,181 acres of ACEC designations overlap lands with wilderness characteristics.

Resources

Impacts to wilderness characteristics in lands with wilderness characteristics from fire and fuels management would result in impacts similar to those under Alternative A, although to a greater extent. In general, the extent and intensity of fuels treatment under Alternative C are greater than under the other alternatives. Adverse impacts to wilderness characteristics in these lands would be proportional to the amount of treatment.

Under Alternative C, lands with wilderness characteristics include more VRM Class III and IV areas and less VRM Class I and II areas than any other alternative. Visual management in these lands under Alternative C would have the greatest potential to result in adverse impacts to wilderness characteristics compared to the other alternatives.

Proactive Management

Under Alternative C, the BLM does not manage lands with wilderness characteristics to maintain their wilderness characteristics; these areas would be managed consistent with management for other resources and resource uses.

Alternative D

Surface Disturbance

Under Alternative D, the BLM would not manage lands to protect wilderness characteristics outside of existing WSAs. Some wilderness characteristics may be afforded indirect protections through the application of management actions (i.e., ACECs, travel designations, VRM classifications) and allowable use decisions for other resources and resource uses (e.g., application of NSO, CSU, and TL stipulations). However, no land use planning decisions would be made specifically to protect wilderness characteristics in Alternative D. Surface disturbance would result in impacts to wilderness characteristics in lands with wilderness characteristics similar to Alternative A, although to a greater extent because Alternative D involves more projected surface disturbance. It is estimated that 1,143 new well pads could be constructed on BLM-administered land, resulting in 3,429 acres of surface disturbance in the Planning Area under this alternative (Appendix T). Some of this development could likely occur in identified lands with wilderness characteristics. Management actions under Alternative D are projected to result in approximately 3 percent more short-term (140,175 acres) and 17 percent more long-term (18,306 acres) surface disturbance on BLM-administered land than Alternative A. The noise and presence of these developments in conjunction with access road construction, vehicle traffic associated with the construction, drill rig transport, and production of the wells are likely to change or degrade the natural character and opportunities for solitude and primitive and unconfined types of recreation throughout the life of the plan. Adverse impacts to wilderness characteristics from surface disturbance in lands with wilderness characteristics would be similar to Alternative C, but to a lesser extent.

Encouraging the use of native plant species to re-seed areas could reduce opportunities for the establishment of noxious weeds and invasive species, which could improve the overall naturalness of an area, creating conditions favorable to maintaining wilderness characteristics or even creating new areas through remediation which could be found to have wilderness characteristics in the future.

Resource Uses

Under Alternative D, the BLM does not manage lands with wilderness characteristics to maintain their wilderness characteristics; these areas would be managed consistent with management for other resources and resource uses. Table 4-30 shows acres of management in lands with wilderness characteristics under this alternative. The impacts from resource uses to wilderness characteristics in inventoried lands with wilderness characteristics under Alternative D would generally be similar in extent to Alternative A and would result from the same types of resource use. Table 4-30 summarizes acreages and allocations associated with resources and resource uses in those lands that have the potential to affect wilderness characteristics. Management under Alternative D includes the third smallest amount of area open to mineral materials disposal and the third smallest amount of area available for mineral leasing. Recreation management areas where they contain lands with wilderness characteristics, especially the Absaroka Mountain Foothills SRMA, Tatman Mountains RMZ, and McCullough Peaks SRMA containing 3,044 acres, 27,035 acres, and 42,425 acres, respectively, would

beneficially affect wilderness characteristics by preserving the desired back country naturalness sub-component of the RSCCs in these areas.

In general, management of resource uses in lands with wilderness characteristics under Alternative D is similar to that under Alternative A, although more mitigation and reclamation requirements under Alternative D may limit impacts to wilderness characteristics.

Special Designations

Several special designations overlap lands with wilderness characteristics under Alternative D. Restrictions on surface disturbance and constraints on resource uses from overlapping special designations would limit adverse impacts to wilderness characteristics. These beneficial impacts to lands with wilderness characteristics would be similar to those described under Alternative A, although to a greater extent due to the larger area of overlapping ACECs (51,681 acres).

Resources

Impacts to wilderness characteristics in lands with wilderness characteristics from fire and fuels management would result in impacts similar to those under Alternative A.

Under Alternative D, the BLM would manage 166,405 acres of lands with wilderness characteristics under VRM Class II objectives, which is 304,570 acres less than alternatives B and E, and 59,506 acres more than Alternative A. Benefits to wilderness characteristics from this alternative would be the same as under Alternative B, though to a lesser extent due to the smaller area of lands with wilderness characteristics managed under VRM Class II objectives.

Proactive Management

No management actions exist specific to protecting lands with wilderness characteristics under Alternative D. Consequently no impacts as a result of management actions specific to lands with wilderness characteristics are expected. However, management actions associated with other resources in which NSO stipulations, CSU stipulations or other COAs are applied that would create conditions favorable to maintaining wilderness characteristics (such as helping to retain naturalness or opportunities for primitive or unconfined types of recreation) could have a beneficial impact if these COAs apply to lands with wilderness characteristics. See Table 4-31 below for a summary of Resource Allocations that could create conditions favorable for maintaining wilderness characteristics.

Additionally under all alternatives, implementing existing and travel management plans developed subsequent to this RMP would benefit lands with wilderness characteristics by providing site-specific travel designations that accommodate appropriate access while considering resource protection and user safety.

Table 4-31. Overlap between Resource Allocations whose Management could Create Conditions Favorable to Maintaining Wilderness Characteristics and Inventoried Areas Found to Have Wilderness Characteristics

Resource Allocation Protection	Acres within inventoried units that may receive indirect protections from overlapping mitigation for other resource protections	Naturalness may be indirectly protected from overlapping mitigation for other resource protection	Outstanding opportunity for solitude may be indirectly protected from overlapping mitigation for other resource protection	Opportunities for primitive recreation may be indirectly protected from overlapping mitigation for other resource protection
ACECs	11,343	Yes	Yes	Yes
Sage-grouse PHMAs	133,998	Yes	Yes	Yes
CSU	237,391	Yes	Yes	No
NSO	60,566	Yes	Yes	Yes
Closed to Oil and Gas Leasing	47,092	Yes	Yes	Yes
MLP Areas	215,739	Yes	Yes	Yes
RMAs	219,900 (SRMA) 9,452 (ERMA)	Yes	Yes	Yes

Source: BLM 2013a

ACEC	Area of Critical Environmental Concern
CSU	Controlled Surface Use
MAs	Priority Habitat Management Areas
MLP	Master Leasing Plan
NSO	No Surface Occupancy
RMA	Recreation Management Area

Alternative E

Under Alternative E, the BLM manages all lands with wilderness characteristics to maintain their wilderness characteristics (476,349 acres), the same as Alternative B. Management actions to maintain wilderness characteristics in lands with wilderness characteristics and impacts on other resources and resource uses under Alternative E would be the same as Alternative B. Table 4-30 shows acres of management in lands with wilderness characteristics under this alternative.

Surface Disturbance

Under Alternative E, surface disturbance in lands with wilderness characteristics would be less than under any alternative. Management actions under this alternative are projected to result in approximately 47 percent less short-term and 31 percent less long-term surface disturbance on BLM-administered land than Alternative A. Restrictions on minerals, ROWs, vegetative treatments, and other resource uses in lands with wilderness characteristics for the protection of other resource values under Alternative E would further reduce the potential for surface disturbance in these areas more than any other alternative. As a result, there would be greater benefits to the wilderness characteristics in these lands because these areas would be left in a more natural, unmodified state.

Resource Uses

Management of mineral development, timber harvest practices, mechanical vegetation treatments, motorized vehicle use, ROWs, and rangeland improvements for the maintenance of wilderness characteristics under Alternative E are the same as Alternative B; impacts to wilderness characteristics, as well as impacts on other resources use from the management of these areas, would be the same as Alternative B.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), is the same as Alternative B. Special designations could benefit wilderness characteristics by restricting resource uses that adversely affect naturalness and outstanding opportunities for solitude and primitive and unconfined recreation. Special designations cover a larger percentage of the Planning Area under Alternative E compared to the other alternatives. Under Alternative E, the area of ACEC overlapping lands with wilderness characteristics managed to maintain their wilderness characteristics would be substantially greater than under alternatives A or B (225,306 acres). However, because the characteristics of these areas are already protected, the impacts from these overlapping special designations would be the same as Alternative B.

Resources

Alternative E management to maintain wilderness characteristics in lands with wilderness characteristics is the same as Alternative B; beneficial impacts to soil, water, wildlife and special status species, and cultural and visual resources would be the same as Alternative B.

Under Alternative E, the management of fire and fuels in lands with wilderness characteristics managed to maintain wilderness characteristics is similar to Alternative B, and impacts to fire and fuels management from managing lands with wilderness characteristics would be the similar to Alternative B.

Proactive Management

Impacts to lands with wilderness characteristics under Alternative E would be the same as those described under Alternative B.

Alternative F

Surface Disturbance

Surface disturbance under Alternative F would be similar to Alternative A and would result in adverse impacts to wilderness characteristics in lands with wilderness characteristics, although to a slightly greater extent because Alternative F involves additional projected surface disturbance. Under this alternative, management actions are projected to result in an approximately 1 percent increase in short-term and a 13 percent increase in long-term surface disturbance on BLM-administered land than Alternative A. Adverse impacts under Alternative F would be similar to Alternative D and would be likely to increase with the amount of total surface disturbance.

Resource Uses

Management of minerals, ROWs, vegetative treatments, and other resource uses in lands with wilderness characteristics under Alternative F would be similar to Alternative B from constraints on mineral leasing and ROW avoidance and exclusion areas, but to a lesser extent because Alternative F manages 426,952 acres less than Alternative B. Table 4-30 summarizes acreages and allocations

associated with resources and resource uses in lands with wilderness characteristics that have the potential to affect these characteristics. Generally, impacts under Alternative F would be similar to Alternative D.

Special Designations

Management of special designations under Alternative F, except in the Greater Sage-Grouse PHMAs ACEC (1,116,698 acres), would be the same as Alternative D. Beneficial impacts to lands with wilderness characteristics from restrictions on surface disturbance and constraints on resource uses from overlapping special designations would limit adverse impacts to wilderness characteristics, similar to Alternative A, but to greater extent because of the larger area of overlapping ACECs (48,770 acres) under Alternative F.

Resources

Impacts to wilderness characteristics in lands with wilderness characteristics from fire and fuels management would result in impacts similar to those under Alternative A.

Proactive Management

Under Alternative F, 49,396 acres (in nine lands with wilderness characteristics) are managed to maintain wilderness characteristics. Impacts to wilderness characteristics in these areas would be similar to Alternative B. The remaining lands with wilderness characteristics under Alternative F are not managed to maintain their wilderness characteristics.

4.6.7 Livestock Grazing Management

Adverse impacts to livestock grazing management result from management actions that limit, reduce, or prohibit livestock grazing or AUMs in the Planning Area. Additionally, management actions that degrade rangeland health (e.g., the condition of soils, watersheds, and vegetation communities) and livestock forage or that restrict the placement, construction, or maintenance of range improvement projects would result in adverse impacts. Management actions that are beneficial to livestock grazing include those that increase AUMs, decrease restrictions on the grazing of livestock, improve rangeland health or livestock forage, distribute or disperse livestock in ways that increase access to forage, or reduce the cost associated with livestock grazing management.

Direct impacts to livestock grazing result from management actions that change AUM allocations or restrict livestock grazing. Indirect impacts to livestock grazing result from management actions that affect rangeland health and productivity or that change livestock grazing management on BLM-administered lands with the Planning Area.

4.6.7.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Surface disturbances reduce the amount of forage available to herbivory use and can be short- and long-term (Appendix T).
- Surface disturbances increase the likelihood for the introduction and spread of invasive species, which degrade rangeland health and impact forage quality and quantity.

- To varying degrees, areas of concentrated herbivory use exist in most allotments (i.e., riparian/wetland areas, salting areas, fence corridors, etc.). Range improvements and managed livestock grazing methods disperse livestock and minimize livestock concentrations.
- Grazing management practices such as season of use and kind of livestock and stocking level modification, rotational grazing, and temporary closures can maintain or improve rangeland health and ensure the achievement of Wyoming Standards for Healthy Rangelands (Appendix N).
- Range improvements would include the following types of projects: spring/seep development and protection, reservoirs and pits, wells, new or modified fencing, vegetation treatments, and pipelines.
- Any changes in grazing management, including changes in permitted use, would be based on rangeland monitoring and documented field observations, in accordance with grazing regulations (43 CFR 4110.3).
- Management actions for other resource uses (e.g., oil and gas leasing) can affect livestock grazing allocations and management.
- Managing wildlife and special status plants and wildlife can affect livestock grazing allocations.
- As described in the Footnote 1 in Table W-1, *Utilization Levels in the Planning Area* (Appendix W), the BLM may adjust utilization levels downward to ensure that total utilization of the current year's growth following the use period of wildlife does not exceed the prescribed level for dormant season use in areas where extensive wildlife use occurs (i.e., crucial winter ranges for elk, bighorn sheep, pronghorn, and greater sage-grouse, and winter sage-grouse concentration areas or sage-grouse nesting habitat). Potential changes would be analyzed through AMPs or permit renewals.
- If a portion of an allotment is closed to livestock grazing, a proportional loss of AUMs in that allotment would result. Issues related to compensation of permittees or lessees for the loss of use of range improvements in allotments closed to livestock grazing would be addressed at the time an allotment is closed, and in accordance with regulations at 43 CFR 4120.3-6.

4.6.7.2 Summary of Impacts by Alternative

Principal impacts to livestock grazing would result from actions that limit the area available to livestock grazing and reduce the number of AUMs in the Planning Area. Overall, AUM reductions under Alternative B would result in the greatest adverse impacts to livestock grazing, followed by alternatives E, C, D, F, and A. Alternative C, under which the BLM would manage resources in the Planning Area to increase commodity production, would result in the greatest beneficial impacts to livestock grazing. Alternatives B and E would place the most restrictions on the utilization of forage by livestock and the placement and construction of range improvements. In addition, alternatives B and E would close large portions of the Planning Area to livestock grazing, including elk and bighorn sheep winter range areas and within Greater Sage-Grouse Key Habitat Areas ACEC.

Alternative C places the fewest restrictions on livestock grazing management and livestock forage and utilization. Livestock grazing management under alternatives A, D, and F—the alternatives most likely to apply management actions on a case-by-case basis—would generally result in a continuance of current grazing practices. Impacts to livestock grazing from the protection of other resources, such as wildlife and cultural resources, are generally less adverse under Alternative C than under the other alternatives. Proactive management under Alternative C would benefit livestock grazing the most because it focuses on maximizing livestock forage use. Because there are fewer restrictions on other resource uses such as

mineral development, Alternative C would result in the greatest loss in AUMs from surface-disturbing activities, with a short-term loss of 1,170 AUMs per year, followed by alternatives D, F, A, B, and E with short-term losses of 668, 653, 649, 352, and 342 AUMs per year, respectively. Over the long term, closing areas to livestock grazing and long-term surface disturbance would result in the greatest loss of active (use) AUMs per year under alternatives B and E (163,609 AUMs and 163,609 AUMs, respectively), followed by Alternative C (4,120 AUMs), Alternative D (1,912 AUMs), Alternative F (1,851 AUMs), and Alternative A (1,663 AUMs).

4.6.7.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Resource Uses

Impacts on livestock grazing would generally be the result of activities affecting forage quantity/production or quality in grazing allotments, such as vegetation treatments, and management that constrains or enhances livestock grazing management. Surface-disturbing activities, fire and fuels management and vegetation treatments, invasive species, grazing and surface-disturbance restrictions intended to protect resources, and proactive management actions have the greatest impact on livestock grazing in the Planning Area.

Mining of locatable, leasable, and salable minerals would affect soils and vegetation communities and would result in a loss of forage in developed areas. Surface-disturbing and disruptive activities associated with all types of mineral and geophysical exploration and development are subject to the *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix H), which would help to reduce impacts to livestock forage through the application of standard mitigation. Compared to the other minerals, locatable minerals development would result in the largest acreage of surface disturbance and would have the greatest short-term and long-term impacts to available livestock forage.

The revegetation of disturbed areas, resulting from reclamation of oil and gas drilling and other operations, would occur under all the alternatives and would reduce the long-term adverse impacts to forage. Even with successful reclamation, there may be a permanent loss of available livestock forage in the form of limited or lost access to grazing areas from road and industrial facility development. This development may result in temporary or long-term closure of affected allotments or in reductions in permitted use in developing or producing gas fields. The construction and improvement of roads associated with minerals development may provide livestock operators with better access to livestock and would enhance their ability to maintain improvements. Disturbed areas associated with nonproducing wells would result in short-term impacts, as they would be reclaimed quickly and most forage production would be restored. Typically, livestock concentrate on newly reclaimed areas and forage utilization decreases on the native rangeland. Although utilization levels may vary from year to year, utilization levels that remain consistently high would not be expected to meet watershed and vegetation management objectives. Adjustments in livestock management to meet these objectives may result in temporary adverse impacts. Appendix W describes the appropriate utilization levels for key species in the Planning Area.

The presence and extent of invasive plant species in an area affects rangeland health and forage productivity. Invasive plant species displace native vegetation and, because they typically are unpalatable to livestock and wildlife, often remain ungrazed. Invasive plant species may spread or become established as a result of surface-disturbing activities, motorized vehicle use, or dispersal by

livestock or wildlife. Surface-disturbing activities include mechanical disturbance, such as construction of well pads, roads, pits, reservoirs, pipelines, and powerlines; mining; and vegetation treatments. Even when reclamation occurs, allotments where surface-disturbing activities have occurred may experience increased invasive plant species infestations over both the short and long term. The prevention and treatment of areas infested with invasive species are required under all alternatives. Management of invasive species would temporarily displace livestock and reduce the available forage, but would also maintain or improve rangeland health and forage quality over the long term.

Land disposals would result in adverse impacts if they reduced the available AUMs in active grazing allotments. Typically, land disposals occur on small, isolated parcels of BLM-administered land, with the goal being the consolidation of land ownership to enhance management of resource values. Exchange is the preferred method for all land tenure adjustments, and changes in AUMs resulting from any exchange would be site-specific and depend on the qualities of the both the disposal and acquisition parcels. However, because the land acquired is often located some distance from the disposal parcels, impacts to individual allotments due to AUM loss may occur.

The development of ROWs would result in both short-term and long-term reductions in forage. ROW authorizations for permanent facilities or roads would result in long-term reductions in forage. ROW authorizations that include only initial disturbance would be reclaimed to reduce long-term impacts to livestock grazing resulting from reductions in forage.

Allowing motorized vehicle use and recreational use and development would result in adverse impacts to livestock grazing through damage to soils and livestock forage, but would also benefit livestock grazing management activities. Adverse impacts from allowing motorized vehicles may include gates being left open by recreationists, the displacement of livestock from heavily used areas, or a reduction in forage palatability from the spread of invasive plants along motorized travel corridors and an increase in dust on forage near areas of heavy motorized vehicle use. Beneficial impacts from less restrictive motorized vehicle use would be minor to negligible. Adverse impacts due to closures could result from increased restricted access to permittees.

Provided resource damage does not occur and new roadways are not created, the BLM authorizes necessary tasks requiring off-road use of motorized vehicles under all the alternatives in areas not designated as closed to motorized vehicle use.

The BLM allows the development of range improvement projects (e.g., fences and spring developments) in portions of the Planning Area under all the alternatives, which would generally result in long-term beneficial impacts to rangeland health and livestock grazing management. Range improvement projects allow livestock managers and permittees to better implement grazing management practices and manage the distribution and movement of livestock in allotments. Adverse impacts associated with the construction of fencing, water pipelines, and other range improvements would include short-term impacts to forage; revegetation would usually occur within several growing seasons. Long-term adverse impacts associated with the construction of range improvements may include undesirable changes to livestock grazing patterns and distribution in an allotment, congregation of livestock and wildlife around new water sources, and changes in livestock trailing patterns that alter vegetation or affect rangeland health. Any long-term adverse impacts from range improvements would be site-specific in nature.

Special Designations

Prohibition of surface-disturbing activities associated with some special designations would result in adverse impacts to livestock grazing because they would limit the ability to construct range improvements (e.g., along the Nez Perce [Neeme-poo] NHT) or require additional mitigation for their

construction (e.g., the Brown/Howe Dinosaur Area ACEC) that may increase the cost of such improvements.

Resources

Management actions to prevent or mitigate soil loss would generally result in beneficial impacts to vegetation, which would increase livestock forage production and quality. All alternatives maintain existing watershed improvement projects; use BMPs to reduce runoff, soil erosion, and sediment yield; and subject all surface-disturbing activities associated with mineral and geophysical exploration and development to application of the *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix H). Projects designed to enhance watershed health would enhance vegetation resources by reducing erosion and improving water quality, thereby increasing forage and water for livestock over the long term. However, adjustments in livestock management that may be needed to meet or maintain riparian habitat requirements, PFC, and water quality objectives may result in temporary adverse impacts. Surface disturbance associated with the implementation of such watershed enhancement projects would also result in short-term site-specific adverse impacts to livestock forage.

Water can be a limiting factor for livestock grazing management, especially during drought, affecting livestock survival and distribution. Water developments designed to provide new water sources for wildlife or livestock would result in beneficial impacts to livestock through increased water availability. New water sources may also promote improved distribution of livestock by opening areas to grazing where a lack of water was previously the limiting factor.

The continued closure of 4,805 acres along the Bighorn River to most livestock grazing occurs under all alternatives and would restrict livestock grazing in the area and reduce the available forage base.

Wildland fire and fuels management would have varying impacts to livestock grazing, depending on fire size, intensity, and climatic factors. Wildland fire may result in adverse impacts such as the spread of invasive plant species, the destruction of range improvements, the displacement of livestock, and short-term impacts to livestock forage. With proper stabilization and rehabilitation, long-term impacts of wildland fire would generally be beneficial due to improvements in forage quality, quantity, and availability following the fire. For a period after a fire in shrubland communities, there would be enhanced forage production as herbaceous vegetation becomes temporarily dominant.

Vegetation treatments designed to reduce fuel hazards, improve wildlife habitat, enhance vegetation production or plant community health, or regenerate plant communities would result in long-term beneficial impacts to livestock grazing by increasing forage availability. Vegetation treatments would also result in short-term reductions in forage even though they are designed and conducted in accordance with the rangeland health requirements in the *Wyoming Standards for Healthy Rangelands* (Appendix N).

Wildlife and special status species habitat management would affect livestock grazing by restricting the placement of range improvement projects and potentially affecting the ability to implement grazing management practices. Management of greater sage-grouse habitat, white-tailed prairie dog towns, and the Bighorn River HMP/RAMP and Yellowtail Wildlife Habitat Management Area would affect the location, cost, required mitigation, and design standards and BMPs of range improvements. In addition, the maintenance of sagebrush and understory diversity in crucial seasonal greater sage-grouse habitat, particularly in PHMAs, may result in an adverse impact by reducing the time livestock could graze in an area, changes in seasons of use, and, in some cases, result in temporary removal of livestock until vegetation treatments are in place. In areas where DPC is being met, current grazing practices would continue and there would be no adverse impacts. The inclusion of specific management thresholds for

sage-grouse in NEPA analysis for renewals and modifications of livestock grazing permits/leases in PHMAs could result in adverse impacts to permittees by requiring modifications of existing grazing practices to meet greater sage-grouse habitat objectives and the potential for livestock grazing adjustments if thresholds are exceeded. Wild horses and livestock generally rely on the same resources, so the appropriate management level (i.e., herd size) of wild horses in the Planning Area may affect forage availability for livestock. The initial appropriate management levels in the two HMAs do not vary across alternatives.

Cultural and paleontological resource management may have adverse impacts to livestock grazing through the removal of forage during site excavations, or through restrictions on the design and placement of range improvements. For example, the BLM requires avoidance of surface-disturbing activities in areas near scientifically significant paleontological resource sites, which may affect the placement of range improvements. VRM may also affect the location or design of range improvements in visually sensitive areas.

Proactive Management

The application of the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* (Appendix N), BMPs, requirements that forage supplements be weed free, the use of rangeland health assessments, and the development of range improvement projects would result in beneficial impacts to livestock grazing from increased forage quality and quantity and improved rangeland health. The intent of any grazing management practices and range improvement projects is to improve the quality or quantity of forage, thereby enhancing grazing management flexibility. These practices may increase costs to the livestock permittees associated with increased livestock herding and maintenance of range improvements. Under all alternatives, AMPs remain in effect or are revised as necessary, and the *Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming* are applied across the Planning Area. Livestock grazing management actions are designed to enhance rangeland health, improve forage for livestock, and meet other multiple-use objectives through the application of these standards, other appropriate BMPs (see Appendices L and W), and the use of appropriate range improvements.

Alternative A

Surface Disturbance

Management actions under Alternative A are projected to result in approximately 136,253 acres of surface disturbance on BLM-administered land over the life of the plan (Appendix T); this disturbance would result in the short-term loss of approximately 12,977 AUMs, or roughly 649 AUMs per year. Most of this acreage, 120,607 acres, would be reclaimed in the short term, reducing the long-term loss of AUMs. Table 4-32 lists the total long-term loss of AUMs under Alternative A due to surface disturbance and the loss of active (use) AUMs due to livestock grazing closures (Map 81). The baseline active (use) AUMs for the Planning Area were 305,264 in 2012 and, therefore, the loss of AUMs under this alternative would represent less than a 1 percent reduction.

Table 4-32. Change in Active Animal Unit Months (AUMs) per Year by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Acres Closed to Livestock Grazing	5,009	1,984,211	5,009	5,009	1,984,211	5,009
AUMs Lost[1]	169	162,572	169	169	162,572	169
Acres of Long-Term Disturbance	15,646	10,893	41,485	18,306	10,802	17,663
AUMs Lost[2]	1,490	1,037	3,951	1,743	1,029	1,682
Total Loss of AUMs (long-term)	**1,659**	**163,609**	**4,120**	**1,912**	**163,601**	**1,851**

Sources: BLM 2009a; BLM 2013a

[1]AUMs lost due livestock grazing closure were calculated by subtracting active (use) AUMS in areas closed to livestock grazing from active (use) AUMs in open grazing allotments.
[2]Because it is not possible to determine the exact allotments where there would be surface disturbance, AUMs lost to long-term surface disturbance were calculated using the Planning Area average of 10.5 acres per AUM.

Resource Uses

Silviculture treatments may benefit livestock grazing management where they reduce canopy cover and increase understory forage. Under Alternative A, precommercial thinning in overstocked and regenerated timber sale areas for trees in the 20- to 30-year age class, timber harvesting in commercial forestland to protect and benefit ecosystem functions, and clear cuts subject to certain stipulations may benefit livestock grazing management. The use of silvicultural treatments may also result in beneficial impacts by moving forests and woodlands towards DPC, though the degree to which these treatments would move areas towards DPC would depend on the location, timing, and other factors of treatments. Silvicultural treatments that move areas toward DPC would make more forage available for herbivory by stimulating herbaceous plant growth in the forest and woodland understory.

Alternative A may result in additional expense or delay to grazing permittees as it allows livestock flushing on a case-by-case basis to avoid the dispersal of invasive species.

Under Alternative A, the BLM closes approximately 68,115 acres to motorized vehicle use. These closures may have an adverse impact on permittee access to livestock and range improvements but would result in a beneficial impact to rangeland health and forage palatability, as described under *Impacts Common to All Alternatives*.

Special Designations

Special designations under Alternative A would result in adverse impacts to the development of range improvements due to management that prohibits, or requires avoidance of, surface-disturbing activities. ACECs under Alternative A with such management include Red Gulch Dinosaur Tracksite, Sheep Mountain Anticline (above caves and cave passages), Carter Mountain, Five Springs Falls, and Upper Owl Creek. Alternative A also requires avoidance of surface-disturbing activities in view within ¼ mile of the Nez Perce (Neeme-poo) NHT and the Bridger Trail and Fort Washakie to Meeteetse to Red Lodge Trail and prohibits the construction of range improvements along 11 WSR eligible segments. Other areas, such as the Brown/Howe Dinosaur Area ACEC, require mitigation or avoidance of impairment following surface disturbance to limit adverse impacts to vegetation.

Under Alternative A, the management of the Red Gulch Dinosaur Tracksite ACEC and all WSR eligible waterway segments may restrict livestock grazing use. Alternative A closes the interpretive area of the Red Gulch Dinosaur Tracksite ACEC to livestock grazing and manages all WSRs to prevent an increase in actual grazing use. The closure of the interpretive area would not affect the AUMs for the surrounding allotment, but restrictions on grazing in the WSR eligible segments would prohibit any upward adjustments to grazing in these areas, regardless of on-the-ground rangeland conditions.

Resources

Under Alternative A, the BLM routinely seeds, or requires permittees and operators to seed, disturbed areas with native plant species and requires that vegetation cover of disturbed soils be reestablished within 5 years of initial seeding. These reclamation requirements would benefit livestock forage by promoting short-term forage recovery in areas where surface disturbance has occurred and preventing degradation of rangeland health due to soil loss.

Under Alternative A, beneficial long-term impacts to grassland and shrubland health would occur by managing grassland and shrubland communities on at least 600,000 acres of BLM-administered land toward DPC objectives for watershed protection and livestock grazing. Managing towards DPC objectives improves forage for livestock and wildlife, improves overall DPC health and plant vigor, and reduces potential erosion. However, because these management actions are implemented on only a small fraction of grassland and shrubland communities, Alternative A would have limited beneficial long-term impacts to grassland and shrublands and associated forage for herbivory.

Allowing the surface discharge of produced water if it meets state of Wyoming water quality standards and making this water available for use on a case-by-case basis would benefit livestock by increasing water availability and may improve livestock distribution.

Management under this alternative prohibits surface-disturbing activities within 500 feet of surface water and riparian/wetland areas (70,715 acres) except when such activities are necessary and their impacts can be mitigated, which may affect the use of range improvements. This management may result in adverse impacts to the placement of range improvements in these areas or increased costs from increased mitigation requirements.

Under Alternative A, the BLM manages wildland fires to restore fire-adapted ecosystems and to reduce hazardous fuels, resulting in short-term adverse impacts from forage loss, but long-term beneficial impacts to forage production. The impact of management under this alternative would be progress towards a balance of herbaceous and woody vegetation in treated areas that would provide forage for livestock. Reducing the accumulation of hazardous fuels would have the beneficial impact of reducing the risk of catastrophic wildfires. In areas where fuels exceed historical levels, intense fires would result in the loss of forage over an area, as they may destroy the seeds of perennial grasses and shrubs and alter soils in ways that increase the risk of invasive species establishment. Alternative A would result in the second-greatest area of fuel treatments and prescribed fire with proportional impacts to livestock grazing.

Most of the total projected prescribed fire and fuels treatment acreage (70,000 acres) under Alternative A would be applied to grassland and shrubland communities not meeting DPC objectives. FRCC Classes 2 and 3 have the highest risk of catastrophic fire or of having lost or losing key ecosystem components. There is a risk in these areas that the vegetation management acreage under Alternative A would be inadequate to reduce fuel conditions enough to substantially diminish the risk of catastrophic fire and prevent associated adverse impacts to livestock grazing.

Alternative A prohibits the placement of salt, mineral, or forage supplements within ¼ mile of water, wetlands, riparian areas, reclaimed or reforested areas, or as determined by the authorized officer, which would beneficially impact livestock by distributing herbivory to maintain vegetation health and plant vigor across the landscape but may restrict permittees' flexibility in the placement of range improvements to maximize livestock grazing use.

Wildlife management actions that avoid or prohibit surface-disturbing activities under Alternative A also restrict the location, cost, and timing of range improvement project construction and maintenance. Generally, Alternative A determines wildlife seasonal protections for surface-disturbing and disruptive activities related to the maintenance and operation of projects on a case-by-case basis. Specific restrictions to range improvements include a prohibition on new water developments for livestock in elk crucial winter range (unless adverse impacts can be avoided or mitigated) and direction to retain riparian vegetation when cleaning or removing sediment from wet reservoirs where feasible. Prohibitions on new water developments would have adverse impacts to the placement of range improvements, and may result in the placement of projects in locations that are not optimal for livestock grazing management. Additional design requirements or mitigation would increase the cost of range improvement construction and maintenance.

The management of special status species under Alternative A would result in adverse impacts to livestock grazing. Under Alternative A, the BLM reviews all range improvement projects for potential impacts to special status plant species and requires avoidance, minimization and/or compensation measures on a case-by-case basis. Adverse impacts to the location and cost of range improvements may result, and would be of a similar type to those identified under impacts from wildlife management.

The application of Standard Paleontological Resources Protection Stipulations (see *Glossary*) to authorizations for surface-disturbing activities on PFYC 3, 4 or 5 formations, including a prohibition of surface-disturbing activities within at least 50 feet of the outer edge of the paleontological locality, may have adverse impacts to the placement of range improvement projects.

Under Alternative A, the Planning Area is managed primarily as VRM Class III and IV, with only approximately 15 percent managed as VRM Class I and II. Depending on their visibility, range improvement projects in areas managed as VRM Class I or II may need to be designed to minimize their contrast with the surrounding landscape or placed in locations where they are less likely to attract the attention of viewers. In Class I and II areas, this may result in adverse impacts to grazing management through additional costs to permittees and restrictions on the placement of range improvements.

Proactive Management

Under Alternative A, most of the Planning Area is open to livestock grazing and management of grazing is designed to provide for protection or enhancement of other resource values. Areas closed to livestock grazing include campgrounds, exclosures, and areas specifically closed under the Management Actions Common to All Alternatives.

Limited, but beneficial impacts to livestock grazing would result from the apportionment of any additional sustained yield forage to meet multiple-use objectives, after meeting DPC objectives, and to satisfy the suspended permitted use of permittees/lessees (148,394 AUMs) in the allotment where the forage is available. While this management would help to replace suspended AUMs, the focus would remain on meeting broader multiple-use objectives.

Alternative A requires range improvement projects be designed to meet allotment management objectives, resulting in localized beneficial impacts. The focus of these projects under Alternative A would be to meet multiple-use objectives.

The issuance of permits/leases for livestock grazing on parcels that are not currently included in grazing allotments would increase available AUMs. The increase in actual forage may be limited due to the small size of most unallocated parcels and the expense and challenge of managing these areas.

Reserve common allotments are not considered under this alternative, which would reduce the flexibility of providing alternate forage options to permittees whose allotments are rested following rangeland restoration activities.

Alternative B

Surface Disturbance

Management actions under Alternative B are projected to result in approximately 73,940 acres of surface disturbance on BLM-administered land over the life of the plan; this disturbance would result in the short-term loss of approximately 7,042 AUMs, or roughly 352 AUMs per year. Most of this (63,047 acres) would be reclaimed in the short term, reducing the long-term loss of AUMs (see Table 4-32). The total long-term loss of AUMs under Alternative B due to surface disturbance and the loss of active (use) AUMs due to livestock grazing closures (Map 82) would be 163,609 AUMs (an approximately 54 percent reduction from the baseline active [use] AUMs for the Planning Area). The projected surface disturbance under Alternative B would result in less long-term and short-term adverse impact to AUMs due to loss of forage than Alternative A; however, the total AUM loss from closures under this alternative is larger than under Alternative A.

Resource Uses

The use of silvicultural treatments would result in benefits similar to Alternative A, although to a lesser extent because the BLM would treat less acreage under Alternative B. Prohibiting clear cuts and precommercial thinning for reasons other than fuel reduction and restricting timber harvesting to areas where natural processes are unable to accomplish forest health goals would result in a more closed canopy than Alternative A. Therefore, although areas would still be moved toward DPC, less understory vegetation would be available for grazing compared to Alternative A.

Impacts from livestock flushing would be similar to Alternative A.

Alternative B closes approximately 170,253 acres of BLM-administered land to motorized vehicle use, an increase of approximately 150 percent over Alternative A, which would result in fewer impacts to rangeland health and forage palatability but may have the greatest adverse impact to permittee access to livestock and range improvements compared to the other alternatives.

Special Designations

Adverse impacts to the construction of range improvements would be greater under Alternative B than Alternative A because the alternative designates more ACECs and expansion areas, and more restrictive management in special designations. Under Alternative B, the BLM would manage seven of the ACECs to limit or prohibit surface-disturbing activities, and this alternative would expand the area where surface-disturbing activities are avoided to include areas in view within 5 miles of NHTs, other trails, and National Historic Landmarks. Alternative B would also result in greater adverse impacts to the construction of range improvements along WSR suitable waterways than Alternative A, prohibiting their construction along all segments.

Unlike Alternative A, managing lands with wilderness characteristics to maintain their wilderness characteristics under Alternative B may adversely affect the ability to construct range improvements projects, because these projects are only allowed where their short-term adverse impacts to wilderness

characteristics can be mitigated. Mitigation requirements may increase the cost of range improvements in these areas or may prohibit these developments altogether if mitigation is not possible.

Resources

Under Alternative B, the BLM requires the reestablishment of healthy native plant communities in disturbed areas to 50 percent pre-disturbance levels of desired vegetative cover within three growing seasons and 80 percent within 5 years. Though the use of native plants may slow reclamation time, the vegetative cover requirements under this alternative would result in greater short- and long-term benefits to livestock by requiring more forage restoration in a shorter amount of time than under Alternative A. These reclamation requirements would have a greater beneficial impact to livestock grazing. Long-term beneficial impacts to forage quality and stability would also result from the reestablishment of native plant communities.

Alternative B would result in the least acreage of vegetation treatments (Appendix T). Alternative B would result in a limited beneficial impact towards improving vegetation conditions to achieve or make progress towards achieving the reference state plant community (based on the ESD for the site) in all grasslands and shrublands described by this alternative. This alternative would less effective at moving these vegetation communities towards DPC objectives, and would result in less beneficial impacts, such as the improvement in forage for livestock, to rangeland health than described under Alternative A.

Prohibiting the surface discharge of produced water and surface-disturbing activities within ¼ mile of riparian/wetland areas (162,887 acres) would reduce or remove beneficial impacts to livestock grazing realized under Alternative A. Eliminating the surface discharge of produced water would remove a potential water source for livestock that would be available under Alternative A. The surface-disturbing activity prohibitions under Alternative B would affect a larger acreage than Alternative A, and would result in a larger adverse impact on the construction of range improvements.

Fewer vegetation treatments to reduce hazardous fuels are projected under Alternative B than Alternative A (Appendix T), resulting in less projected beneficial impact to long-term forage production and an increased risk of forage loss due to catastrophic wildfires.

Impacts from restrictions on the placement of salt, mineral, or forage supplements would be similar to Alternative A, although to a greater extent because under Alternative B, the buffer width increases to ½ mile from water, wetlands, riparian areas, or reclaimed or reforested areas.

Wildlife management actions under Alternative B would result in greater adverse impacts to livestock grazing than under Alternative A (Table 4-32 and Map 82). The BLM does not allow new livestock grazing use in elk and bighorn sheep crucial winter range under Alternative B. The closure of all crucial winter range for elk and bighorn sheep (270,834 acres) and greater sage-grouse Key Habitat Areas (1,232,583 acres) to livestock grazing would result in the loss of approximately 143,183 AUMs, or 47 percent of the total current active (use) AUMS in the Planning Area. Please refer to Section 4.8.2 *Economic Conditions* for additional information on the effects of changes in AUMs on livestock operations.

Impacts to the construction and maintenance of range improvements from wildlife management actions would be greater under Alternative B than Alternative A. In addition to management discussed under Alternative A, Alternative B expands prohibitions on livestock water developments to include greater sage-grouse nesting areas and areas important for special status species, and also applies seasonal restrictions when the actions are determined to be detrimental to wildlife. This alternative also prohibits surface-disturbing activities within ½ mile of big game migration corridors (97,808 acres), closing these areas to new construction.

The management of special status species under Alternative B would result in greater adverse impacts to livestock grazing than Alternative A. In addition to the management under Alternative A, Alternative B requires avoidance of reservoir work during amphibian mating and metamorphosis periods (April to July), which would adversely affect livestock permittees' ability to conduct maintenance on reservoirs. Under Alternative B, additional adverse impacts to the construction of range improvements and placement of forage supplements would occur, due to prohibitions within ½ mile of known special status plant species occurrences.

The management of cultural and paleontological resources under Alternative B would result in greater adverse impacts to the construction of range improvements than Alternative A. Under this alternative, the BLM avoids surface-disturbing activities in view within 5 miles of important cultural sites and in view within ¼ mile of significant segments of historic sites. Alternative B also prohibits surface-disturbing activities within at least 100 feet of the outer edge of the paleontological locality, regardless of PFYC.

Alternative B includes a higher percentage of VRM Class I and II areas than Alternative A, with more than 61 percent of the Planning Area in these most restrictive classes; therefore Alternative B would have greater adverse impacts on the cost and placement of range improvement projects.

Proactive Management

Livestock grazing management under Alternative B focuses on meeting multiple-use objectives, rather than maximizing forage or benefits for livestock. Alternative B apportions any additional sustained yield forage primarily to wild horses and wildlife, and does not allow permits/leases on parcels not included in a grazing allotment. Therefore, Alternative B would not result in beneficial impacts to suspended forage replacement and increased AUMs from new permits and leases as would Alternative A. Alternative B also requires range improvements projects, including vegetation treatments, be designed to maximize multiple-use benefits.

Alternative B establishes and manages reserve common allotments on a voluntary basis, resulting in beneficial impacts to livestock grazing. Reserve common allotments would increase management flexibility and the ability to rest allotments following vegetation treatments, allowing more intensive vegetation treatments and the temporary removal of livestock for more effective rangeland recovery. Intensive vegetation treatments would contribute to vegetation class diversity and greater long-term forage production, but would also temporarily decrease forage in treated areas.

Alternative C

Surface Disturbance

Management actions under Alternative C are projected to result in approximately 245,642 acres of surface disturbance on BLM-administered land over the life of the plan; this disturbance would result in the short-term loss of approximately 23,395 AUMs, or roughly 1,170 AUMs per year. Most of this acreage, 204,157 acres, would be reclaimed in the short term, meaning that the long-term loss of AUMs would be reduced. The projected surface disturbance under Alternative C would result in the greatest long-term (Table 4-32) and short-term adverse impact livestock grazing due to the resulting loss of AUMs. The loss of AUMs due to closing areas to livestock grazing would be similar to Alternative A. Overall, the total loss AUMs due to closures and long-term surface disturbance under this alternative would be greater than under Alternative A and less than under Alternative B, representing a loss of less than 1 percent of the baseline 305,264 AUMs (Table 4-32; Map 81).

Resource Uses

The use of silvicultural treatments would result in beneficial impacts similar to Alternative A, although to a greater extent because Alternative C treats more area. Forest and woodland management under Alternative C would result in the greatest beneficial impact to forage for livestock. Alternative C allows the most timber harvesting of any alternative, and earlier precommercial thinning and larger clear cuts than Alternative A. Under Alternative C, the BLM also manages juniper and limber pine stands to enhance livestock grazing. Activities that control juniper encroachment or stimulate herbaceous growth in the forest and woodland understory would benefit grazing because forage production would increase.

The BLM does not require livestock flushing under Alternative C. This would benefit permittees by reducing costs and allowing more flexibility to move herds, but may cause long-term adverse impacts by increasing the potential for establishment and spread of invasive species, which may reduce forage.

Alternative C closes approximately 9,274 acres of BLM-administered land to motorized vehicle use, an approximately 86 percent decrease compared to Alternative A, and would have the least adverse impact on permittee access but the largest potential impact to rangeland health and forage palatability of any alternative.

Special Designations

Alternative C would result in the least adverse impact on the construction of range improvements from the management of special designations. Impacts from the management of the Brown/Howe Dinosaur Area ACEC would be the same as under the other alternatives, but restrictions and mitigation associated with surface-disturbing activities in other areas managed as ACECs and WSRs under alternatives A and B would not occur. Impacts from the management of the NHT and Other Historic Trails would be similar to those described under Alternative A.

Resources

Alternative C would have a beneficial impact on the short-term production of forage in areas of surface disturbance. The use of nonnative and native seed mixes and a focus on increasing commodity production (e.g., livestock grazing) may result in increased short-term forage production compared to the other alternatives. However, a lower standard for the reestablishment of desired vegetative cover than Alternative B, including the use of nonnative seeding to create more short-term forage production, may result in less forage quality and stability in the long term.

Alternative C would result in the most acreage of vegetation treatments to improve vegetation conditions (Appendix T); however, no grasslands and shrublands are managed towards DPC and are instead managed to achieve or to make progress towards achieving the *Wyoming Standards for Healthy Rangelands* (Appendix N). Alternative C would result in the fewest beneficial impacts from proactive management towards achieving historical community structure and composition. However, the projected area of prescribed burns and vegetation treatments under Alternative C would result in beneficial impacts across the greatest area to achieve rangeland health standards, relative to the other alternatives.

The management of produced water and riparian/wetland areas under Alternative C would benefit livestock grazing. The surface disposal of produced water would create a larger beneficial impact for livestock grazing than under Alternative A due to a requirement that discharged water be put to use (e.g., for livestock watering). This alternative also allows surface-disturbing activities or livestock supplements in flood plains or riparian/wetland areas on a case-by-case basis, increasing permittees' flexibility in the placement of range improvements to maximize livestock grazing use but also the

potential for concentrated livestock grazing to degrade long-term vegetation health and plant vigor in these areas.

Management under Alternative C emphasizes vegetation treatments as a tool to enhance livestock forage and has the largest projected area of vegetation treatments to reduce hazardous fuels (Appendix T). Depending on the FRCC class in which it occurs (see Section 4.3 *Fire and Fuels Management*), this management would result in the greatest short-term loss of forage. However, there would be more benefits to long-term forage production. Increased fire and fuels treatments would result in the smallest risk of forage loss due to catastrophic wildfires and less stress related to finding pasture for livestock following wildfire events compared to other alternatives.

Wildlife management actions under Alternative C are the least restrictive to livestock grazing management. The BLM allows domestic sheep grazing on pronghorn crucial winter range and does not apply seasonal restrictions on maintenance and operation actions to protect wildlife. Adverse impacts to livestock grazing from the elimination of approximately 143,183 AUMs within elk and bighorn sheep crucial winter range and greater sage-grouse Key Habitat Areas under Alternative B would not occur under this alternative. Alternative C would result in the least adverse impacts from wildlife management, due to surface-disturbance restrictions, on the construction of range improvements. However, management under this alternative does allow the greatest potential for contact between elk and cattle, and may increase the transmission of brucellosis.

The management of special status species under Alternative C would result in impacts to livestock grazing. Impacts to reservoir maintenance from restrictions during amphibian mating and metamorphosis periods would be the same as under Alternative A. Adverse impacts to the construction of range improvements in special status plant species habitat would be greater than under alternatives A and D, but less than under Alternative B.

The management of cultural resources under Alternative C (i.e., restricting surface-disturbing activities in view within ¼ mile of certain important cultural sites) would result in greater adverse impacts to the construction of range improvements than under Alternative A, but less than under alternatives B and D.

Adverse impacts from the management of paleontological resources would be less than the other alternatives because surface-disturbing activities are prohibited within only 50 feet of the outer edge of the paleontological locality and standard Paleontological Resources Protection Stipulations are only attached to authorizations for surface-disturbing activities in PFYC 4 or 5 areas.

Impacts from the management of visual resources on range improvements would be similar to those described under Alternative A.

Proactive Management

Management under Alternative C would be the most beneficial to livestock grazing due to its focus on maximizing livestock forage use instead of the enhancement of other resource values. The BLM apportions additional sustained yield primarily to satisfy suspended permitted use, which would result in greater beneficial impacts to livestock forage availability than under alternatives A and B, and similar impacts to those under Alternative D. Range improvements under Alternative C would also be designed to maximize livestock forage and distribution.

Under Alternative C, the BLM allows the issuance of permits/leases for unallocated parcels and does not establish reserve common allotments; the impacts would be similar to those described for this management action under Alternative A.

Alternative C does not establish reserve common allotments and would not result in the beneficial impacts afforded by these allotments described for alternatives A and C.

Alternative D

Surface Disturbance

Management actions under Alternative D are projected to result in approximately 140,175 acres of surface disturbance on BLM-administered land over the life of the plan; this disturbance would result in the short-term loss of approximately 13,350 AUMs, or roughly 668 AUMs per year. Most of this acreage, 121,869 acres, would be reclaimed in the short term, meaning that the long-term loss of AUMs would be reduced. The total long-term loss of AUMs under Alternative D due to surface disturbance and closing areas to livestock grazing would be slightly greater than under Alternative A, representing a loss of less than 1 percent of the baseline 305,264 AUMs (Table 4-32; Map 81).

Resource Uses

The use of silvicultural treatments would result in impacts similar, but to a greater extent than alternatives A and B, and a lesser extent than under Alternative C. The earlier use of precommercial thinning and clear-cut practices similar to those under Alternative C may reduce canopy cover and increase forage more than Alternative A. Other silvicultural activities and associated impacts from the management of aspen, juniper, and limber pine stands and timber harvesting would be the same as those under Alternative A.

The impacts from livestock flushing practices under Alternative D would be the same as those under Alternative A.

Alternative D closes approximately 61,010 acres of BLM-administered land to motorized vehicle use, or an approximately 10 percent decrease in areas closed compared to Alternative A. Impacts to permittee access and rangeland health and forage palatability would be similar to Alternative A, but to a lesser extent.

Special Designations

Adverse impacts from the management of special designations to the construction of range improvements and the availability of areas for grazing would be less than under Alternative B, but greater than under alternatives A and C. Except for the Carter Mountain ACEC, Alternative D includes all of the Alternative A ACECs, with the same management of surface-disturbing activities. Alternative D allows surface-disturbing activities across the Carter Mountain ACEC if the effects can be avoided or mitigated, which may reduce adverse impacts to the placement of range improvements. Similar to Alternative A, Alternative D would avoid surface-disturbing activities near NHTs and Other Historic Trails, although the area affected may be greater (i.e., the foreground of these trails up to either 3 miles [NHTs] or 2 miles [Other Historic Trails]). Unlike alternatives A and B, under Alternative D, the BLM would not manage any of the WSR eligible waterway segments as suitable for inclusion in the NWSRS, thereby eliminating any adverse impacts to range improvement placement or limitations to increases in grazing along these waterway segments. The interpretive area of the Red Gulch Dinosaur Tracksite is closed to livestock grazing under this alternative, but this management would not affect the AUMs for the surrounding allotment.

Resources

In disturbed areas, Alternative D allows the reestablishment of healthy native or DPCs based on pre-disturbance/desired plant species composition and judges successful reclamation by whether conditions are equal to or better than pre-disturbance site conditions. Reclamation practices under Alternative D would restore forage to disturbed areas more quickly than under alternatives A and C. Compared to Alternative B, this alternative provides additional flexibility that may shorten the reclamation time by allowing the use of beneficial nonnative plants, but may result in reduced long-term beneficial impacts to forage quality and stability from using nonnative species.

Alternative D would result in the same acreage of vegetation treatments as described under Alternative A (Appendix T), and would manage some vegetation communities for a higher plant community state or phase (based on state and transition models in ESDs) where site-specific management objectives determine that a higher plant community state or phase is desirable. The impacts of this alternative on grasslands and shrublands and the associated forage would be similar to those described under Alternative A. Alternative D also would result in approximately the same acreage of burns from wildland fire as Alternative A, although the emphasis under Alternative D to use burns to accomplish other resource management objectives (e.g., livestock grazing forage improvement) may result in greater benefits to livestock forage production than Alternative A.

As under alternatives A and C, Alternative D allows the use of produced water by livestock. This alternative would result in greater beneficial impacts to livestock water availability and distribution than the other alternatives because it removes the case-by-case stipulation for the use of produced water.

Management under this alternative prohibits or restricts surface-disturbing activities near surface water and riparian/wetland areas over a larger area (within 500 feet and ¼ mile), with appropriate mitigation, than under Alternative A. Such management would, therefore, result in greater beneficial impacts to vegetation health (and, therefore, forage productivity) than alternatives A and C, but less than Alternative B. However, it also may increase mitigation costs compared to Alternative C. Prohibiting the placement of salt, mineral, and forage supplements in sensitive areas (i.e., within ¼ mile of water, wetlands, riparian areas, reclaimed or reforested areas) would result in the same impacts as Alternative A.

Wildlife management actions would generally result in fewer adverse impacts to livestock grazing management under Alternative D than under alternatives A or B, and more than under Alternative C. Impacts from wildlife management actions that avoid or prohibit surface-disturbing activities and therefore restrict the location, cost, and timing of range improvement project construction and maintenance would be similar to those described under Alternative A. Mitigation requirements under Alternative D may be less restrictive than under Alternative A, which may result in fewer adverse impacts to the placement of new range improvements or reduced costs for range improvement construction and maintenance due to design requirements.

Adverse impacts to livestock grazing management due to the management of special status species would generally be less than under Alternative B, but more than under alternatives A and C. Alternative D includes a smaller mile avoidance area than Alternative B near BLM special status plant species populations for range improvements that may concentrate herbivory. This alternative also allows water development projects in sage-grouse nesting habitat with 10 inches or less annual precipitation if adverse effects can be avoided or mitigated based on site-specific analysis, a less restrictive requirement for allowing water development than that under Alternative B. Reservoir maintenance practices and avoiding reservoir work during amphibian mating and metamorphosis periods under Alternative D would result in similar impacts to those under Alternative B. Alternative D would also include greater

sage-grouse seasonal habitat objective management that would provide for and maintain sustainable sagebrush and grass cover types. As a result, Alternative D may result in additional beneficial impacts to livestock grazing by increasing available forage in greater sage-grouse breeding and brood-rearing habitats.

Unlike under the other alternatives, Alternative D prioritizes allotments in PHMAs for field checks to help ensure compliance with the terms and conditions of grazing permits. While these checks could result in beneficial impacts where they identify issues with livestock grazing management that are degrading rangeland health conditions, they could also adversely affect livestock grazing where they identify conflict with greater sage-grouse that results in corrective actions that make certain areas unavailable for livestock grazing or change grazing management practices.

The management of cultural and paleontological resources under Alternative D would result in less adverse impacts to the construction of range improvements than under Alternative B, but more than under alternatives A and C. Alternative D requires the avoidance of surface-disturbing activities in view within 3 miles or the visual horizon, whichever is closer (the setting consideration zone) where setting is an important aspect of the integrity for the site and uses BMPs to avoid, minimize and/or compensate adverse impacts. Similar to Alternative B, this alternative attaches standard Paleontological Resources Protection Stipulations to authorizations for surface-disturbing activities regardless of PFYC. Unlike the other alternatives however, this alternative does not prohibit surface-disturbing activities within a certain distance from the outer edge of paleontological localities if the impacts can be mitigated and written authorization to proceed is issued by the authorized officer.

Alternative D includes the third largest area of VRM Class I and II areas, with more than 27 percent of the Planning Area in these most restrictive classes. Therefore, Alternative D likely would result in more adverse impacts to the cost and placement of range improvement projects than Alternative C, but less than alternatives A and B.

Proactive Management

As under Alternative A, most of the Planning Area is open to livestock grazing. Specific closures under Alternative D are the same as under Alternative A (see Table 4-32); however, unlike Alternative A, Alternative D allows livestock grazing in areas closed to livestock grazing as a tool to maintain or improve resource conditions. Under Alternative D, the BLM would manage livestock grazing to support other resource objectives, and would require mitigation for new resource uses to minimize or avoid conflicts with livestock grazing. Requiring avoidance, minimization and/or compensation when a resource use conflicts with livestock grazing would result in a beneficial impact to livestock grazing management that may not occur under the other alternatives.

The design requirements, management focus, and impacts of range improvement projects under Alternative D would be the same as under Alternative A.

The management focus under this alternative – to apportion additional sustained yield to satisfy suspended permitted use of permittees/lessees and to meet multiple-use objectives – would be similar to that under Alternative A and would result in similar beneficial impacts to forage availability as under described under that alternative.

Similar to Alternative B, this alternative establishes and manages reserve common allotments on a voluntary basis, but, unlike Alternative B, this alternative also establishes reserve common allotments on abandoned allotments on a case-by-case basis thereby further increasing beneficial impacts to livestock grazing management flexibility by increasing the acreage where intensive rangeland-improving vegetation treatments could be performed (in accordance with existing policy, WO IM 2013-184).

However, upon voluntarily relinquishment of a grazing permit or lease, the BLM would consider whether these areas should remain available for livestock grazing or be used for other resource management objectives. If lands are made unavailable for grazing, this would be an adverse impact to livestock grazing. Currently, there are no reserve common allotments in the Planning Area (Appendix P). Similar to alternatives A and C, this alternative would result in beneficial impacts to livestock grazing by allowing the case-by-case issuance of permits/leases for livestock grazing for parcels that are not included in a grazing allotment.

Alternative E

Surface Disturbance

Management actions under Alternative E are projected to result in approximately 71,829 acres of surface disturbance on BLM-administered land over the life of the plan; this disturbance would result in the short-term loss of approximately 6,841 AUMs, or roughly 342 AUMs per year. Most of this acreage (62,008 acres) would be reclaimed in the short term, reducing the long-term loss of AUMs. The total long-term loss of AUMs under Alternative E due to surface disturbance and the loss of active (use) AUMs due to livestock grazing closures (Map 83) would be 163,601 AUMs (an approximately 54 percent reduction from the baseline active (use) AUMs for the Planning Area; see Table 4-32). The projected surface disturbance and closure-related effects on AUMs would be similar to Alternative B, and the type and magnitude of impacts would be the same as Alternative B.

Resource Uses

The management of resource uses under Alternative E is the same as Alternative B in all areas available for livestock grazing, and the type and magnitude of impacts under Alternative E would be the same as Alternative B. However, the use of herbicides to control invasive species would be minimized within the Greater Sage-Grouse Key Habitat Areas ACEC under Alternative E. Flash burners, mowing, and selected hand-cutting would be prioritized in these areas. Therefore, Alternative E may restrict grazing permit holders to more labor-intensive methods to control weeds when compared to Alternative B.

Special Designations

Management of special designations under Alternative E, except in the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres), is the same as Alternative B. Because greater sage-grouse Key Habitat Areas are closed under Alternative B, no additional adverse impacts on livestock grazing management are anticipated from restrictions for this ACEC in Alternative E.

Resources

The management of resources under Alternative E is the same as Alternative B in all areas available for livestock grazing, and the type and magnitude of impacts under Alternative E would be the same as Alternative B.

Proactive Management

Livestock grazing management is the same as Alternative B and places higher consideration on other resources, rather than maximizing forage or benefits for livestock. Therefore, the beneficial and adverse impacts under Alternative E would be the same as Alternative B.

Alternative F

Surface Disturbance

Management actions under Alternative F are projected to result in approximately 137,064 acres of surface disturbance on BLM-administered land over the life of the plan; this disturbance would result in the short-term loss of approximately 13,054 AUMs, or roughly 653 AUMs per year. Most of this acreage, 119,384 acres, would be reclaimed in the short term, meaning that the long-term loss of AUMs would be reduced. The total long-term loss of AUMs under Alternative F due to surface disturbance and closing areas to livestock grazing would be slightly more than under Alternative A, representing a loss of less than 1 percent of the baseline 305,264 AUMs (Table 4-32; Map 81). The projected surface disturbance and closure-related effects on AUMs would be similar to Alternative D, and the type and magnitude of impacts would be the same as Alternative D.

Resource Uses

The silvicultural management actions prescribed under Alternative F are the same as Alternative D, and the associated beneficial impacts would be the same as Alternative D.

Under Alternative F, livestock flushing practices and associated impacts are similar to Alternative A.

The acreage of BLM-administered land closed to motorized vehicle use under Alternative F is the same as Alternative D. Impacts to rangeland health, forage palatability, and permittee access would be similar to Alternative A. As stated under Alternative A, authorized or permitted uses that specify allowable access are not affected by travel management designations.

The use of herbicides to control invasive species would be minimized within the Greater Sage-Grouse PHMAs ACEC under Alternative F. Flash burners, mowing, and selected hand-cutting would be prioritized in these areas. Therefore, Alternative E may restrict grazing permit holders to more labor-intensive methods to control weeds when compared to Alternative D.

Special Designations

Alternative F designates 1,116,698 acres as the Greater Sage-Grouse PHMAs ACEC in addition to the same ACECs designated under Alternative D. Management of and effects from ACECs to the construction of range improvements would be similar to Alternative D, but to a greater extent because of the restrictions on surface-disturbing activities in the Greater Sage-Grouse PHMAs ACEC (similar to Alternative E). Adverse impacts would be greater under Alternative F than alternatives A, C, and D, but less than alternatives E and B.

Resources

Habitat restoration and vegetation management under Alternative F is the same as Alternative D, except within greater sage-grouse PHMAs where restoration and maintenance of greater sage-grouse habitat is the priority consideration for all vegetation management decisions. Reclamation practices under Alternative F require forage restoration in disturbed areas similar to Alternative D but to a greater extent, and more effectively than under alternatives A and C. Under Alternative F, vegetation treatments that reduce sagebrush for the purpose of increasing livestock forage are avoided within greater sage-grouse PHMAs. In PHMAs, any vegetation treatment plan under Alternative F must include pretreatment data on wildlife and habitat condition, establish non-grazing exclosures, and include long-term monitoring for at least three years post-treatment before livestock grazing returns. Monitoring would continue for five years after livestock are returned to the area. Current management for livestock grazing would continue as permitted until the vegetation treatment is implemented. Compared to

alternatives A and D, Alternative F would remove the ability of grazing permittees to perform vegetation treatments to improve forage quality for livestock, and could limit the ability to access new forage following reclamation and treatment.

Alternative F would result in the same acreage of prescribed fire treatment as alternatives A and D, although the emphasis of protecting and enhancing greater sage-grouse habitat for treatments in PHMAs under Alternative F could reduce the benefits to livestock grazing forage availability compared to those alternatives. In particular, Alternative F excludes livestock grazing in burned PHMAs (35 percent of BLM-administered surface lands) until woody and herbaceous plants achieve sage-grouse habitat objectives; such a requirement could adversely affect livestock grazing in a substantial portion of the Planning Area since sagebrush may take multiple years to reestablish (Manier et al. 2013). Similar to Alternative E, the fire and fuels management of Alternative F may also result in an increased risk of forage loss due to catastrophic fire.

Alternative F allows the use of produced water by livestock, and the beneficial impacts associated with produced water disposals would be the same as Alternative D.

The management of surface-disturbing activities and livestock grazing near surface water and riparian/wetland areas under Alternative F is the same as Alternative D, except in the Greater Sage-Grouse PHMAs ACEC. In these areas surface disturbance limitations would result in beneficial impacts to vegetation health and forage productivity compared to alternatives A, C, and D, but would limit the ability of permittees to implement surface-disturbing rangeland improvement projects. Alternative F manages grazing use of riparian/wetland and wet meadow areas consistent with Alternative D, except in the greater sage-grouse PHMAs where closures to hot-season grazing and adjustments to the seasonal distribution of livestock may apply.

Alternative F applies the same wildlife and special status species management action as Alternative D, except in greater sage-grouse PHMAs. Under Alternative F, grazing in lekking, nesting, brood-rearing, and winter habitats would be seasonally avoided. These restrictions on location and season of use would have adverse impacts on forage availability for livestock grazing compared to alternatives A and D, where these restrictions do not apply.

Alternative F applies the same VRM and cultural and paleontological management actions as Alternative D, and impacts to livestock grazing would be the same as described under Alternative D.

Proactive Management

As with alternatives A and D, most of the Planning Area would be open to livestock grazing under Alternative F. Specific closures under Alternative F would be the same as under alternatives A and D (Table 4-32). Similarly, livestock grazing management practices and associated impacts of Alternative F would be the same as Alternative D, with the exception of lands within the Greater Sage-Grouse PHMAs ACEC. In general, the livestock grazing management practices of Alternative F focus on the conservation, enhancement, and restoration of greater sage-grouse habitat within the Greater Sage-Grouse PHMAs ACEC.

Within priority sage-grouse habitat, objectives and management considerations that benefit greater sage-grouse are incorporated into all BLM grazing allotments through AMPs or permit renewals, and additional restrictions would be placed on riparian/wetland and wet meadow areas to promote recovery or maintenance of appropriate vegetation and water quality. Under Alternative F, grazing and trailing would also be avoided within lekking, nesting, brood-rearing, and winter habitats of priority sage-grouse habitat during periods of the year when sage-grouse are utilizing such areas. A focus on greater sage-grouse habitat considerations in the Greater Sage-Grouse PHMAs ACEC, over consideration that would

provide greater benefits to livestock grazing management, would result in adverse impacts from seasonal and other closures and a reduced ability to perform vegetation treatments.

Management considerations under Alternative F would result in similar beneficial impacts to forage availability as alternatives A and D, except within the Greater Sage-Grouse PHMAs ACEC. Additional vegetation management restrictions within priority sage-grouse habitat would reduce the availability of livestock forage over a larger acreage than alternatives A and D. In addition, Alternative F would create seasonal and spatial limitations on grazing activities within the Greater Sage-Grouse PHMAs ACEC.

4.7 Special Designations and Other Management Areas

4.7.1 Areas of Critical Environmental Concern

This section describes impacts related to the 20 existing, existing with proposed expansion, and new proposed ACECs in the Planning Area (see Table 4-33). The BLM manages ACECs to provide special management for important and relevant resources, values, natural systems, and natural hazards (referred to here as values of concern). This section also addresses impacts related to two other Management Areas (the Craig Thomas Little Mountain SMA and the Chapman Bench Management Area) closely related to the existing and proposed ACECs. Section 4.4.6 *Wildlife* describes the impacts of the Absaroka Front Management Area; Section 4.2.5 *Leasable Minerals – Oil and Gas* describes impacts from Oil and Gas Management Areas.

The discussion of ACECs and other Management Areas considers impacts in two ways: (1) the impacts of management in these special designations to other resources and resource uses and (2) the impacts of management to the protection of the values of concern for which the BLM proposes that designation. Most of the values of concern are resources in their own right and are further discussed and analyzed by alternative in the corresponding sections of this chapter. For example, this section describes impacts to paleontological values of concern in the Big Cedar Ridge ACEC, but Section 4.5.2 *Paleontological Resources* describes overall impacts to paleontology from management under the alternatives. The impacts analysis in this section focuses on high-level comparisons of potential adverse and beneficial impacts among the alternatives. While simply designating an ACEC would not produce effects that can be analyzed, the management prescriptions applied to the ACEC would result in effects.

4.7.1.1 Methods and Assumptions

The introduction to Chapter 4 identifies the assumptions used in this impact analysis. Assumptions related to other resources and resource uses discussed in this section apply to the analysis of ACECs and other Management Areas. There are no additional specific assumptions.

To allow for a consistent analysis, the ACEC boundaries designated under Alternative B are used as the area of analysis for all alternatives. Using Alternative B boundaries, the analysis evaluates the impacts of key management actions listed in Chapter 2 (e.g., mineral development, ROWs, and travel management) to ACEC values of concern, other resources, and resource uses. For the purposes of this analysis, "values of concern" refers to relevant and important ACEC values described in the Draft Areas of Critical Environmental Concern Evaluation Report (BLM 2010c). When an alternative proposes an ACEC, the BLM also considered how management actions specific to that ACEC could impact ACEC values of concern, other resources, and resource uses. When an alternative does not propose an ACEC, the BLM based the determination of impacts on a GIS analysis of management for that area under that alternative. For example, the BLM would not manage the Big Cedar Ridge area as an ACEC under Alternative C. However, to ensure the analysis is comparable across alternatives, Alternative C describes management for minerals, ROWs, and travel for this same geographic area. The adverse and beneficial impacts of not designating this area as an ACEC under Alternative C are then compared to the adverse and beneficial impacts of managing this same area as an ACEC under alternatives A and B.

To evaluate impacts to the exploration and development of mineral resources, the BLM overlaid GIS data depicting the occurrence and/or development potential for locatable minerals, leasable minerals, and mineral materials (based on information in the S*olid Mineral Occurrence and Development Potential Report* [BLM 2009d] and *Reasonable Foreseeable Development Potential Report for Oil and Gas* [BLM

2014 a]) with the Alternative B ACEC boundaries. The BLM used the mineral potential and the specific management of minerals in the area as the basis of analysis when comparing impacts to mineral resources from management under the alternatives.

Table 4-33. Existing and Proposed ACECs and other Management Areas by Alternative

Area	Alternative					
	A	B	C	D	E	F
Existing ACECs (no expansion proposed)						
Big Cedar Ridge	X	X		X	X	X
Red Gulch Dinosaur Tracksite	X	X		X	X	X
Sheep Mountain Anticline	X	X		X	X	X
Spanish Point Karst	X	X	X	X	X	X
Existing ACECs (and proposed expansion)						
Brown/Howe Dinosaur Area	X	X	X	X	X	X
Carter Mountain	X	X		X	X	X
Five Springs Falls	X	X		X	X	X
Little Mountain	X	X		X[1]	X	X[1]
Upper Owl Creek Area	X	X		X	X	X
Proposed ACECs						
Chapman Bench		X		X[2]	X	X[2]
Clarks Fork Basin/Polecat Bench West Paleontological Area		X		–[3]	X	–[3]
Clarks Fork Canyon		X		X	X	X
Foster Gulch Paleontological Area		X		–[3]	X	–[3]
Greater Sage-Grouse PHMAs						X
Greater Sage-Grouse Key Habitat Areas					X	
McCullough Peaks South Paleontological Area		X		–[3]	X	–[3]
Rainbow Canyon		X			X	
Rattlesnake Mountain		X			X	
Sheep Mountain		X		X	X	X
Paleocene-Eocene Thermal Maximum (PETM)		–[4]		X	–[4]	X

Source: BLM 2013a

[1]Although not proposed for expansion under Alternative D, the BLM manages a portion of the proposed expansion area as the Craig Thomas Little Mountain Special Management Area.
[2]Although not proposed as an ACEC under Alternative D, the BLM manages a portion of this area as the Chapman Bench Management Area.
[3]Although not proposed under Alternative D, a portion of this area falls within the proposed PETM ACEC.
[4]Although not proposed under Alternative B, the entire area of the PETM ACEC is within the Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch Paleontological Area, and McCullough Peaks South Paleontological Area ACECs.

ACEC Area of Critical Environmental Concern

4.7.1.2 Analysis of Alternatives

Impacts Common to All Alternatives

Although the values of concern vary by area and ACEC, the effects of key management (i.e., ROWs, CTTM, VRM, and mineral development) on these values and other resource uses would have some similarities. The following paragraphs describe the general effects of key management.

Restrictions placed on the exploration for, or development of, mineral resources in an area designated as an ACEC would generally result in adverse impacts to mineral development. Withdrawing or closing an area designated as an ACEC to mineral or oil and gas development removes the potential to develop that resource. NSO, CSU, and TLS restrictions and limitations, or restrictions on surface-disturbing activities in ACECs can limit potential development, increase timeframes and costs, and may decrease the feasibility of economic recovery of mineral resources. Within an area designated as an ACEC, the BLM would require a plan of operations and associated NEPA analysis addressing the values of the ACEC for all locatable mineral exploration (except casual use) and development, including disturbances of 5 acres or less (43 CFR 3809). The BLM would not automatically require a plan of operations absent such a designation (see Section 4.2.1 *Locatable Minerals* for more information). In parts of ACECs with low development potential, the adverse impacts of such restrictions and stipulations generally would be lower because the resource is either not present in commercial quantities or is uneconomical to mine.

Closing an area to, or withdrawing an area from, mineral development or applying other restrictions or mitigation to minerals development generally results in beneficial impacts to scenic quality, vegetation, soils, wildlife habitat, cultural resources, and other values of concern in ACECs by protecting the identified important and relevant resources from disturbance or degradation.

Impacts from ROW management in ACECs and other Management Areas generally affects the ROW program and the values of concern for the ACEC. Managing an area with more ROW restrictions, such as ROW avoidance areas, generally would require additional mitigation, application of BMPs, or other design considerations that would result in adverse impacts to ROWs in the form of additional expense and delay of project development. Restrictions, limitations, or required mitigation for ROW authorizations generally result in beneficial impacts to the values of concern in ACECs by protecting these resources from disturbance or mitigating adverse impacts to an acceptable level.

Unless otherwise noted in the following sections, permitted livestock grazing use would be allowed within ACECs in agreement with the *Wyoming Standards for Healthy Rangelands*. Livestock trampling and wallowing in areas of concentrated livestock use can damage the natural, educational, and scientific values within ACECs. However, proper livestock grazing management can mitigate these impacts by improving the distribution of livestock.

Under all alternatives, management that restricts travel would result in adverse impacts to access and OHV use. Managing an area as limited to designated roads and trails, for example, would limit the roads and trails available for use and may adversely affect the ability to access certain areas. Restrictive travel management designations benefit values of concern for the ACEC by, for example, closing a route that may damage resources or limiting disturbances to wildlife in crucial winter ranges.

Any resource use that results in authorized or unauthorized road or trail development (e.g., oil and gas development or user-pioneered trails) can have a direct impact on paleontological resources, wildlife habitat, and other resource values because the road or trail may physically pass through or over these resources and damage or destroy them. In addition, an indirect impact from road and trail development may occur when the road provides access to a previously remote and/or inaccessible location. People

who gain access may inadvertently damage fragile resources or disrupt wildlife during sensitive life stages.

Managing an area with more restrictive VRM classifications (Classes I and II) would result in adverse impacts to BLM-authorized actions that create surface disturbance or contrast with the visual setting. Adverse impacts to these BLM-authorized actions in areas with restrictive VRM classifications would result from changes to the size, scope, location, required mitigation, or BMPs for the actions. Managing an area with more restrictive VRM classifications would generally result in beneficial impacts to the important and relevant resources in an ACEC. Requiring additional design consideration and mitigation to preserve the visual setting in the area reduces the potential for facilities or development that could adversely affect important and relevant resources. Conversely, managing areas with less restrictive VRM classifications (Classes III and IV) would generally result in adverse impacts to values of concern, especially if the values of concern in an ACEC are associated with scenic quality.

Existing ACECs (No Expansion Proposed)

Big Cedar Ridge

Under alternatives A, B, D, E, and F the BLM manages the Big Cedar Ridge area (264 acres) as an ACEC (Maps 84, 85, and 87-89); the BLM would not manage it as an ACEC under Alternative C. Paleontological resources (in the form of paleobotanical fossils of late Cretaceous age) are the values of concern in the Big Cedar Ridge area. Threats to the values of concern in this area include potential surface disturbance from mineral and ROW development, and theft and vandalism of paleontological resources.

4.7.1.3 Summary of Impacts by Alternative

Management under alternatives A, B, D, E, and F would be the most effective for protecting the paleontological values of concern in the Big Cedar Ridge area, but also would result in the greatest restrictions on ROW authorizations and mineral development in the area. Alternative C would be less effective for protecting the values of concern, but would be more beneficial to ROWs and other surface-disturbing activities than alternatives A, B, D, E, and F.

4.7.1.4 Detailed Analysis of Alternatives

Alternative A

Under Alternative A, Big Cedar Ridge area is an ACEC with management objectives designed to protect and maintain paleontological resources and provide hands-on educational experiences for visitors and groups.

Under Alternative A, restrictions on mineral development could result in adverse impacts to the use of these resources in the ACEC. The low potential for most mineral resources in the ACEC minimizes the potential for adverse impacts from these restrictions on mineral development. Restrictions on mineral development would benefit the paleontological values of concern in the ACEC.

The ACEC is withdrawn from appropriation under the mining laws and the fossil concentration area (264 acres) is closed to mineral materials disposal. Withdrawing the ACEC could result in adverse impacts to locatable mineral development in the ACEC by prohibiting development of these minerals. However, the likelihood of adverse impacts is limited because of the low occurrence in the ACEC for bentonite and

gypsum (the only locatable minerals currently extracted in commercial quantities in the Planning Area) and low development potential for sand and gravel. Withdrawing the Big Cedar Ridge ACEC would reduce the potential for destruction or degradation of paleontological resources.

Alternative A manages the ACEC as open to mineral leasing with an NSO restriction and a prohibition of surface disturbance from geothermal exploration and development. Allowing mineral leasing with an NSO restriction may result in adverse impacts to mineral development in the ACEC by requiring directional drilling or other development techniques that may limit economically feasible recovery of these resources. NSO restrictions would benefit the ACEC values of concern by reducing the potential for destruction or degradation of paleontological resources. However, the low development potential for oil and gas and the historically limited interest in such development in this area may minimize impacts to and from oil and gas development.

Managing the ACEC as a ROW exclusion area, closing it to the use of heavy equipment, and limiting motorized vehicle use to existing roads and trails would result in adverse impacts to these resource uses in the ACEC. Restrictions on these resource uses would benefit paleontological resources in the ACEC by preventing direct disturbance to these resources and by limiting the potential for indirect impacts from theft and vandalism, which increases with accessibility.

Management that allows the collection of fossils and provides educational research opportunities (including working with museums), while also protecting the resource, would result in beneficial impacts by protecting and promoting the paleontological values of the area. Allowing the use of hand tools in the ACEC to collect plant fossils for research and casual use in the fossil concentration areas, and only allowing mechanized collection on a case-by-case basis pending approval, would further increase benefits to paleontological values associated with research and allows the BLM to limit the use of heavy equipment or other excavation methods that could destroy or degrade resources.

Site-specific surveys for cultural and historic resources for casual use collection of plant fossils are not required. Because only casual use collection and use of hand tools are allowed for collection of fossils, these activities would not be likely to result in the destruction of cultural or historic resources if they are discovered.

Providing a focus area for recreational collection would benefit recreation in the Planning Area by allowing opportunities for legal recreational collection of common fossils. Recreational collection may result in long-term adverse impacts to paleontological resources in the ACEC because these resources would be lost to scientific and educational public uses.

Alternative B

The management of and impacts from designating the Big Cedar Ridge ACEC under Alternative B are the same as under Alternative A.

Alternative C

Under Alternative C, the BLM would not manage the Big Cedar Ridge area as an ACEC, but manages it in accordance with multiple use principles consistent with other resource objectives. Standard guidelines related to surface-disturbing activities would apply.

Under Alternative C, the area is available for locatable mineral entry, open to mineral leasing (with moderate constraints on 214 acres and standard stipulations on the remainder), and open to mineral materials disposal. Management of this area under Alternative C would be the least restrictive to

mineral development, and may result in the greatest adverse impact to the paleontological values of concern.

Under Alternative C, the BLM manages the Big Cedar Ridge area primarily as a ROW avoidance area (223 acres), and manages the remaining area as open to ROW authorizations. ROWs are allowed under this alternative, which would result in an increased potential for damage to known paleontological resources compared to the other alternatives.

Motorized vehicle use is limited to existing roads and trails under this alternative, and impacts from travel management would be the same as under Alternative A.

Applicable laws and regulations and the management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative C. These decisions include protective management, such as surveying and monitoring requirements in PFYC 5 formations, but generally would provide less protection for the paleontological values of concern than the other alternatives.

Alternative D

The management of and impacts from designating the Big Cedar Ridge ACEC under Alternative D are the same as under Alternative A.

Alternative E

Management of and impacts to values of concern in the Big Cedar Ridge area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Big Cedar Ridge area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for cave and karst resources under Alternative D is representative of the impacts anticipated under Alternative F.

Red Gulch Dinosaur Tracksite

Under alternatives A, B, D, E, and F, the BLM manages the Red Gulch Dinosaur Tracksite area as an ACEC (1,798 acres) (Maps 84, 85, and 87-89); the BLM would not manage the area as an ACEC under Alternative C. Paleontological resources (in the form of trace fossils of early Jurassic age) are the values of concern in the Red Gulch Dinosaur Tracksite ACEC. Threats to the values of concern in this area include surface disturbance from mineral and ROW development, and theft and vandalism.

4.7.1.5 Summary of Impacts by Alternative

Management of the Red Gulch Dinosaur Tracksite ACEC under alternatives A, B, D, E, and F would be the most effective for protecting the paleontological values of concern, and these alternatives would result in minimal impacts to ROW and minerals development in the area. Alternative C, which does not designate the Red Gulch Dinosaur Tracksite as an ACEC, may result in adverse impacts to the paleontological values of concern. Management under Alternative C would be more beneficial to ROWs and other surface-disturbing activities than alternatives A, B, D, E, and F.

4.7.1.6 Detailed Analysis of Alternatives

Alternative A

Under Alternative A, management objectives in the Red Gulch Dinosaur Tracksite ACEC strive to protect and maintain the paleontological resources, including the largest dinosaur tracksite in Wyoming and other Middle Jurassic fossil deposits.

Surface-disturbing activities are prohibited in the ACEC, except for the construction of roads, trails, interpretive signs, and other facilities to enhance public education and recreation and activities allowed under a paleontological resources use permit.

Prohibiting or restricting surface-disturbing activities in the ACEC would result in adverse impacts to ROWs, renewable energy, and other types of development. Restrictions on surface-disturbing activities would reduce the potential for destruction or degradation of paleontological resources and values. Under Alternative A, restrictions on mineral development would result in adverse impacts to the use of these resources in the ACEC. Under Alternative A, withdrawing the Red Gulch Dinosaur Tracksite ACEC from appropriation under the mining laws and managing it as open to mineral leasing with an NSO restriction in the Sundance Formation would result in minimal adverse impacts to development of mineral resources, as no mineral development has been proposed in this area. Withdrawing the ACEC could result in minimal impacts on locatable mineral development in the ACEC, particularly in areas where gypsum deposits may be present. Valid existing mining claims represent valid existing rights and would not be affected by the withdrawal (see Section 4.2.1 *Locatable Minerals*). The development potential for oil and gas in the ACEC is very low and impacts from the restrictions on mineral leasing would be limited. Due to the low potential for sand and gravel across the entire ACEC, impacts to mineral materials disposal from restricting surface-disturbing activities in the ACEC would be limited. Withdrawals and closures to mineral development in the Red Gulch Dinosaur Tracksite ACEC would reduce the potential for destruction or degradation of paleontological values.

Management actions restricting motorized vehicle use and setting paleontological resources use permitting requirements could result in adverse impacts to these resource uses by limiting travel and access in the ACEC. Restrictions on these resource uses would result in additional protection of and benefits to the paleontological values of concern in the ACEC. Motorized vehicle restrictions may benefit paleontological resources by reducing the potential for vehicle-caused damage to near-surface paleontological resources, such as dinosaur tracks, and limiting unauthorized access to important paleontological sites. All scientific and educational researchers studying the dinosaur tracks or working in that geologic horizon in the Red Gulch Dinosaur Tracksite ACEC are required to obtain a paleontological resources use permit. Permit requirements would protect the integrity of the resources and enable the advancement of scientific knowledge by allowing excavations to continue.

Closing the interpretive area of the Red Gulch Dinosaur Tracksite ACEC to livestock grazing would not affect AUMs, but may provide additional protection for near surface paleontological resources that may be damaged by the passage of livestock.

Prohibiting the use of heavy equipment and chemical and dye retardants may adversely affect the ability to control wildland fires in the area. Reducing surface disturbance and the application of chemicals that may damage exposed dinosaur tracks would be beneficial to the protection of these resources. However, reducing available suppression tactics for wildland fire may increase its area and severity, which may damage paleontological resources close to the surface.

Alternative B

The management of and impacts from the Red Gulch Dinosaur Tracksite ACEC under Alternative B are the same as under Alternative A.

Alternative C

Under Alternative C, the BLM does not manage the Red Gulch Dinosaur Tracksite area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

Under Alternative C, the area is open to locatable mineral entry, mineral leasing, and mineral materials disposal. There would be moderate constraints on oil and gas development in a portion of the area (1,674 acres), and the remainder of the area would be open to mineral leasing subject to standard lease stipulations. Alternative C includes the fewest restrictions on mineral development and would result in the smallest impact on the development of these resources. This management would result in the greatest adverse impacts to the paleontological values of concern compared to the other alternatives.

Management of the area under Alternative C could result in more surface disturbance than alternatives A and B. Under Alternative C, the BLM manages the Red Gulch Dinosaur Tracksite area primarily as a ROW avoidance area (1,674 acres) or open to ROW authorizations. Alternative C would allow for more potential ROW development in the area compared to the other alternatives, which would result in the greatest potential for damage to near-surface paleontological resources, although standard guidelines for surface disturbance would still apply under this alternative.

Alternative C limits motorized vehicle use to designated roads and trails; impacts to and from travel management would be the same as under alternatives A and B.

Applicable laws and regulations and the management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative C. These decisions include protective management, such as surveying and monitoring requirements in PFYC 5 formations, but generally would provide less protection for the paleontological values of concern than the other alternatives.

Alternative D

The management of and impacts from the Red Gulch Dinosaur Tracksite ACEC under Alternative D are the same as under Alternative A.

Alternative E

Management of and impacts to values of concern in the Red Gulch Dinosaur Tracksite area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Red Gulch Dinosaur Tracksite area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Sheep Mountain Anticline

Under alternatives A, B, D, E, and F, the BLM would designate the Sheep Mountain Anticline area an ACEC (11,520 acres) (Maps 84, 85, and 87-89), and would not designate it as an ACEC under Alternative C. The values of concern in the Sheep Mountain Anticline ACEC are geologic features, caves, cultural resources, and scenic qualities. The primary geologic feature of interest in the ACEC is the Sheep Mountain Anticline, a classic and internationally known Laramide structure. Threats to the resource values in this area include surface disturbance from mineral and ROW development.

4.7.1.7 Summary of Impacts by Alternative

Alternatives A, B, D, E, and F would be the most effective for protecting the values of concern in the Sheep Mountain Anticline area because they would restrict locatable mineral development and prohibit surface-disturbing activities above caves and cave passages. Restrictions that limit surface disturbance, particularly under alternatives D and F, would reduce the potential for the disturbance of cultural resources and adverse impacts to the geology and associated scenic qualities of the area. However, these alternatives also would result in the greatest restrictions to mineral development and other surface-disturbing activities, particularly alternatives B, D, E, and F, which, respectively, either manage the ACEC as closed to mineral leasing or impose NSO/CSU stipulations. Alternative C would be least effective for protecting the values of concern, but would be more beneficial for mineral development and other surface-disturbing activities.

4.7.1.8 Detailed Analysis of Alternatives

Alternative A

Under Alternative A, the BLM manages the Sheep Mountain Anticline to protect its geologic features and its recreational and interpretive uses. Management for the area is designed to protect outstanding scenic values while continuing to provide limited developed recreational facilities and motorized access.

The limited development potential for mineral resources in the ACEC would minimize the potential adverse impacts of restrictions on mineral development. Restrictions on minerals development would benefit the values of concern by reducing the potential degradation of resources and the development of facilities and infrastructure that would impact scenic values.

Under Alternative A, the BLM withdraws the Sheep Mountain Anticline ACEC from appropriation under the mining laws and requires a plan of operations for existing mining claims for all locatable mineral exploration (except casual use). Withdrawing the ACEC could result in adverse impacts to locatable mineral development by prohibiting new claims—particularly in areas of potential occurrence for gypsum (1,982 acres) and bentonite (223 acres). Valid existing mining claims represent valid existing rights and would not be affected by the withdrawal (see Section 4.2.1 *Locatable Minerals*).

Under Alternative A, the Sheep Mountain Anticline ACEC is open to oil and gas leasing with primarily major and moderate constraints; however, the low development potential for oil and gas resources in this area would limit potential impacts to oil and gas development as well as limit development that may impact the values of concern in the ACEC.

Under Alternative A, prohibiting surface-disturbing activities such as geophysical exploration (except casual use), mineral materials disposal, and construction activities (except those related to development of recreation facilities or wildlife habitat) above caves and cave passages would result in adverse impacts

to these resource uses by limiting these activities in the ACEC. Surface-disturbing activities elsewhere in the ACEC would be allowed, subject to restrictions on such activities addressed under other resources. The low potential for sand and gravel in most of the ACEC would limit adverse impacts to mineral materials disposal. The low potential for sand and gravel would also limit mineral material extraction and associated adverse impacts to cave and geologic values.

Limiting motorized travel in the ACEC to designated roads and trails and managing the area for the existing semi-primitive motorized and primitive recreational settings would result in adverse impacts to motorized vehicle use. Limiting motorized travel to designated roads and trails would reduce the available routes. These restrictions would maintain or enhance the recreational settings by eliminating unnecessary or undesirable vehicle routes, increasing opportunities for nonmotorized use, and allowing the closure of routes that result in adverse impacts to the values of concern.

Alternative B

With the exception of oil and gas leasing, management and impacts under Alternative B are the same as those under Alternative A.

Under Alternative B, managing the ACEC as closed to oil and gas leasing would result in greater adverse impacts to the development of these resources than under Alternative A. The low to very low development potential for oil and gas in the ACEC would minimize these adverse impacts. Managing the ACEC as closed to oil and gas leasing would provide more protection to the values of concern than Alternative A.

Alternative C

Alternative C does not designate the Sheep Mountain Anticline as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area is open to locatable mineral entry (except 172 acres), mineral leasing, and mineral materials disposal under Alternative C. There are moderate (358 acres) or major (3,369 acres) constraints on oil and gas development in most of the area, with these activities subject to standard restrictions in the remainder. Minerals management under Alternative C may result in greater development of these resources and therefore greater adverse impacts to the values of concern, compared to the other alternatives.

Alternative C limits motorized vehicle use to designated roads and trails; impacts from travel would be the same as alternatives A and B.

Alternative D

Except for oil and gas leasing, restrictions on surface-disturbing activities, and VRM, management and impacts under Alternative D would be the same as under Alternative A.

Under Alternative D, the BLM applies an NSO restriction on most of the ACEC and a CSU on the remainder. This management could result in greater adverse impacts to the development of leasable minerals than Alternative A, but these adverse impacts would be minimized because of the low to very low development potential for oil and gas in the area. The restrictions on leasable minerals would provide greater protection to the values of concern than alternatives A and C, but less than Alternative B.

Under Alternative D, the BLM manages the Sheep Mountain Anticline ACEC as VRM Class II. Although none of the other alternatives includes specific VRM for this ACEC, the area is VRM Class II under alternatives B and C and VRM Classes III and IV (5,120 acres) under Alternative A, due to other resource considerations. Management as VRM Class II would require changes to the design and mitigation of BLM-authorized actions that could result in adverse impacts in the form of additional costs and delay for discretionary projects in the ACEC. Conversely, this VRM could benefit the values of concern, particularly the scenic qualities, by reducing or mitigating the visual contrast of BLM-authorized actions.

Alternative D imposes more restrictions on surface-disturbing activities than alternatives A and B. In addition to surface disturbance restrictions over caves and cave passages, this alternative only approves surface-disturbing activities elsewhere in the ACEC if the effects can be mitigated. Such a requirement would benefit geologic and related scenic values of concern for the area by limiting alterations to the visual environment, but may result in additional delay or expense for range improvements, ROW authorizations, and other surface-disturbing activities.

Alternative E

Management of and impacts to values of concern in the Sheep Mountain Anticline area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Sheep Mountain Anticline area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Spanish Point Karst

This area is designated an ACEC under all the alternatives (6,298 acres) (Maps 84-89). The values of concern managed for in the Spanish Point Karst ACEC are caves, recreational opportunities, sinking stream segments, an important aquifer recharge area, and important water quality functions. Threats to this ACEC include surface disturbance from mineral and ROW development and aerial spraying of pesticides onto aquifer recharge areas. Management and impacts to the area are the same under all alternatives.

4.7.1.9 Summary of Impacts by Alternative

The Spanish Point Karst area is designated as an ACEC with the same management under all alternatives, and impacts to the ACEC would be the same under all alternatives. Restrictions on resource uses in the ACEC would provide protection for the cave and karst system, important aquifer recharge zone, sinking stream segments, and the groundwater quantity and quality values of concern, but could result in adverse impacts to the restricted resource uses.

4.7.1.10 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

The management objective for the Spanish Point Karst area is the protection of the cave and karst system, important aquifer recharge zone, sinking stream segments, and the groundwater quantity and quality the area provides. Impacts from the management of the Spanish Point Karst area do not vary by alternative. Pursuing agreements for the cooperative management of surface activities in watersheds on USFS-administered and private lands in and adjacent to the Spanish Point Karst ACEC could result in beneficial impacts to the values of concern in the area by coordinating management for the protection of water resources. To the extent possible, the BLM also maintains compatible management prescriptions between these lands and those administered by the BLM.

Restrictions on minerals development would reduce potential adverse impacts from activities that could degrade values of concern. Restrictions on minerals development include withdrawing the ACEC from appropriation under the mining laws, closing it to mineral leasing, and geophysical exploration. The potential for all mineral resources in the ACEC is low to very low, which minimizes adverse impacts to minerals development.

Managing the Spanish Point Karst ACEC as a ROW avoidance area and closing it to motorized vehicle use would have direct adverse impacts on these activities. Restrictions on these resource uses could enhance protection for caves, opportunities for primitive recreation, and water quality by minimizing surface disturbance and the potential for erosion and vegetation loss that would adversely affect these values.

Under all alternatives, managing basal vegetative cover to maximize (or maintain) ground cover in good or better ecological condition would benefit water quality by reducing erosion and the movement of sediment into water resources.

Existing ACECs (and Proposed Expansions)

Brown/Howe Dinosaur Area

This area is designated an ACEC under all the alternatives (Maps 84-89). The BLM manages it within the existing boundaries under alternatives A, C, D, and F (5,501 acres) and expand it by 15,233 acres under alternatives B and E. Management of this ACEC would vary by alternative. The values of concern managed for in both the existing and expansion area of the Brown/Howe Dinosaur Area are paleontological resources, most notably dinosaur fossils from the suborder Theropoda and Sauropoda. Threats to the area proposed under alternatives A, C, D, and F include surface disturbance from mineral and ROW development, and theft and vandalism; threats to the area proposed for expansion under alternatives B and E do not include theft and vandalism.

4.7.1.11 Summary of Impacts by Alternative

Management under alternatives B and E would be the most effective for protecting the paleontological values of concern in the existing Brown/Howe Dinosaur Area ACEC and the proposed expansion area, but also place the most restrictions on ROW authorizations and mineral development. Impacts under alternatives A, C, D, and F would be similar and would be less restrictive toward mineral resource development in the existing and expansion areas than under alternatives B and E. Management under

alternatives A, C, D, and F would provide less protection for paleontological values compared to the expanded Brown/Howe Dinosaur Area ACEC under alternatives B and E.

4.7.1.12 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Under all alternatives, mitigating surface-disturbing activities in the Brown/Howe Dinosaur Area ACEC would benefit the protection the paleontological values of concern.

Prohibiting the sale or exchange of lands in the ACEC, unless such disposals are consistent with management objectives, could improve the effectiveness and efficiency of resource management and protection in the area. Allowing exchanges consistent with resource objectives (paleontological values) would allow management flexibility to acquire high-value paleontological resources in the area while preventing land disposal that would transfer these resources out of BLM management.

Under all alternatives, limiting motorized vehicle use to designated roads and trails would reduce the routes available for recreational and other uses. Restrictions on motorized travel would decrease the potential for impacts to surface paleontological resources by allowing the closure of routes that result in adverse impacts to paleontological values.

All alternatives require fencing and signing of quarry sites in the Brown/Howe Dinosaur Area ACEC, which would benefit visitor safety and may reduce degradation of paleontological values from human disturbance.

All alternatives only allow fossil collection, excavation, or removal in the Brown/Howe Dinosaur Area ACEC under a permit issued by the Wyoming BLM State Director and only by institutions and individuals engaged in BLM-approved research, museum, or educational projects. These requirements would result in beneficial impacts by protecting the integrity of paleontological resources and enabling the advancement of scientific knowledge and research on these values in the area.

Alternative A

Allowing surface-disturbing activities in the ACEC, only if they are preceded by a paleontological sensitivity survey and monitored during construction, when necessary, could result in adverse impacts to ROW and minerals development and other surface-disturbing activities. The survey may delay activities or require mitigation or placement to limit impacts to paleontological values, but would continue to allow some activities while protecting the integrity of fossil-bearing material in the area. Restrictions on surface disturbance would benefit paleontological values of concern in the ACEC.

Managing the Brown/Howe Dinosaur Area ACEC as available for locatable mineral entry, open to mineral leasing, and open to mineral materials disposal would benefit these resource uses. Allowing mineral development could have an adverse impact on the paleontological values of concern in the ACEC. However, the low potential for development of these resources (BLM 1994c) would minimize the adverse and beneficial impacts of allowing locatable mineral entry. Requiring oil and gas operations and mineral materials disposal to conform to the applicable provisions of the regulations (43 CFR 3100) and other terms and conditions determined necessary by the authorized officer to avoid damage to these resources would minimize adverse impacts to paleontological resources. Restrictions from the management of the ACEC and other resources result in major (411 acres) and moderate (4,933 acres) constraints on oil and gas development in this area.

Under Alternative A, the Brown/Howe Dinosaur Area ACEC is open to ROW authorizations, subject to the requirements for surface-disturbing activities described above, which would result in adverse impacts to paleontological resources in the ACEC. Requiring paleontological sensitivity surveys before approving minor ROW authorizations in the Brown/Howe Dinosaur Area ACEC may cause long-term adverse impacts to ROWs by increasing authorization processing times and potentially requiring mitigation, relocation, or modification of facilities if paleontological resources are found. Due to the small size of this area compared to the size of the Planning Area, these impacts may be minimal.

Alternative B

Under Alternative B, the BLM would expand the Brown/Howe Dinosaur Area ACEC by 15,233 acres. The management and impacts described under *Impacts Common to All Alternatives* and, unless otherwise noted, under Alternative A, would apply to the expanded ACEC area. Expanding the ACEC would increase restrictions on resource uses in the area and increase the protection of the paleontological values of concern in the area.

Under Alternative B, restrictions on mineral development in the expanded ACEC could result in greater adverse impacts to the use of these resources than under Alternative A. Restrictions on minerals development would result in greater beneficial impacts to paleontological values of concern compared to Alternative A.

The expanded ACEC is withdrawn from appropriation under the mining laws, closed to mineral leasing, and closed to mineral materials disposal under Alternative B. Withdrawal from locatable mineral entry could result in adverse impacts to the use of mineral resources because no new claims could be staked; these impacts would be most likely to occur in the approximately 1,462 acres of known or potential occurrence for bentonite and 3,079 acres of known or potential occurrence for gypsum in the expanded ACEC.

The development potential for oil and gas in the ACEC is very low; therefore, adverse impacts to this resource use from the restrictions under Alternative B are unlikely to occur. Adverse impacts from closing the area to mineral materials disposal would be greatest on the approximately 1,659 acres of high-potential for sand and gravel. Mineral restrictions, including the withdrawal, under Alternative B would result in greater beneficial impacts to paleontological resources in the area compared to Alternative A by decreasing mineral activity and associated disturbance that could degrade paleontological values. Decreased mineral activity also may reduce new roads and may decrease access opportunities for recreational collectors or access that could degrade resource values.

Under Alternative B, managing the ACEC as a ROW avoidance area would result in greater adverse impacts to this resource use by limiting new ROW authorizations in the ACEC. Under Alternative A, the area proposed for expansion under Alternative B is open to ROW authorizations, subject to the standard requirements for surface-disturbing activities and paleontological resources. The more restrictive ROW management under Alternative B would reduce or mitigate surface disturbance and would provide more protection for paleontological resources than under Alternative A.

Alternative C

The management of and impacts from the Brown/Howe Dinosaur Area ACEC under Alternative C are the same as those under Alternative A.

Under Alternative C, the BLM manages the area proposed for expansion under Alternative B primarily as a ROW avoidance area (11,047 acres), with only a small portion (4,186 acres) open to ROW

authorization. Therefore, ROW management is more restrictive than under Alternative A and impacts to the values of concern in this area would be similar to those under Alternative B.

Alternative D

The management of and impacts from the Brown/Howe Dinosaur Area ACEC under Alternative D are the same as those under Alternative A, except for surface-disturbing activities and VRM.

Similar to Alternative A, Alternative D allows surface-disturbing activities if preceded by an on-the-ground survey and monitoring in all PFYC 4 and 5 formations; therefore, impacts would be same as under Alternative A. Compared to the other alternatives, Alternative D may result in fewer adverse impacts to ROW placement and other surface-disturbing activities.

Under Alternative D, adverse impacts to locatable and leasable mineral uses and beneficial impacts to paleontological values of concern would be less than under Alternative B. Under Alternative D, the BLM manages the existing ACEC and the expansion area proposed under Alternative B as open to mineral materials disposal. Impacts would be the same as under alternatives A and C.

Under Alternative D, the BLM manages the Brown/Howe Dinosaur Area ACEC and the area proposed for expansion under Alternative B as ROW avoidance areas. Impacts would be the same as under Alternative B.

Under Alternative D, the BLM manages the Brown/Howe Dinosaur Area ACEC and the area proposed for expansion under Alternative B as VRM Class III. Although none of the other alternatives includes specific VRM for this ACEC, managing it as VRM Class III would be more restrictive than VRM Class IV under Alternative C (10,201 acres) and less restrictive than VRM Class II under alternatives A and B (7,357 acres and 15,222 acres, respectively). Management as VRM Class III would allow BLM-authorized actions that result in surface-disturbing activities with reduced mitigation and siting restrictions, and related benefits to some resource uses and adverse impacts to paleontological resources, compared to VRM Class I and II areas.

Alternative E

Management of and impacts to values of concern in the Brown/Howe Dinosaur Area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Brown/Howe Dinosaur Area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for cave and karst resources under Alternative D is representative of the impacts anticipated under Alternative F.

Carter Mountain

The BLM designates the Carter Mountain area as an ACEC under alternatives A, D, and F (10,867 acres) (Maps 84, 87, and 89), and designates and expands this ACEC area by 5,706 acres under alternatives B and E (Maps 85 and 88). The BLM does not designate the Carter Mountain area as an ACEC under Alternative C. Management of this area varies by alternative. The values of concern in the Carter Mountain area are vegetation and wildlife resources, including alpine tundra and crucial winter range.

Threats to this area include surface disturbance from mineral, ROW, and renewable energy development, and theft and vandalism of cultural resources. In addition, the proposed expansion area under alternatives B and E contains cultural features, recreational opportunities, special status species habitat, and fragile soils, and supports watershed functions. Threats to the expansion area are the same as those to the ACEC under Alternative A, except that they do not include theft and vandalism.

4.7.1.13 Summary of Impacts by Alternative

Management under alternatives B and E would be the most effective for protecting the values of concern in the ACEC and expanded ACEC area. Alternatives B and E place the greatest restrictions on ROW authorizations, mineral development, and motorized vehicle use of any of the alternatives. Alternatives A and C would result in similar adverse and beneficial impacts. Alternative A includes more prohibitions for surface disturbance on slopes, and more restrictions on fire and fuels and recreation site development than Alternative C. However, the restrictions on motorized vehicle use and VRM classifications are more extensive under Alternative C. Both alternatives A and C would result in similar impacts to the development of mineral resources in the area.

4.7.1.14 Detailed Analysis of Alternatives

Alternative A

Prohibiting surface-disturbing activities on slopes of more than seven percent would result in adverse impacts on the ability to construct range improvements, explore and develop certain minerals, authorize ROWs, and perform other activities. These restrictions could reduce surface-disturbing activities, which would benefit fragile soils, alpine tundra, crucial winter range, and the control of invasive species that could degrade the vegetation and wildlife values of concern in the ACEC. Areas with steep slopes are particularly prone to erosion and can be difficult to reclaim following surface disturbance.

Managing the Carter Mountain ACEC as available for mineral entry, open to minerals leasing, and open to mineral materials disposal would result in adverse impacts to the values of concern by increasing the potential for surface-disturbing activities that could degrade soils and disturb vegetation and wildlife resources. Managing the ACEC as primarily open to these types of mineral development could benefit the use of these resources; however, the low potential for mineral development in the ACEC would also reduce the potential for adverse impacts to the values of concern. There would be major constraints on oil and gas development across most of the ACEC (9,954 acres), with smaller areas of closure and moderate constraints across the remainder.

Acquiring 840 acres in the Carter Mountain ACEC under Alternative A could result in long-term beneficial impacts in the ACEC by improving the effectiveness and consistency of management for the area's watershed and habitat values through consolidation of land ownership.

Under Alternative A, managing the Carter Mountain ACEC as a ROW avoidance area applies restrictions to ROW authorizations and would result in adverse impacts to ROW authorizations by limiting these authorizations or requiring specific lease stipulations. These restrictions could benefit the values of concern by reducing development and increasing impact mitigation measures. Requiring intensive mitigation for new ROWs would further benefit the values of concern by reducing the impacts of any new ROWs on vegetation, crucial winter range, and wildlife using the area.

Under Alternative A, limiting motorized vehicle use to designated roads and trails in the Carter Mountain ACEC, with a seasonal closure from November 15 to June 15 or later if weather or road

conditions are unfavorable, would result in adverse impacts to motorized vehicle use. Adverse impacts to travel may be minimized because the BLM commits to maintaining existing public access and pursuing additional access opportunities under this alternative. Seasonal restrictions and limiting travel to designated roads and trails would benefit the values of concern by protecting fragile soils and alpine tundra and eliminating disturbances to big game habitat during sensitive periods. Requiring approval before snow is removed from BLM-administered roads in big game crucial winter range would further help minimize disturbance to wildlife.

Prohibiting the construction of new recreational sites and restricting the use of heavy equipment in the Carter Mountain ACEC could result in adverse impacts to recreation and fire and fuels management. Under this alternative, restrictions on recreational facility development may affect the BLM's ability to provide desired recreation experiences in the area for those seeking more middle-country RSCC. Heavy equipment restrictions may result in difficulties controlling or suppressing wildland fires in the ACEC, although the use of prescribed fire to control fuels is allowed. Restrictions on recreation and fire and fuels management would benefit the values of concern. These restrictions would prevent surface-disturbing activities that could affect wildlife and vegetation to protect fragile soils and alpine tundra.

Managing the Carter Mountain ACEC as VRM Class II could result in adverse impacts to resource uses by limiting certain activities in the ACEC. Activities such as range improvement projects and oil and gas facility development could be adversely affected because no activity would be allowed to attract the attention of the casual observer; therefore additional mitigation or design consideration may be required. Management as VRM Class II could also benefit vegetation and wildlife habitat values of concern by limiting the size and types of development and surface disturbance that would be allowed, and potentially increasing mitigation for activities that did occur.

Alternative B

Under Alternative B, the BLM would expand the Carter Mountain ACEC by 5,706 acres. Management and impacts described for Alternative A, except for mineral and recreational facilities, apply to the expanded area unless otherwise noted. The larger size of the expanded ACEC and the expansion of common management to include this area means that the impacts from such management would be comparatively larger under Alternative B than under Alternative A.

Under Alternative B, restrictions on mineral development would result in adverse impacts to the use of these resources. The ACEC is withdrawn from appropriation under the mining laws, closed to mineral leasing, and closed to mineral materials disposal. The known or potential occurrence for gypsum and bentonite in the ACEC is low; therefore, adverse impacts to the use of these resources would be minimal. Managing the ACEC as closed to oil and gas development could result in the greatest adverse impacts of any alternative because 1,780 acres with moderate development potential for oil and gas would be closed to leasing; the remainder of the ACEC has very low development potential. Likewise, closure to mineral materials disposal could result in the greatest adverse impacts of any alternative on the 1,872 acres with high-potential for sand and gravel in the ACEC. Minerals management under Alternative B is more restrictive than under Alternative A and could result in greater adverse impacts to mineral resources by further limiting development. Restrictions on minerals development could benefit the values of concern. Under Alternative A, the area proposed for expansion under Alternative B is available for locatable mineral entry and open to mineral leasing. Under Alternative B, more restrictive management limiting surface disturbance from minerals development would result in greater beneficial impacts, compared to Alternative A, in the existing and expansion areas on the vegetation, soils, big game crucial winter range, and cultural and recreational values of concern for these areas.

Managing the Carter Mountain ACEC expansion area as a ROW avoidance area, limiting motorized vehicle use to designated roads and trails, and managing the area as VRM Class II would result in more restrictive management than under Alternative A. Under Alternative A, the area proposed for expansion under Alternative B is managed as a ROW avoidance area. Under Alternative B, increasing resource use restrictions could result in greater adverse impacts to ROW authorizations, travel, and development activities compared to Alternative A. Managing the expansion area as VRM Class II places additional stipulations on the types and locations of activities that would be allowed in the ACEC compared to Alternative A. Under Alternative A, the BLM manages the area proposed for expansion under Alternative B as VRM Class IV (4,348 acres) or Class II (1,358 acres). Managing the existing and expansion areas as VRM Class II under Alternative B would maintain the visual environment more than Alternative A and provide the greatest benefits to recreational and other uses compared to the other alternatives.

Restricting travel to designated roads and trails in this area provides more protection than Alternative A for fragile soils, vegetation communities, wildlife habitat, watershed functions, and cultural resources. Under Alternative A, the BLM limits motorized vehicle use in the area proposed for expansion under Alternative B to existing roads and trails (5,135 acres), and limits the remainder to designated roads and trails (571 acres).

Alternative B allows the construction of recreational facilities to address visitor health and safety, use and user conflicts, and resource protection, which could result in greater beneficial impacts to recreational values than under Alternative A. This management may also increase surface disturbance and visitation to sensitive areas compared to Alternative A, which may result in adverse impacts to the non-recreational values of concern.

Alternative C

Under Alternative C, the BLM does not designate the Carter Mountain as an ACEC, and manages it in accordance with multiple use principles consistent with other resource objectives.

Management under Alternative C has the lowest potential to adversely impact the development of oil and gas resources and ROW authorizations. Similar to Alternative A, the area would be available for locatable mineral entry, open to mineral leasing, and open to mineral materials disposal. Constraints on oil and gas development would be lowest under this alternative, with moderate constraints on oil and gas development throughout most of the area (15,563 acres), with major constraints on the remainder. Under Alternative C, the BLM manages the Carter Mountain area as open to ROW authorizations. Standard guidelines related to surface disturbance would apply. These resource uses would result in additional surface disturbance in the area compared to alternatives A and B, leading to potential damage to the identified values of concern.

Applying only the standard guidelines for surface-disturbing activities under Alternative C would reduce the beneficial impacts on the protection of fragile soils, scenic quality, vegetation communities, wildlife habitat, watershed functions, and cultural resources compared to the other alternatives.

Managing motorized vehicle use as limited to designated roads and trails (5,135 acres) or with seasonal restrictions (11,438 acres) would result in impacts similar to those under Alternative A for the existing ACEC. Travel management in the proposed expansion area under alternatives B and D is more restrictive than under Alternative C and, therefore, Alternative C may result in fewer adverse impacts to travel. Compared to Alternative A, management of motorized vehicle use under Alternative C may result in fewer adverse impacts to the values of concern.

Under Alternative C, the BLM manages the Carter Mountain area as VRM Class II, and impacts would be the similar to those under Alternative B.

Alternative D

Management of and impacts from the Carter Mountain ACEC under Alternative D are the same as under Alternative A, with the exceptions described below.

Management of and impacts to travel in the ACEC and the area proposed for expansion under Alternative D is the same as under Alternative B. Unlike alternatives A and B, this alternative does not pursue additional public access to the area, which may reduce the beneficial impacts to public access described for Alternative A.

Alternative D would consider the acquisition of other parcels from willing sellers in the Carter Mountain area. Such acquisitions may result in additional long-term beneficial impacts to management for the area's watershed and habitat values compared to Alternative A.

Under Alternative D, the BLM manages ROW authorizations in the Carter Mountain ACEC and the expansion area proposed under Alternative B the same as under Alternative B. However, unlike alternatives A and B, intensive mitigation is not required for additional ROW authorizations, and associated adverse impacts to ROW authorizations and beneficial impacts to habitat and sensitive wildlife from this mitigation would not occur. Alternative D allows some surface-disturbing activities other than mineral leasing or ROW throughout the ACEC if the effects on alpine tundra could be avoided or mitigated based on site-specific analysis. Compared to alternatives A and B, allowing the construction of range improvements and other surface-disturbing activities throughout the ACEC would reduce adverse restrictions to these resource uses and would reduce the benefits of prohibiting these activities in habitat and alpine tundra on steep slopes.

Impacts from the construction of recreational facilities would the same as under Alternative B.

Under Alternative D, the management of mineral resources is generally more restrictive than alternatives A and C, but less than Alternative B. Alternative D withdraws a smaller portion of the ACEC from locatable mineral entry (4,998 acres) than Alternative B, but, similar to Alternative B, the BLM manages the entire area as closed to oil and gas leasing. Like Alternative B, adverse impacts could occur to oil and gas development on 1,780 acres with moderate development potential that would be closed to leasing. Similar to alternatives A and C, the entire area is available for mineral materials disposal. Overall, the management of locatable mineral entry and mineral materials disposal would have similar beneficial and adverse impacts as Alternative A, while the management of oil and gas leasing would have similar beneficial and adverse impacts as Alternative B.

VRM classifications and associated impacts in the Carter Mountain ACEC and the expansion area proposed under Alternative D are the same as under Alternative B.

Alternative E

Management of and impacts to values of concern in the Carter Mountain area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Carter Mountain area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for cave and karst resources under Alternative D is representative of the impacts anticipated under Alternative F.

Five Springs Falls

The BLM designates the Five Springs Falls area as an ACEC under alternatives A, D, and F (163 acres) (Maps 84, 87, and 89) and designates and expands this ACEC area by 1,646 acres under alternatives B and E (Maps 85 and 88). The BLM would not designate the Five Springs Falls ACEC or its expansion area as an ACEC under Alternative C. Management of this area would vary by alternative. The values of concern in the Five Springs Falls ACEC include special status species plants and scenic and recreational features. In addition, the proposed expansion area contains geologic features and is managed to improve public awareness of natural geologic hazards in the area. Threats in the area of the ACEC proposed under alternatives A and D include damage to rare and endemic plants caused by recreation. Threats to the expansion area proposed under Alternative B include surface disturbance from mineral and ROW development.

4.7.1.15 Summary of Impacts by Alternative

Management under alternatives B and E would be the most effective for protecting the special status plant species, scenic, recreational, and geologic values of concern within the ACEC boundary designated under alternatives A, D, and F, and the expanded ACEC designated under alternatives B and E. Alternatives B and E also would result in the greatest restrictions on surface-disturbing activities and mineral development because the extent of the area to which this management is applied would be greater than under alternatives A, D, and F. Alternative C would be less effective for protecting the values of concern in the ACEC and in the ACEC expansion area. Alternative C would be more beneficial than the other alternatives to ROW authorizations and other uses that require surface disturbance.

4.7.1.16 Detailed Analysis of Alternatives

Alternative A

Alternative A prohibits surface-disturbing activities such as geophysical exploration (except casual use) and construction activities (except those related to development of recreation or interpretive areas dealing with rare plants). Prohibiting surface-disturbing activities would result in adverse impacts by limiting these activities. This restriction would benefit special status plant species and scenic and recreational values of concern in the ACEC.

Withdrawing the ACEC from appropriations under the mining laws would result in minimal adverse impacts to locatable minerals because there are few areas of known and potential occurrence for gypsum and bentonite in the ACEC. The Five Springs Falls ACEC is open to exploration and development of salable minerals and leasable minerals are open with an NSO restriction. However, there is no identified development potential for oil and gas and there is low potential for sand and gravel within this ACEC. Therefore, impacts would be minimal for these minerals.

Under Alternative A, managing the Five Springs Falls ACEC as a ROW avoidance area could result in adverse impacts to this resource use by limiting new ROW authorizations in the ACEC. ROW

management that reduces or mitigates surface disturbance may help protect scenic and recreational values of concern. Requiring intensive mitigation for new ROWs would further benefit these values by reducing the impacts of new ROWs.

Limiting motorized travel in the ACEC to designated roads and trails would result in adverse impacts to motorized vehicle use. This travel restriction would reduce the available routes and would allow the closure of routes that result in adverse impacts to the values of concern.

Under Alternative A, restricting the use of heavy equipment in the Five Springs Falls ACEC may result in adverse impacts to fire and fuels management by limiting the ability to effectively and efficiently control wildland fires in the ACEC. Restricting these surface-disturbing activities would result in beneficial impacts by limiting potential degradation or destruction of the values of concern. However, limiting available options to control the spread or severity of wildfire may result in more catastrophic wildfires.

Alternative B

Alternative B expands the Five Springs Falls ACEC by 1,646 acres. Management and impacts described for Alternative A, with the exception of minerals, would apply to the expanded area unless otherwise noted. The larger size of the expanded ACEC, and the expansion of common management to include this area, would result in similar types of impacts to Alternative A, but to a greater extent.

Withdrawing the expansion area from appropriation under the mining laws could result in greater adverse impacts than Alternative A; however, no locatable mineral development is anticipated in this ACEC due to the absence of areas of known or potential occurrence. Valid existing mining claims represent valid existing rights and would not be affected by the withdrawal, although no new claims could be staked. This withdrawal could benefit the values of concern by reducing the impacts of surface disturbance. The degree of impacts from this withdrawal would be greater than under Alternative A, under which not withdrawing the area and allowing the staking of mining claims may result in adverse impacts to special status plant species habitat and scenic quality due to disturbance associated with mineral development. Managing the ACEC as closed to mineral leasing and closing it to mineral materials disposal would result in minimal adverse impacts because the development potential for oil and gas ranges from low to none and the potential for sand and gravel is low. Both the adverse and beneficial impacts of these actions would be greater than for the existing area and the expansion area than under Alternative A, under which the BLM manages the area as open to mineral leasing and mineral materials disposal.

Managing the existing and expansion area of the Five Springs Falls ACEC as a ROW avoidance area would result in greater adverse and beneficial impacts than under Alternative A, under which the expansion area is primarily open to ROW authorizations.

As under Alternative A, Alternative B limits motorized vehicle use in the existing and expansion area of the Five Springs Falls ACEC to designated roads and trails.

Alternative C

Under Alternative C, the BLM does not designate the area as an ACEC, and manages it in accordance with multiple use principles consistent with other resource objectives.

Alternative C includes the least restrictions on mineral development because the area is available for locatable mineral entry, open to mineral leasing, and open for mineral materials disposal. Impacts to

values of concern in the Five Springs Falls area from the development of minerals would be similar to those under Alternative A.

Management under this alternative is likely to result in the least adverse impacts to ROW authorizations because the area is primarily open to ROW authorizations and other surface-disturbing activities. Standard guidelines related to surface-disturbing activities would apply, but there would be more surface disturbance in the area compared to alternatives A and B, increasing the potential for damage to values of concern.

Under Alternative C, the BLM limits motorized vehicle use to designated roads and trails (1,646 acres) and closes some areas to motorized travel (163 acres). Impacts from travel management would be similar to Alternative A.

Alternative D

Under Alternative D, management of and impacts from the Five Springs Falls ACEC would be the same as under Alternative A, with the exceptions identified below.

As under Alternative B, the BLM closes the existing Five Springs Falls ACEC to mineral materials disposal and mineral leasing under Alternative D. Therefore, impacts under Alternative D would be the same as under Alternative B in this area. Similar to Alternative C, the area proposed for expansion under Alternative B would be available for locatable mineral entry, primarily open to oil and gas leasing with moderate constraints (1,526 acres), and open to mineral materials disposal. Under Alternative D, impacts from the management of mineral exploration and development in the Alternative B expansion area would be similar to Alternative C.

As under Alternative B, under Alternative D the BLM manages the existing Five Springs Falls ACEC and the expansion area proposed under Alternative B as a ROW avoidance area. However, unlike Alternative B, intensive mitigation is not required for additional ROW authorizations. The additional potential for adverse impacts to ROWs and benefits to special status plants species and scenic and recreational features from this additional mitigation would not occur under this alternative.

As under Alternative A, the existing area of the Five Springs Falls ACEC and the expansion area proposed under Alternative B are limited to designated roads and trails under Alternative D; impacts from this management would be the same as described under Alternative A.

Alternative E

Management of and impacts to values of concern in the Five Springs Falls area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Five Springs Falls area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Little Mountain

Under Alternative A, the BLM designates the Little Mountain area as an ACEC (21,476 acres) (Map 84) and designates and expands the area by 50,575 acres under alternatives B and E (Maps 85 and 88). The BLM does not designate these areas as ACECs under Alternative C. Under alternatives D and F (Maps 87 and 89), the BLM designates the ACEC with the Alternative A boundaries, and manages the area proposed for expansion under alternatives B and E as the Craig Thomas Little Mountain SMA (Maps 85 and 88). Although the Craig Thomas Little Mountain SMA would maintain its existing designation under all the alternatives, the BLM only proposes special management for this area under alternatives D and F. Management of this area would vary by alternative. Values of concern for this area includes caves, cultural and paleontological resources, and scenic qualities. In addition, the proposed expansion area contains wildlife and vegetation resources, including big game and special status species habitat and important plant populations. Threats to the ACEC and SMA include surface disturbance from mineral (including gravel pits, uranium, and limestone) and ROW development, timber extraction, recreational and OHV use, and invasive species, which affect habitat for special status species and have the potential to disturb wintering wildlife.

4.7.1.17 Summary of Impacts by Alternative

Management under alternatives B and E would be the most effective for protecting the caves, cultural and paleontological resources, scenic, wildlife, and vegetation values of concern. ACEC alternatives A, D, and F, and ACEC expansion or SMA alternatives B, D, E, and F would be the most effective for protecting the values of concern because they allow the least development. Alternatives B and E implement the greatest restrictions on surface-disturbing activities, mineral development, ROW authorizations, and motorized travel on the largest area, resulting in the greatest adverse impacts to these resource uses. Alternatives D and F would result in impacts similar to alternatives B and E, although the adverse impacts to mineral leasing and locatable mineral entry and the beneficial impacts to the values of concern from restricting these mineral uses would both be less under alternatives D and F. Alternative C would be the least effective for protecting the values of concern in the ACEC area designated under alternatives A, D, and F, and the ACEC expansion or SMA areas proposed under alternatives B, D, E, and F, respectively. Alternative C would be more beneficial to mineral development, ROW authorizations, and motorized travel than the other alternatives.

4.7.1.18 Detailed Analysis of Alternatives

Alternative A

Under Alternative A, the Little Mountain ACEC is available for locatable mineral entry, which could result in long-term adverse surface-disturbance impacts to the cultural, paleontological, and scenic values of concern for this area. As with all ACECs, the BLM has the ability to institute case-by-case withdrawals that may result in beneficial impacts to the values of concern by allowing for the protection of important sites. All cave and karst areas in the Planning Area also are withdrawn from appropriation under the mining laws, which would protect the Horsethief, Natural Trap, and other caves in the ACEC. Allowing locatable mineral entry would benefit this resource use, particularly areas of known potential for gypsum occurrence (3,154 acres).

Alternative A manages the ACEC as open to oil and gas leasing with an NSO restriction on the areas above these caves. Allowing mineral leasing with an NSO restriction could have adverse impacts on

mineral leasing in the ACEC by requiring directional drilling or other development techniques that may limit economically feasible recovery of these resources. NSO restrictions would benefit the values of concern in the ACEC by reducing their potential for destruction or degradation.

Under Alternative A, the Little Mountain ACEC is managed as a ROW avoidance area, which could result in adverse impacts to ROW authorizations. Managing the ACEC as a ROW avoidance area and requiring intensive mitigation for new ROWs could also benefit the values of concerns by reducing the impact of new ROWs on caves, cultural and paleontological resources, and scenic quality values of concern.

Under Alternative A, limiting motorized vehicle use to designated roads and trails would limit access and opportunities for travel. Travel management under Alternative A may result in beneficial impacts to the values of concern by eliminating routes that damage resources and limiting access to sensitive cultural, paleontological, and cave areas. Placing warnings signs around safety hazards in the Little Mountain ACEC to warn the public of health and safety hazards posed by radioactivity at uncovered mine entrances and adits would benefit visitor health and safety in the area.

Alternative B

Alternative B would expand the Little Mountain ACEC by 50,575 acres. Management and impacts described for Alternative A would apply to the expanded area unless otherwise noted. The larger size of the expanded ACEC, and the expansion of common management to include this area, would result in similar types of impacts, but to a greater extent than Alternative A.

Under Alternative B, restrictions on mineral development would result in adverse impacts to the use of these resources. The ACEC is withdrawn from appropriation under the mining laws and closed to mineral leasing within the entire Little Mountain ACEC. Withdrawing the entire ACEC under Alternative B could have the greatest adverse impacts on locatable mineral development due to the withdrawal of 13,264 acres with known gypsum occurrence. Withdrawal would eliminate the potential to develop locatable minerals because no new claims could be staked; valid existing mining claims represent valid existing rights and would not be affected by the withdrawal (see Section 4.2.1 *Locatable Minerals*). Adverse impacts to mineral development would be greater under Alternative B than under Alternative A, under which the BLM manages the expansion area as available for locatable mineral entry on 50,575 acres and would protect more area.

Management of mineral leasing in the expansion area under Alternative B is more restrictive than under Alternative A. However, the development potential for oil and gas in the existing ACEC and expansion area ranges from very low to none, which may minimize the impact of this more restrictive management. Beneficial impacts to the values of concern as a result of restrictions on mineral development under Alternative B are greater than under Alternative A.

Managing the proposed ACEC expansion area as a ROW avoidance area could result in greater adverse impacts to the authorization of ROWs than Alternative A, which manages a portion of the expansion areas as open to ROW authorizations. Managing the entire expansion area as a ROW avoidance area may benefit the values of concern in the ACEC by limiting ROW development in the area or requiring mitigation to reduce adverse impacts.

Limiting motorized vehicle use in the ACEC to designated roads and trails would result in greater adverse impacts to motorized vehicle access and greater beneficial impacts to the values of concern than Alternative A in the Alternative B expansion area. Under Alternative A, the expansion area is limited to existing roads and trails.

Alternative C

Alternative C does not designate the Little Mountain area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

Similar to Alternative D, only a small portion of the area under Alternative C (488 acres) is withdrawn from appropriation under the mining laws. This management may result in greater adverse impacts to the values of concern in the Little Mountain area than alternatives A and B by increasing mineral activity and associated surface disturbance.

Management of ROWs and motorized vehicle use under Alternative C would be similar to that under Alternative A. Applying standard guidelines related to surface disturbance for ROWs would result in a lower standard for the mitigation of surface disturbance compared to alternatives A and B, leading to greater potential for adverse impacts to the values of concern under Alternative C than the other alternatives.

Alternative D

Under Alternative D, the management of and impacts from the Little Mountain ACEC and the Craig Thomas Little Mountain SMA are the same as under Alternative B, except for authorizations for renewable energy development, locatable mineral entry, and mineral leasing in the SMA.

Under Alternative D, the Craig Thomas Little Mountain SMA is a renewable energy exclusion area. Excluding renewable energy could result in adverse impacts to the development of wind energy in the Little Mountain area, but would also reduce the possibility of damage to the values of concern from surface disturbance and prevent adverse impacts from the introduction of new contrasting elements, such as wind turbines, on scenic qualities. Management of renewable energy is more restrictive than the other alternatives, which primarily manage the area as an open or avoidance area for renewable energy.

The Little Mountain ACEC and the Craig Thomas Little Mountain SMA are available for locatable mineral entry. As noted for Alternative A, the BLM has the ability to institute withdrawals for ACECs on a case-by-case basis and withdraws cave and karst resources from appropriation under the mining laws. Allowing locatable mineral entry would benefit the development of these resources, particularly in the 13,264 acres with known gypsum occurrence, and the 2,195 acres with known bentonite occurrence. Allowing locatable mineral entry would result in long-term adverse surface-disturbance impacts to the values of concern for this area, particularly cultural and paleontological resources, scenic qualities, and wildlife and special status species habitat.

Under Alternative D, the restrictions on mineral leasing in the Craig Thomas Little Mountain SMA could result in adverse impacts to the use of these resources, particularly on the 53,221 acres managed as closed. Management of mineral leasing in the Craig Thomas Little Mountain SMA under Alternative D is more restrictive than under alternatives A and C, but less restrictive than under Alternative B. As noted for Alterative B, the very low to no development potential for oil and gas in this area may minimize the impact of restrictive management to mineral development. Conversely, beneficial impacts to the values of concern as a result of restrictions on mineral development may be greater than under alternatives A and C, but less than under Alternative B.

Alternative E

Management of and impacts to values of concern in the Little Mountain area and the Craig Thomas Little Mountain SMA under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Little Mountain area and the Craig Thomas Little Mountain SMA under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for cave and karst resources under Alternative D is representative of the impacts anticipated under Alternative F.

Upper Owl Creek Area

Alternative A designates the Upper Owl Creek area as an ACEC (13,758 acres) (Map 84); alternatives B and E designate and expand the Upper Owl Creek ACEC by 18,975 acres (Maps 85 and 88). Alternative C does not designate the Upper Owl Creek area as an ACEC. Management of this area varies by alternative. Values of concern in the Upper Owl Creek area include cultural sites, fisheries habitat, recreational opportunities, scenic qualities, shallow soils, special status species and wildlife habitat, and important vegetation communities. Threats to the values of concern in the ACEC proposed under Alternative A include surface disturbance from mineral and ROW development. In the expansion area proposed under alternatives B and E, threats to the values of concern also would include timber extraction and land disposals.

4.7.1.19 Summary of Impacts by Alternative

Alternatives B and E would provide the greatest protection for the cultural sites, fisheries habitat, recreational opportunities, scenic qualities, shallow soils, special status species and wildlife habitat, and important vegetation communities that are the values of concern for the Upper Owl Creek area. Adverse impacts to the values of concern from travel management and surface disturbance would be greatest under Alternative C, but adverse impacts from ROW authorizations would be greater under alternatives A, D, and F. Alternative C generally would be the least restrictive to resource uses in the area, while alternatives B and E would include the most restrictions.

4.7.1.20 Detailed Analysis of Alternatives

Alternative A

Under Alternative A, limiting or prohibiting surface-disturbing activities in the Upper Owl Creek ACEC would restrict the ability to perform activities such as geophysical exploration and road construction. Restricting surface-disturbing activities would protect fragile soils, alpine tundra, important wildlife habitat, and scenic values of concern. Additional protection for these values would be provided by requiring a detailed activity plan before approval of any proposal for a major surface-disturbing activity.

Under Alternative A, restrictions on mineral development would result in minimal adverse impacts to these resources in the ACEC. Alternative A includes a withdrawal from appropriation under the mining laws for the Upper Owl Creek ACEC; however, gypsum and bentonite are unlikely to be developed in this

ACEC. Therefore, development and potential impacts would be low. The Upper Owl Creek ACEC is open to oil and gas leasing with an NSO restriction; however, the development potential for oil and gas in the ACEC is very low and adverse impacts from this management are likely to be minimal. Restrictions on minerals development may benefit the values of concern by reducing surface disturbance that could decrease the recreational setting, fragment or disturb special status species and wildlife habitat and vegetation communities, and reduce the potential for erosion and disturbance to shallow soils.

Managing the Upper Owl Creek ACEC as open for future ROW authorizations would result in adverse impacts to the values of concern by allowing development and disturbance associated with ROWs. There may be some impacts to fragile soils, vegetation, and wildlife habitat from ROW surface disturbance, although prohibiting and limiting surface-disturbing activities in this ACEC would minimize adverse impacts. Allowing ROW authorizations in this ACEC would benefit ROWs.

Restricting motorized travel to designated roads and trails would limit the roads and trails available for travel, potentially resulting in adverse impacts to travel and motorized recreational use. This designation may benefit the values of concern in the area by reducing the number roads and trails and closing routes that damage soils and vegetation; impact scenic quality; alter the desired primitive RSCC, experiences, and benefits; and impact wildlife habitat values of concern.

Encouraging coordination between the BLM and local stakeholders in landscape management may provide opportunities to improve wildlife habitat, decrease the fragmentation of vegetation communities, maintain or enhance the visual qualities, and provide for exceptional primitive type recreational opportunities, experiences, and benefits across jurisdictional boundaries within the mixed land ownership pattern of the ACEC.

Alternative B

Alternative B would expand the Upper Owl Creek ACEC by 18,975 acres. Management and impacts described for Alternative A would apply unless otherwise noted. The larger size of the expanded ACEC, and the expansion of common management to include this area, would result in similar, but comparatively greater impacts, to those under Alternative A.

The area withdrawn from appropriation under the mining laws is larger under Alternative B (13,016 acres) than Alternative A. The proposed expansion area includes few areas with known or potential bentonite and gypsum occurrence. Therefore, the withdrawal is expected to result in minimal adverse impacts to locatable mineral development in the area. In addition, managing the ACEC as closed to oil and gas leasing would be more restrictive than under Alternative A, which manages the area as open, although the low to very low development potential for oil and gas in the area may minimize adverse impacts to mineral leasing. Although Alternative B expands restrictions on mineral development in comparison to Alternative A, minimal adverse impacts to the use of these resources are anticipated due to the low potential for occurrence or development. Management that restricts mineral development may benefit the values of concern by reducing the potential for surface disturbance associated with mineral development.

Expanding the ROW avoidance area to include the expansion area could result in greater adverse impacts to the authorization of ROWs under Alternative B compared to Alternative A, which manages the expansion area as open to ROW authorizations. This management also would increase protection for the values of concern compared to the other alternatives.

Impacts to and from travel management would be similar to Alternative A, because most of the area under both alternatives is limited to designated roads and trails. Alternative A limits motorized vehicle

use in the expansion area primarily to designated roads and trails (18,080 acres) with a smaller area limited to existing roads and trails (1,640 acres).

Alternative C

Alternative C does not designate the Upper Owl Creek area as an ACEC; the BLM manages it in accordance with multiple use principles consistent with other resource objectives.

The area is available for locatable mineral entry under Alternative C, but adverse and beneficial impacts would be minimal because gypsum and bentonite are not present in production-scale quantities. Due to the low to no development potential for oil and gas in the area, impacts would be minimal and similar to Alternative A.

Alternative C manages the Upper Owl Creek area as open to ROW authorizations (29,699 acres) and as a ROW avoidance area (3,034 acres). ROW management under Alternative C is more restrictive than under Alternative A, and the adverse impacts to ROW authorizations are likely to be greater under Alternative C than under alternatives B and D. Beneficial impacts to the values of concern from ROW authorizations may be greater than under Alternative A due to increased area excluded and avoided to ROW authorizations. Only standard guidelines related to surface disturbance would apply, so the impacts from the additional restrictions on surface disturbance realized under alternatives A and B would not occur.

Under Alternative C, managing motorized vehicle use as limited to existing (19,720 acres) and limited to designated (13,057 acres) roads and trails would result in the greatest adverse impacts from motorized travel to the values of concern by increasing access and opportunities for travel that could degrade or damage resources. This alternative places the fewest restrictions on motorized travel of any alternative.

Alternative D

Under Alternative D, management of and impacts from the Upper Owl Creek ACEC (Map 87) are the same as under Alternative A, except for ROW authorizations, locatable mineral entry, and mineral leasing. However, under Alternative D, management of the area proposed for expansion under Alternative B differs from management under Alternative A.

Under Alternative D, management to limit or prohibit surface-disturbing activities in the existing ACEC would result in impacts as described for Alterative A. In the proposed Alternative B expansion area, only standard guidelines related to surface disturbance would apply. Therefore, the impacts from the additional restrictions on surface disturbance realized under Alternative B would not occur under Alternative D.

Unlike Alternative A, Alternative D manages the Upper Owl Creek ACEC as available for locatable mineral entry, closed to oil and gas leasing, and as a ROW avoidance area, which could result in adverse impacts to mineral leasing and ROW authorizations. Alternative D manages the area of the existing ACEC as closed to oil and gas leasing and the area proposed for expansion under Alternative B as open with primarily moderate constraints (4,228 acres). This management may result in greater adverse impacts to mineral leasing and greater beneficial impacts to the values of concern than alternatives A and C, but less than Alternative B. Unlike alternatives A and C, this alternative does not withdraw the existing ACEC or the Alternative B expansion area, and impacts to and from locatable mineral entry would therefore be similar to Alternative C. However, as with all ACECs, the BLM has the ability to institute case-by-case withdrawals that may result in beneficial impacts to the values of concern in the existing ACEC by allowing for the protection of important sites.

Managing the existing ACEC as a ROW avoidance area and open to ROW authorizations in the expansion area proposed under Alternative B would result in impacts to the authorization of ROWs and the values of concern similar to those for Alternative A, and fewer adverse impacts to ROW authorization and beneficial impacts to the values of concern than under Alternative B.

As under alternatives A and B, the existing area of the Upper Owl Creek ACEC and the expansion area proposed under Alternative B are limited to designated roads and trails under Alternative D. Impacts from this management would be the same as for the other alternatives.

Alternative E

Management of and impacts to values of concern in the Upper Owl Creek area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Upper Owl Creek area under Alternative F (Map 89) would be the same as those described under Alternative D; therefore, the impacts analysis for the Upper Owl Creek area under Alternative D is representative of the impacts anticipated under Alternative F.

Proposed ACECs

Chapman Bench

Alternatives B and E designate the Chapman Bench area as an ACEC (23,326 acres) (Maps 85 and 88), but alternatives A and C do not. Although not proposed as an ACEC under alternatives D and F, the BLM manages a portion of this area as the Chapman Bench Management Area (Maps 87 and 89). Values of concern in the proposed Chapman Bench ACEC are special status bird species, vegetation, and wildlife habitat. Threats to this area include potential mining interests when this reserved land is opened to all public land laws, which would affect special status bird species (e.g., long billed curlew, mountain plover, and greater sage-grouse) in the area.

4.7.1.21 Summary of Impacts by Alternative

Alternatives B and E are the only alternatives that designate the Chapman Bench area as an ACEC and would be the most effective for protecting the special status bird species, vegetation, and wildlife habitat values of concern in the Chapman Bench area. Alternatives B and E would also result in the greatest restrictions on the ROW authorizations, mineral leasing, and other surface-disturbing activities. Alternatives D and F designate a portion of this area as the Chapman Bench Management Area and apply management to protect the values of concern; this management is less restrictive to resource uses and would provide fewer protections to special status species and wildlife habitat than alternatives B and E. Alternatives A and C allow mineral development and are less restrictive of ROW authorizations than alternatives B and E. Alternatives D and F restrict locatable mineral entry, mineral materials disposal, and ROWs similar to alternatives B and E in the Chapman Bench ACEC, but manages these activities similar to Alternative C across the remainder. Alternatives B, C, and E would be the most

restrictive of travel in the area, and would therefore provide the greatest protection to values of concern from fragmentation and disruption related to motorized vehicle use.

4.7.1.22 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the Chapman Bench area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The Chapman Bench area has been closed to mineral entry because the BOR previously administered the land; Alternative A would open the area to mineral entry. Trace quantities of placer gold have been reported in stream sediment and gravel of Big Sand Coulee in the general area of Chapman Bench. Gold in the Big Sand Coulee area occurs as fine flakes and pin-point sized fragments (Thomas 1965). Managing the area as available for locatable mineral entry could result in adverse impacts to wildlife habitat if speculative placer gold claims were located in the area. The area has a low potential for gypsum and bentonite occurrence, which may minimize the potential for development and associated impacts to the values of concern. Under Alternative A, the area is open to mineral leasing with primarily moderate constraints, which could result in adverse impacts to the special status bird species, vegetation, and wildlife habitat values of concern due to surface disturbance and disruption. However, the development potential for oil and gas (9,206 acres of low potential and 14,121 acres very low potential) in the area may minimize the potential for development and associated impacts.

The area is open to mineral materials disposal, and adverse impacts to the values of concern would likely occur on the 5,852 acres where the potential for sand and gravel is high. Beneficial impacts to mineral development from this management would likely occur on this 5,852 acres by allowing disposal of mineral materials in this area, subject to BLM review.

The Chapman Bench area is managed primarily as open to ROW authorizations (18,668 acres), with a smaller area managed as a ROW avoidance area (4,694 acres). Standard guidelines related to surface disturbance would apply. Allowing ROW authorizations could result in surface disturbance and disruption and related adverse impacts to the values of concern, such as the spread of invasive species or the loss of vegetation. Managing the area as primarily open to ROW authorizations would benefit this resource use.

Alternative A manages motorized vehicle use in the Chapman Bench areas as limited to existing roads and trails, which would benefit motorized travel in the area. Travel management would benefit special status bird species, vegetation, and wildlife habitat by restricting off-road driving and damage to habitat or disruption of wildlife.

Alternative B

Under Alternative B, the BLM manages the Chapman Bench area as an ACEC for the retention, enhancement, and success of the greater sage-grouse, mountain plover, and long-billed curlew. Prohibiting surface-disturbing activities in the Chapman Bench ACEC would restrict and result in adverse impacts to activities such as geophysical exploration and road construction. This restriction may benefit special status bird species and wildlife in the area by limiting the potential for disruptions, habitat fragmentation, or invasive species infestations that would degrade their habitat.

Under Alternative B, restrictions on mineral development are likely to result in greater adverse impacts to these resource uses than under Alternative A. The ACEC is withdrawn from appropriation under the mining laws and closed to mineral leasing; however, the potential for gypsum and bentonite occurrence is low, and the development potential for oil and gas in the area consists of 9,206 acres of low potential and 14,121 acres of very low potential. Due to the low oil and gas development potential, development and resulting impacts would be minimal. The ACEC is closed to mineral materials disposal, and adverse impacts to mineral development would be greatest on the 5,852 acres with high-potential for sand and gravel. Restrictions and closures of the area to mineral activity could benefit the values of concern in the ACEC by preventing mining-related surface disturbance, habitat fragmentation, and general degradation of the habitat and disturbance of special status species. Several of the sensitive bird species proposed for management in this ACEC prefer habitat composed of shortgrass or similar vegetation cover and bare ground. This preferred vegetation cover can be compromised by increases in cover, for example, cheatgrass which will increase overall cover and make habitat less suitable. Disturbance in preferred habitat types may encourage invasive weeds (e.g., cheatgrass and halogeton) to dominate instead of native shortgrass species. Locally, the BLM has not observed preferential selection of habitat removed through blading or similar action by invasive weed species. Local nesting locations are in a condition not modified through mechanical means and are composed of native shortgrass short statured plant species providing appropriate nesting cover. Management under Alternative B would also not allow mineral development near known nest sites, which are susceptible to disruption by such activities and are used year after year by individuals.

Under Alternative B, most of the Chapman Bench ACEC is a renewable energy and ROW avoidance area (17,897 acres) and a ROW exclusion area on the remainder (5,430 acres). Of all the alternatives, this management is the most restrictive to future ROW authorizations and the most restrictive of ROW-related surface disturbance and disruption. This management is likely to result in the greatest beneficial impacts to the wildlife and vegetation values of concern.

Alternative B limits motorized vehicle travel in the ACEC to existing roads and trails, and impacts under Alternative B would be the same as those under Alternative A.

Seasonally stipulating, where feasible, vegetative treatments, invasive, nonnative pest species control, fuels management, and maintenance of existing facilities in the Chapman Bench ACEC would protect wildlife and special status species during sensitive times of the year, while still allowing maintenance and treatments to occur.

Alternative C

Alternative C does not designate the Chapman Bench as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The management of and impacts associated with mineral resources under Alternative C would be similar to those under Alternative A.

Alternative C manages the Chapman Bench area as an avoidance area for ROW authorizations (19,664 acres), and manages a smaller area as open to ROW authorizations (3,662 acres). Management under this alternative may result in greater adverse impacts to ROW authorizations than under Alternative A because a larger portion is a ROW avoidance area subject to development constraints or additional mitigation and monitoring that could affect construction costs. Such constraints could benefit special status bird species and wildlife that would be adversely affected by such developments. Standard guidelines related to surface disturbance would apply on portions managed as open to ROW authorizations.

Alternative C limits motorized vehicle use primarily to designated roads and trails (23,268 acres). This alternative is the most restrictive to motorized travel and would result in the greatest potential for adverse impacts to travel and transportation management in the area. This alternative represents the smallest potential for travel-related impacts to the values of concern of any of the alternatives.

Alternative D

Under Alternative D, the BLM manages the Chapman Bench area as a Management Area for the retention and success of the greater sage-grouse, mountain plover, and long-billed curlew. The 3,425 acres of BLM-administered surface ownership managed for these values are all within the Alternative B ACEC (23,326 acres) boundaries. The BLM allows surface-disturbing activities across the entire Chapman Bench area, consistent with other resource objectives and standard guidelines for surface-disturbing activities. The adverse and beneficial impacts of prohibiting such activities, as described for Alternative B, would not occur under this alternative.

The Chapman Bench Management Area is withdrawn from appropriation under the mining laws, open to mineral leasing with an NSO restriction, and closed to mineral materials disposal. The larger area proposed as an ACEC under Alternative B is open to locatable mineral entry, open to mineral leasing with moderate constraints, and open to mineral materials disposal. The management of mineral uses in the Chapman Bench Management Area could result in adverse impacts to mineral exploration and development and benefits to the values of concern similar to Alternative B. In the larger area designated as an ACEC under Alternative B, impacts to and from mineral development under this alternative would be less beneficial to the values of concern and more beneficial to mineral development.

ROW management and associated impacts across the Chapman Bench area would be similar to those under Alternative C. Under Alternative D, the Chapman Bench Management Area is a renewable energy and ROW avoidance area. The larger area designated as an ACEC under Alternative B is mostly managed as a ROW avoidance area, with a smaller area managed as open to ROW authorizations (3,691 acres).

Under Alternative D, management of and impacts from motorized vehicle use across the entire Chapman Bench area would be the same as under Alternative A.

Similar to Alternative B, under Alternative D the BLM can stipulate, where feasible, treatment and maintenance activities in the Chapman Bench Management Area to protect wildlife, while still allowing maintenance and treatments to occur. In the larger area proposed as an ACEC under Alternative B, the standard guidelines related to surface disturbance and the management of other resource objectives would apply to these activities; therefore, under Alternative D, impacts in this area would be similar to those under alternatives A and C.

Alternative E

Management of and impacts to values of concern in the Chapman Bench area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Chapman Bench area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Clarks Fork Basin/Polecat Bench West Paleontological Area

Alternatives B and E designates the Clarks Fork Basin/Polecat Bench West Paleontological Area as an ACEC (23,895 acres) (Maps 85 and 88); alternatives A, C, D, and F would not. Although not proposed under alternatives D and F, a portion of this area falls within the proposed PETM ACEC (Maps 87 and 89). The values of concern in the proposed Clarks Fork Basin/Polecat Bench West Paleontological Area ACEC are paleontological resources in the form of mammalian and paleobotanical fossils and geochemical data used in the study of a major Carbon Isotope Excursion recorded during an ancient period of global warming known as the PETM. Scenic and geologic features also are valuable features in this ACEC. Threats to the area include additional surface disturbance from mineral development (e.g., oil and gas, mineral materials, and possible locatable mineral mining), and ROW development, timber extraction, recreational and OHV use, and invasive and nonnative species infestations. These activities threaten habitat for special status species and create disturbances in crucial winter range during sensitive periods. Heavy public recreational use and existing SRPs also threaten the values of concern in the area. Water quality and quantity issues, as a result of surface and groundwater withdrawals and untreated irrigation outflows, also threaten the area.

4.7.1.23 Summary of Impacts by Alternative

Alternatives B and E are the only alternatives that designate the Clarks Fork Basin/Polecat Bench West Paleontological area as an ACEC, and would be the most effective for protecting the paleontological values of concern. Alternatives B and E also place the greatest restrictions on surface-disturbing activities, mineral development, ROWs, and motorized travel. Alternatives B and E include specific requirements related to paleontological sensitivity surveys and monitoring that would benefit the protection of the values of concern to a greater extent than the other alternatives. The management of mineral development are similar under alternatives A and C, but ROW and motorized travel management under Alternative C is more restrictive than under Alternative A. A portion of the Clarks Fork Basin/Polecat Bench West Paleontological area is included in the PETM ACEC under alternatives D and F; the *Paleocene-Eocene Thermal Maximum* section describes management of and impacts to this area under alternatives D and F.

4.7.1.24 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area is open to locatable mineral entry, open to mineral leasing (with primarily moderate constraints on 10,249 acres), and open to mineral materials disposal on 23,113 acres under Alternative A. A plan of operations would not be required for notice-level locatable minerals activities. The known and potential gypsum and bentonite occurrence, the low (23,320 acres) to very low (575 acres)

development potential for oil and gas, and the low potential for sand and gravel in the area would result in fewer adverse impacts to minerals development activities.

Alternative A manages the Clarks Fork Basin/Polecat Bench West Paleontological Area as open to ROW authorizations (20,068 acres), and manages a smaller area as a ROW avoidance area (3,271 acres). Standard guidelines related to surface disturbance would apply. ROW management would benefit this resource use in open areas, but may limit such development in avoidance areas or require specific mitigation that may increase project costs and timeframes. Restrictions on ROW developments would generally benefit paleontological resources by reducing surface-disturbing activities and potential destruction of paleontological values.

Alternative A limits motorized vehicle use to existing roads and trails, which may result in adverse impacts to values of concern by allowing access to travel that may disturb and degrade paleontological values of concern in the area.

The Clarks Fork Basin/Polecat Bench West Paleontological Area is open to livestock grazing under Alternative A. Livestock trampling and wallowing in areas of concentrated livestock use can damage exposed paleontological resources. While in most instances, concentrated livestock use would result in adverse impacts to paleontological values, proper livestock grazing management can mitigate these impacts by improving the distribution of livestock.

Restricting surface disturbance solely through application of the standard guidelines for surface disturbance may lead to damage to the identified values of concern, soil erosion, spread of invasive species, and impacts to water quality. Management under this alternative is the least restrictive of ROW authorizations and other surface-disturbing activities, and would result in the largest adverse impact to the identified values of concern.

Alternative B

Management of surface-disturbing activities in the ACEC emphasizes avoiding impairment of the management objectives and existing values, while protecting the integrity of fossil-bearing material. Under Alternative B, avoiding or prohibiting surface-disturbing activities and the use, occupation, construction, or maintenance of facilities in the Clarks Fork Basin/Polecat Bench West Paleontological ACEC that are inconsistent with the management direction and objectives for the area would restrict development and maintenance activities, but would benefit the protection of paleontological resources. Requiring that minor ROW authorizations and other minor surface-disturbing activities be preceded by paleontological sensitivity surveys and potential monitoring during construction, may have long-term impacts by increasing processing times of authorizations and potentially requiring mitigation, relocation, or modification of facilities if paleontological resources are found. These ROW and surface-disturbance stipulations would further protect paleontological resources in the area.

Under Alternative B, withdrawing the Clarks Fork Basin/Polecat Bench West Paleontological ACEC from appropriation under the mining laws and closing the area to geophysical exploration would likely result in greater adverse impacts to mineral development than Alternative A. Restricting mineral development would benefit the ACEC by reducing the potential for destruction or degradation of paleontological values and the other adverse impacts associated with surface disturbance (e.g., the potential spread of invasive species).

Under Alternative B, the Clarks Fork Basin/Polecat Bench West Paleontological ACEC is a renewable energy exclusion area and motorized vehicle use is limited to designated roads and trails. Excluding renewable energy would result in adverse impacts to the ability to develop renewable energy. Limiting

motorized vehicle use to designated roads and trails would restrict access in the area by limiting the roads available for recreational and other motorized travel. Restrictions on renewable energy and motorized travel would reduce the possibility of damage to paleontological resources from surface disturbance and would allow the closure of routes that may result in damage to paleontological resources. Management of travel and renewable energy is more restrictive under Alternative B than under Alternative A and resulting beneficial impacts for the values of concern would be greater under Alternative B.

Management under Alternative B continues livestock grazing provided it does not disturb the natural, educational, and scientific research values of the ACEC. The flexibility to restrict livestock grazing if use becomes concentrated or adversely affects other resource values may result in beneficial impacts to the values of concern by reducing potential degradation by livestock. Conversely, any restrictions could adversely affect livestock grazing by reducing the number of AUMs available in the ACEC from its current level of 1,344.

Fossil collection, excavation, or removal in the Clarks Fork Basin/Polecat Bench West Paleontological ACEC would be allowed under a permit issued by the Wyoming BLM State Director and only to institutions and individuals engaged in BLM-approved research, museum, or educational projects. This management would protect the integrity of the resources and enable the advancement of scientific knowledge in the area, but also would restrict recreational collection of fossils.

Alternative C

Alternative C does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area would be open to locatable mineral entry and open to mineral leasing (with primarily moderate constraints on 10,153 acres), and primarily open to mineral materials disposal (21,058 acres). Impacts would be similar to those under Alternative A.

Alternative C manages the Clarks Fork Basin/Polecat Bench West Paleontological area as an avoidance area for ROW authorizations (11,099 acres), and manages a smaller area managed as open to ROWs (12,796 acres). Standard guidelines related to surface disturbance would apply, but the additional restrictions under Alternative B would not. As under Alternative B, Alternative C limits motorized vehicle use to designated roads and trails. Management under Alternative C is more restrictive to ROW development and motorized travel than under Alternative A.

The standard guidelines related to surface disturbance would apply and may result in additional surface disturbance in the area compared to alternatives A or B, leading to potential soil erosion, spread of invasive species, impacts to water quality and damage to the identified values of concern. Management under Alternative C would be the least restrictive of ROW authorizations and other surface-disturbing activities and would result in the largest adverse impact on the identified values of concern.

Alternative D

Alternative D does not designate this area as an ACEC. Part of the Clarks Fork Basin/Polecat Bench West Paleontological area (4,972 acres) is within the proposed PETM ACEC. See the *Paleocene-Eocene Thermal Maximum* section for an analysis of the effects of management in this area.

Alternative E

Management of and impacts to values of concern in the Clarks Fork Basin/Polecat Bench West Paleontological Area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Clarks Fork Basin/Polecat Bench West Paleontological Area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Clarks Fork Canyon

The Clarks Fork Canyon area is designated as an ACEC under alternatives B and E (12,249 acres) (Maps 85 and 88) and alternatives D and F (4,746 acres) (Maps 87 and 89); it is not designated as an ACEC under alternatives A or C. The values of concern in the proposed Clarks Fork Canyon ACEC are geologic features, including the Canyon Mouth Anticline, and glacial features, open space, recreational opportunities, special status species plants and wildlife, and wildlife habitat. Threats to this proposed ACEC include surface disturbance from mineral and ROW development.

4.7.1.25 Summary of Impacts by Alternative

Alternatives B, D, E, and F are the only alternatives that designate the Clarks Fork Canyon area as an ACEC. Due to the larger size and more restrictive management, alternatives B and E would be the most effective for protecting the glacial features, open space, recreational opportunities, special status species plants and wildlife, and wildlife habitat values of concern in the ACEC. Alternatives B and E would be most effective for managing threats from motorized vehicle use and surface disturbance resulting from ROW development and locatable mineral entry by including the greatest restrictions on these activities. Management of mineral materials disposal and oil and gas leasing under alternatives B, D, E, and F would be similar within their respective ACEC boundaries, although the larger area managed under alternatives B and E would be less restrictive under alternatives D and F. Alternative A generally would provide the least restrictive management and would be the least effective for protecting the values of concern. Alternative A management would be the most beneficial to motorized travel and would include management for locatable and mineral materials similar to Alternative C. Alternative C management would be the most beneficial to ROW authorizations.

4.7.1.26 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area is mostly open for locatable mineral entry with a withdrawal on 1,714 acres, open to mineral leasing (with primarily major constraints on 5,876 acres), and primarily open to mineral materials disposal (8,950 acres). Allowing mineral development could result in surface disturbance that would

degrade wildlife and special status species habitat and may damage the glacial features and recreational setting values of the area.

The Clarks Fork Canyon area is managed as open to ROW authorizations on 5,758 acres and as a ROW avoidance area on 5,389 acres. Managing a portion of the area as open to ROW authorizations could result in adverse impacts to the values of concern, including degradation of wildlife and special status species habitat and damage to glacial features and the recreational setting.

Alternative A limits motorized vehicle use to existing roads and trails (5,294 acres), and manages seasonal closure within the Bald Ridge Area (5,739 acres).

Alternative B

Prohibiting surface-disturbing activities in the Clarks Fork Canyon ACEC would restrict and have an adverse impact on such activities as geophysical exploration and road construction. Restrictions on surface disturbance would benefit special status species plants and wildlife in the area by limiting the potential for disruptions, habitat fragmentation, or invasive species infestations that may degrade their habitat.

Restrictions on mineral development under Alternative B would result in greater adverse impacts to the use of these resources compared to Alternative A. The ACEC is withdrawn from appropriation under the mining laws and closed to mineral leasing. Adverse impacts from mineral withdrawal generally are likely to be greatest in the approximately 483 acres with known or potential gypsum occurrence and 892 acres with known or potential bentonite occurrence, but because of the lack of commercial-grade resources, impacts to mineral development would be minimal. Adverse impacts to mineral materials disposal would be greatest on 4,720 acres with higher potential for sand and gravel. The very low development potential for oil and gas would minimize the potential for adverse impacts to leasable minerals development as a result of managing the area as closed to leasing.

Alternative B manages the Clarks Fork Canyon ACEC as a ROW avoidance area, a renewable energy exclusion area, and closed to motorized and mechanized vehicle use or limited to designated roads and trails, including seasonal closure within the Bald Ridge Area. Adverse impacts to these resource uses would be greater under Alternative B than Alternative A because there would be more restrictions on use. More restrictive ROW management would reduce or mitigate surface disturbance and could result in greater protection for values of concern than under Alternative A. In addition, more restrictive motorized travel management would reduce disturbance to wildlife compared to Alternative A.

Allowing and seasonally stipulating vegetative treatments, invasive/nonnative pest species control, fuels management, and maintenance of existing facilities would protect wildlife and special status species during sensitive periods, while still allowing maintenance and treatments to occur.

Alternative C

Alternative C does not designate the Clarks Fork Canyon area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

Management of locatable minerals is similar to Alternative A (withdrawn on 1,766 acres), and the area is open to mineral leasing (with moderate constraints on 8,640 acres and major constraints on the 924 acres) and primarily open to mineral materials disposal (9,097 acres). Alternative C would be less restrictive to mineral development than Alternative A, and adverse impacts to the values of concern in the area may be greater under Alternative C.

Alternative C manages the Clarks Fork Canyon area as primarily open to ROW authorizations (10,890 acres), manages a smaller area for ROW avoidance (1,369 acres), and applies standard guidelines related to surface-disturbing activities. Alternative C manages motorized vehicle use as limited to designated roads and trails on 12,233 acres and under seasonal restrictions in 5,724 acres in the area. Alternative C is more restrictive to ROW and motorized travel management than Alternative A, but less restrictive than Alternative B. Under Alternative C, there would be more benefits to the values of concern from ROW and travel management than under Alternative A, but less than under Alternative B.

Alternative D

Allowing surface-disturbing activities in the Clarks Fork Canyon ACEC consistent with the goals of the ACEC could eliminate many of the beneficial impacts to special status species plants and wildlife, and the adverse impacts to surface-disturbing activities, predicted to result from the surface disturbance prohibition under Alternative B. However, because surface-disturbing activities would need to be consistent with the goals of the ACEC, this alternative may increase adverse impacts to resource uses and beneficial impacts to the values of concern compared to alternatives A and C, under which only standard restrictions on surface disturbance are applied.

Under Alternative D, restrictions on mineral development could result in greater adverse impacts to the use of these resources than under alternatives A or C, but less than under Alternative B. Management of and impacts from the management of locatable minerals would be the same as under alternatives A and C. As with Alternative B, the ACEC is closed to mineral leasing and mineral materials disposal; however, similar to Alternative C, under Alternative D the additional area proposed under Alternative B is primarily managed as open to mineral leasing with moderate constraints (9,094 acres) and is open to mineral materials disposal. The very low development potential for oil and gas and low-potential for sand and gravel would minimize the potential for adverse impacts to mineral development in the closed portions of the Clarks Fork Canyon area.

Adverse impacts to renewable energy and ROWs and beneficial impacts to the values of concern would be similar to those under Alternative B across the Clarks Fork Canyon area.

Under Alternative D, management of and impacts from motorized travel in the area designated as an ACEC and the larger area proposed under Alternative B would be the same as under Alternative C. Alternative D would manage 6,025 acres within the Bald Ridge area under a seasonal closure and the impacts would be similar to those under Alternative A.

Alternative D allows and seasonally stipulates vegetative treatments, invasive, nonnative pest species control, fuels management, and maintenance of existing facilities, resulting in the same impacts as Alternative B. However, these beneficial impacts would occur over a smaller area because these activities would be governed by other resource considerations in the additional area proposed under Alternative B.

Alternative E

Management of and impacts to values of concern in the Clarks Fork Canyon area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Clarks Fork Canyon area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for cave and karst resources under Alternative D is representative of the impacts anticipated under Alternative F.

Foster Gulch Paleontological Area

Alternatives B and E designate the Foster Gulch Paleontological Area as an ACEC (27,302 acres) (Maps 85 and 88); the other alternatives do not. The values of concern in the proposed Foster Gulch Paleontological Area ACEC are typically paleontological resources in the form of mammalian and paleobotanical fossils and geochemical data used in the study of a major Carbon Isotope Excursion recorded during an ancient period of global warming known as the PETM. Scenic and geologic features also are valuable in this ACEC. Threats to this proposed ACEC include surface disturbance from mineral (primarily oil and gas) and ROW development.

4.7.1.27 Summary of Impacts by Alternative

Alternatives B and E would be the most effective for protecting the paleontological and geological values of concern in the Foster Gulch Paleontological Area. These alternatives also place the greatest restrictions on mineral development, ROW authorizations, and other surface-disturbing activities; motorized travel; livestock grazing management; and the excavation of paleontological resources. Impacts under alternatives A and C would be similar and would allow mineral development, would open more routes to motorized travel, and would be less restrictive to the authorization of ROWs and surface disturbance in areas with paleontological resources. A portion of the Foster Gulch Paleontological Area is included in the PETM ACEC under alternatives D and F; the *Paleocene-Eocene Thermal Maximum* section describes management of and impacts to this area under alternatives D and F.

4.7.1.28 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area is open to locatable mineral entry, open to mineral leasing (with primarily moderate constraints on 10,854 acres and standard stipulations on the remaining 16,448 acres), and open to mineral materials disposal. Mineral development is one of the threats to the paleontological and geological values of the area, and allowing this type of development with minimal restrictions would result in surface disturbance that could cause adverse impacts to values of concern. Except for a small area of high-potential for sand and gravel, low occurrence of bentonite and gypsum and low to very low development potential for oil and gas may minimize adverse impacts to minerals development.

The Foster Gulch Paleontological Area is primarily open to ROW authorizations (24,541 acres), with the remainder managed as a ROW avoidance area (2,761 acres). Managing this area as primarily open to ROW authorizations could result in adverse impacts to the values of concern associated with surface disturbance and ROW development. Managing most of the area as open to ROW authorizations would result in beneficial impacts to ROWs, if ROWs are authorized in the area.

Alternative A limits motorized vehicle use to existing roads and trails in the area. Limiting motorized travel to existing roads and trails may benefit the values of concern in the ACEC by preventing open access that could degrade paleontological resources.

The Foster Gulch Paleontological Area is open to livestock grazing under Alternative A. Managing this area as open to livestock grazing could result in adverse impacts to paleontological resources that may be damaged by livestock trampling and wallowing in areas of concentrated livestock use. Proper management of livestock grazing can mitigate the impacts of grazing by improving the distribution of livestock.

Applicable laws and regulations and the management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative A. These decisions include protective management, such as surveying and monitoring surface-disturbing activities for all PFYC 4 and 5 formations that would provide some protection to the paleontological values.

Alternative B

Management for the ACEC under Alternative B is designed to reduce adverse impacts to paleontological and geological values of concern from surface disturbance. Management under this alternative requires avoiding or prohibiting surface-disturbing activities in the Foster Gulch Paleontological Area ACEC, and prohibiting the use, occupation, construction, or maintenance of facilities in the Foster Gulch Paleontological Area ACEC that are inconsistent with the management direction and objectives for the area. Allowing minor surface-disturbing activities in the Foster Gulch Paleontological Area ACEC if they are preceded by a paleontological sensitivity survey and, if necessary, are monitored during construction, would help protect paleontological resources in the area. Restricting surface-disturbing activities could increase delay or expense, but would continue to allow some activities while also protecting the integrity of fossil-bearing material in the area.

Under Alternative B, withdrawing the Foster Gulch Paleontological Area ACEC from appropriation under the mining laws, managing the area as closed to mineral leasing, and closing it to mineral materials disposal and geophysical exploration could result in greater adverse impacts to mineral development than under Alternative A. Restricting mineral development would result in greater beneficial impacts to the paleontological and geologic values in the area than Alternative A. The low potential for mineral resources in the area may minimize these impacts.

Alternative B is more restrictive than Alternative A in managing ROWs, motorized vehicle use, and livestock grazing; adverse impacts to these resource uses would be greater than under Alternative A. Alternative B manages the Foster Gulch Paleontological Area ACEC as a ROW and renewable energy avoidance area, limits motorized vehicle use to designated roads and trails, and allows livestock grazing under existing regulations, provided it does not disturb the natural, educational, and scientific research values of the Foster Gulch Paleontological Area ACEC. This management would reduce the potential for surface disturbance and would provide increased flexibility to further restrict activities (such as livestock grazing and resource-degrading travel routes) determined to be adverse to the values of concern. Any restrictions on grazing could reduce the currently available 1,206 AUMs in the ACEC and adversely impact livestock grazing.

Alternative B allows fossil collection, excavation, or removal in the Foster Gulch Paleontological Area ACEC only under a permit issued by the Wyoming BLM State Director and only by institutions and individuals engaged in BLM-approved research, or museum and educational projects that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and

museums. Such requirements may result in beneficial impacts by protecting the integrity of the resources and enable the advancement of scientific knowledge.

Alternative C

Alternative C does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The management of and impacts associated with mineral development under Alternative C would be the same as under Alternative A.

Similar to Alternative A, Alternative C manages the Foster Gulch Paleontological Area as primarily open to ROW authorizations (25,621 acres), and manages a smaller area as a ROW avoidance area (1,681 acres). ROW management could result in impacts to the values of concern similar to Alternative A.

Alternative C is more restrictive to motorized vehicle use than Alternative A (travel is limited to designated roads and trails on 17,591 acres and existing roads and trails on 9,711 acres), but less restrictive than Alternative B. Therefore, Alternative C would result in greater beneficial impacts to the values of concern more than Alternative A, but less than Alternative B.

Applicable laws and regulations and the management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative C. This management is less restrictive to surface disturbance that could adversely impact values of concern than under Alternative A, because it does not require on-the-ground surveys for PFYC 4 formations.

Alternative D

Alternative D does not designate this area an ACEC. Part of the Foster Gulch Paleontological area (4,974 acres) is within the proposed PETM ACEC. See the *Paleocene-Eocene Thermal Maximum* section for an analysis of the effects of management of this area.

Alternative E

Management of and impacts to values of concern in the Foster Gulch Paleontological Area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Foster Gulch Paleontological Area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Greater Sage-Grouse Key Habitat Areas and Greater Sage-Grouse Priority Habitat Management Areas

The greater sage-grouse is a USFWS federal candidate species for listing and protection under the ESA. The proposed Greater Sage-Grouse Key Habitat Areas and Greater Sage-Grouse PHMAs ACECs were developed in response to the greater sage-grouse habitat management policy guidance set forth in WY BLM IM No. WY-2012-019 (BLM 2012f), and in accordance with the BLM Washington Office IM No.

2012-44, *BLM National Greater Sage-Grouse Land Use Planning Strategy*. Proposal and consideration of these ACECs represent proactive conservation measures that reduce or eliminate threats to greater sage-grouse to minimize the likelihood of and need for listing of this species under the ESA.

Alternative E designates the greater sage-grouse Key Habitat Areas as an ACEC (1,232,583 acres) (Map 88); the other alternatives do not. Alternative F designates the Greater Sage-Grouse PHMAs as an ACEC (1,116,698 acres) (Map 89); the other alternatives do not. The values of concern for both proposed ACECs are sagebrush steppe vegetation communities that provide habitat for special status wildlife species, including areas designated as greater sage-grouse Key and PHMAs. The boundaries of the greater sage-grouse Key Habitat Areas under Alternative E (also analyzed in the Draft RMP and Draft EIS) are based on Version 2 of the State of Wyoming EO *Greater Sage-grouse Core Area of Protection* (WY EO 2008-2) (Wyoming Office of the Governor 2008), however, the boundaries were modified by the Wyoming BLM to remove large portions of private lands and developed oil fields. In addition, the boundaries of the Key Habitat Areas are generally consistent with greater sage-grouse PHMAs, with the inclusion of additional productive habitats identified by the BLM as important to greater sage-grouse in the Planning Area. The boundaries of the Greater Sage-Grouse PHMAs ACEC are based on Version 3 of WY EO *Greater Sage-grouse Core Area of Protection* (WY EO 2010-4) (Wyoming Office of the Governor 2010), which was delineated by the Wyoming Governor's Implementation Team and Local Working Groups through a collaborative mapping process and includes breeding, later brood-rearing, and winter concentration areas that have been identified as highly important to the health and viability of greater sage-grouse populations. The Wyoming Greater Sage-Grouse Core Area Protection strategy was subsequently updated and supplemented through the issuance of Executive Orders 2011-5 and 2013-3 (Wyoming Office of the Governor 2011 and 2013).

Portions of Key and PHMAs (referred to generally as priority habitat areas) are also designated as important bird areas by the Audubon Society, and many other BLM sensitive animal species are also dependent upon this ecosystem for grazing, pollination, winter range, and nesting areas (i.e., mountain plover, burrowing owl, white-tailed prairie dog, black-tailed prairie dog, long-billed curlew, and Baird's sparrow).

The proposed ACECs are located within portions of the WAFWA Sage-Grouse Management Zone I (Northern Great Plains) and Management Zone II (Wyoming Basin). Major threats to sage-grouse habitats and populations in Management Zone I include oil and gas developments and conversion of native rangeland to crops (Manier et al. 2013). Within Management Zone II, the primary threats include energy development and supporting infrastructure, prolonged drought, and bush eradication programs (Manier et al. 2013; USFWS 2013a). In southern portions of Management Zone II, loss of habitat from subdivision and housing development and associated infrastructure is the primary threat to sage-grouse populations (Manier et al. 2013). Additional threats to the proposed ACECs and greater-sage grouse populations in the Planning Area include livestock grazing, mining and associated activities, fire risk, invasive species, urban development, powerlines, vertical structures, and railroads. Management planning for the protection of greater sage-grouse within the Planning Area would be most effective where the impacts of energy and mineral development, primarily oil and gas, bentonite mining, and sand and gravel extraction, have been accounted for and large, intact sage-grouse priority habitats are delineated prior to the onset of widespread development (Taylor et al. 2012).

4.7.1.29 Summary of Impacts by Alternative

Alternative E would most effectively protect the values of concern for the greater sage-grouse ACECs. Alternative F would provide similar beneficial impacts for the values of concern, but to a lesser degree since it allows more resource use activity in greater sage-grouse priority habitat than Alternative E. Alternatives B and E would result in the greatest restrictions on mineral development, ROW authorizations, and other surface-disturbing activities; motorized travel; and livestock grazing management. Alternatives D and F both allow livestock grazing, mineral development, and ROWs in greater sage-grouse priority habitats, but also manage resources with avoidance objectives that would have beneficial impacts on ACEC values of concern. Impacts under alternatives A and C would be similar and would provide the most opportunities for mineral development and open the most routes to motorized travel; these alternatives apply the fewest restrictions to ROW authorization and surface disturbance, and would provide the least protection for greater sage-grouse priority habitats.

4.7.1.30 Detailed Analysis of Alternatives

Alternatives A-D

The greater sage-grouse Key Habitat Areas and PHMAs are not proposed as ACECs under alternatives A, B, C, or D. Table 4-34 details the management of those Key Habitat Areas and PHMAs under these alternatives absent ACEC designation.

Table 4-34. Summary of Management by Alternative in the Greater Sage-Grouse Key and Priority Habitat Management Areas ACECs

Description	Alternative A (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)	Alternative E (acres)	Alternative F (acres)
Greater Sage-Grouse Key Habitat Area Proposed ACEC (Managed under Alternative E)						
Mineral Materials Disposal – Open	1,169,725	408,453	1,143,441	1,140,930	6,138	1,140,930
Mineral Materials Disposal – Closed	62,858	824,130	89,142	91,653	1,226,445	91,653
Mineral Leasing – Closed	56,422	1,224,301	35,633	69,828	1,224,301	70,206
Mineral Leasing – Major Constraints	414,965	0	12,755	619,371	0	620,840
Mineral Leasing – Moderate Constraints	514,076	0	688,774	459,939	0	458,091
Mineral Leasing – Standard Constraints	238,838	0	487,139	75,163	0	75,164
Locatable Mineral Entry – Open	1,223,865	1,156,829	1,228,298	1,224,490	5,431	1,224,490
Locatable Mineral Entry – Withdrawn	8,718	75,754	4,285	8,093	1,227,152	8,093
Bentonite Potential (Known/Potential)	97,875	97,875	97,875	97,875	97,875	97,875
Gypsum Potential (Known/Potential)	31,052	31,052	31,052	31,052	31,052	31,052
Sand & Gravel Potential (Known/Potential)	79,396	79,396	79,396	79,396	79,396	79,396
Renewable Energy – Avoidance	Not Designated	702,170	885,100	935,772	0	1,149,370
Renewable Energy – Exclusion	Not Designated	529,349	35,672	112,994	1,229,605	80,243
Renewable Energy – Open	Not Designated	1,064	311,811	183,817	2,978	2,970
ROW Management – Avoidance	359,657	1,099,320	771,238	1,113,488	0	1,106,778
ROW Management – Exclusion	20,648	132,194	0	264	1,229,615	264
ROW Management – Open	852,278	1,069	461,345	118,831	2,968	125,541
Travel Management – Limited to Designated	285,263	1,182,590	441,143	433,760	1,182,590	1,055,618
Travel Management – Limited to Existing	945,895	0	789,646	797,439	0	175,580
Travel Management – Closed	379	48,939	329	329	48,939	329
Travel Management Open/Play Area	0	0	406	0	0	0
Livestock Grazing – Closed	312	1,229,612	312	312	1,229,612	312
Livestock Grazing – Open	1,232,271	2,971	1,232,271	1,232,271	2,971	1,232,271

Table 4-34. Summary of Impacts by Alternative in the Greater Sage-Grouse Key and Priority Habitat Management Areas ACECs (Continued)

Description	Alternative A (acres)	Alternative B (acres)	Alternative C (acres)	Alternative D (acres)	Alternative E (acres)	Alternative F (acres)
Greater Sage-Grouse Priority Habitat Management Areas Proposed ACEC (Managed under Alternative F)						
Mineral Materials Disposal – Open	1,066,628	353,904	1,047,872	1,054,498	48,868	1,054,498
Mineral Materials Disposal – Closed	50,070	762,794	68,826	62,200	1,067,830	62,200
Mineral Leasing – Closed	36,607	1,041,069	23,487	60,430	1,041,069	62,406
Mineral Leasing – Major Constraints	434,760	63,033	8,857	686,929	63,401	685,189
Mineral Leasing – Moderate Constraints	480,551	8,237	668,165	366,859	7,900	366,624
Mineral Leasing – Standard Constraints	162,300	1,880	413,710	0	1,849	0
Locatable Mineral Entry – Open	1,107,734	1,050,098	1,115,434	1,109,826	150,291	1,109,826
Locatable Mineral Entry – Withdrawn	8,964	61,600	1,264	6,872	966,613	6,872
Bentonite Potential (Known/Potential)	54,542	54,542	54,542	54,542	54,542	54,542
Gypsum Potential (Known/Potential)	44,746	44,746	44,746	44,746	44,746	44,746
Sand & Gravel Potential (Known/Potential)	61,804	61,804	61,804	61,804	61,804	61,804
Renewable Energy – Avoidance	Not Designated	619,855	844,043	1,004,456	87,173	1,036,856
Renewable Energy – Exclusion	Not Designated	493,812	23,084	112,242	1,024,586	77,295
Renewable Energy – Open	Not Designated	3,031	249,571	0	4,940	2,547
ROW Management – Avoidance	351,298	980,943	734,561	1,112,084	138,320	1,113,861
ROW Management – Exclusion	20,857	132,718	0	2,087	973,446	289
ROW Management – Open	744,543	3,037	382,137	2,527	4,932	2,548
Travel Management – Limited to Designated	323,583	1,063,552	344,466	452,740	1,063,552	1,113,611
Travel Management – Limited to Existing	788,366	18,798	770,929	660,871	18,798	0
Travel Management – Closed	4,109	33,708	665	2,448	33,708	2,448
Travel Management Open/Play Area	0	0	0	0	0	0
Livestock Grazing – Closed	322	1,054,691	322	322	1,054,691	322
Livestock Grazing – Open	1,116,376	62,007	1,116,376	1,116,376	62,007	1,116,376

Sources: BLM 2009a; BLM 2013a

Alternative E

Under Alternative E, the BLM designates greater sage-grouse Key Habitat Areas as an ACEC. Management of the Greater Sage-Grouse Key Habitat Areas ACEC under Alternative E would reduce adverse impacts to the values of concern in the area by reducing the potential for surface-disturbing and disrupting activities to a greater extent than any other alternative. Specifically, anthropogenic disturbances (e.g., roads, oil and gas wells, pipelines, etc.) in Key Habitat Areas are managed to not exceed one disturbance per 640 acres and cover less than 3 percent of the total sage-grouse habitat. Under Alternative E, vegetative and silviculture treatments, invasive and nonnative pest species control, fuels management, and maintenance of existing facilities in the Greater Sage-Grouse Key Habitat Areas ACEC are subject to additional constraints and seasonal stipulations to protect greater sage-grouse during sensitive times of the year.

Withdrawing the majority of the Greater Sage-Grouse Key Habitat Areas ACEC from appropriation under the mining laws (1,227,152 acres), managing the entire area (1,232,583 acres) as closed to mineral leasing, and closing the entire area to mineral materials disposal and geophysical exploration could result in the greatest adverse impacts to minerals development when compared to the other alternatives. Designating greater sage-grouse Key Habitat Areas as an ACEC would require any new notice level activity related to locatable minerals exploration be submitted as a Plan of Operations and subject to analysis under National Environmental Policy Act (NEPA). Conversely, restricting minerals development could result in greater beneficial impacts to the ACEC values of concern than any other alternative.

Alternative E would limit potential adverse effects from resource uses to greater sage-grouse and other sensitive wildlife species and habitats during important mating and nesting time periods to the greatest extent of any alternative. Restrictions on ROWs, renewable energy, livestock grazing, and motorized vehicle use under Alternative E are greater than Alternative A and similar to Alternative B. The entire Greater Sage-Grouse Key Habitat Areas ACEC is managed as a ROW and renewable energy exclusion area, which would reduce the potential for adverse impacts to greater sage-grouse priority habitats more than any other alternative. Livestock grazing management and CTTM in the ACEC would be the same as Alternative B, which closes greater sage-grouse Key Habitat Areas to livestock grazing and limits motorized vehicle use to designated roads and trails with seasonal closures from March 15 to June 30. Closure of the ACEC to livestock grazing would eliminate potential adverse effects from concentrated livestock grazing on sagebrush steppe habitats, reducing the potential for overgrazing or trampling effects by domestic animals. Conversely, these restrictions on resource uses under Alternative E would result in greater adverse impacts to availability of public lands for resource uses than any other alternative. In particular, adverse impacts to locatable minerals development under Alternative E may be greater than any other alternative, due to the withdrawal of 96,981 acres with known or potential bentonite occurrence and 30,929 acres with known or potential gypsum occurrence from mineral entry within the ACEC.

Overall, the relative size and additional restrictions on surface-disturbing activities and resource uses in the proposed Greater Sage-Grouse Key Habitat Areas ACEC under Alternative E would provide the greatest protections to greater sage-grouse and other special status species habitat by reducing fragmentation, the potential for invasive species infestation, and the disturbance of sensitive status species or their habitat during sensitive times of the year.

Alternative F

Under Alternative F, the BLM designates greater sage-grouse PHMAs as an ACEC. In this ACEC, the BLM manages the density of disturbance (e.g., roads, oil and gas wells, pipelines, etc.) to not exceed one disturbance per 640 acres and cover less than 3 percent of existing sagebrush habitat. As a whole, management of surface-disturbing activities within this ACEC would provide greater protection for values of concern than alternatives A, C, and D, but fewer than alternatives B and E.

Adverse impacts to this proposed ACEC from mineral resource activities would be slightly greater than under Alternative A and similar to Alternative D, with the exception of additional constraints on oil and gas development. Under Alternative F, the Greater Sage-Grouse PHMAs ACEC is managed as open to locatable mineral entry (1,056,007 acres), open to mineral leasing (with major constraints on 685,181 acres, moderate constraints on 366,619 acres, and no area with standard constraints), and open to mineral materials disposal subject to density of disturbance limitations. Designating PHMAs as an ACEC would require any new Notice level activity related to locatable minerals exploration be submitted as a Plan of Operations and subject to analysis under NEPA. Mineral development is one of the primary threats to the values in this area, and allowing this type of development may result in adverse impacts from surface disturbance and disruption, as well as increased fragmentation and invasive species infestation. Conversely, this ACEC could adversely affect mineral development through additional restrictions on the number and size of potential leasable or salable minerals developments that make it more difficult to develop these resources. Unlike Alternative E (and to a lesser extent Alternative B), the Greater Sage-Grouse PHMAs ACEC would not preclude mineral development.

Alternative F management of ROW and renewable energy would reduce potential adverse impacts to the values of concern under Alternative A, though to a lesser extent than Alternative E. Similar to minerals development, surface disturbance from ROW and renewable energy development would result in adverse impacts from increased habitat fragmentation and other factors; in addition, these types of developments may provide perches for raptors and create permanent disruptions that also adversely affect greater sage-grouse and other sagebrush obligates. The development of wind energy would result in adverse impacts to the values of concern in this ACEC due to large wind turbines, construction activities, and required infrastructure (e.g., roads, transmission lines, and facilities). Conversely, restrictions and required mitigation for ROW development in the ACEC may result in adverse impacts to project proponents through increases in project costs and development timeframes.

Alternative F limits motorized vehicle use to designated roads and trails (1,113,611 acres) in the ACEC over a greater area than alternatives A, C, and D, which would reduce the potential for habitat fragmentation in greater sage-grouse and other sensitive species habitats in comparison to these alternatives.

McCullough Peaks South Paleontological Area

Alternatives B and E designate the McCullough Peaks South Paleontological Area as an ACEC (6,994 acres) (Maps 85 and 88); the other alternatives do not. The values of concern in the proposed McCullough Peaks South Paleontological Area ACEC are paleontological resources in the form of mammalian and paleobotanical fossils and geochemical data used in the study of a major Carbon Isotope Excursion recorded during an ancient period of global warming known as the PETM. Scenic and geologic features also are valuable in this ACEC. Threats to this proposed ACEC include surface disturbance from mineral (primarily oil and gas) and ROW development.

4.7.1.31 Summary of Impacts by Alternative

Alternatives B and E would be the most effective for protecting the paleontological and geological values of concern in the McCullough Peaks South Paleontological Area. Alternatives B and E also place the greatest restrictions on mineral development, ROW authorizations and other surface-disturbing activities; motorized travel; livestock grazing; and the excavation of paleontological resources. Alternatives A and C allow mineral development, open more routes to motorized travel, and are less restrictive to the authorization of ROWs and surface disturbance in the area. Alternative A is the least restrictive for oil and gas development and ROW authorizations, and may therefore result in the greatest potential for adverse impacts to the values of concern from surface disturbance due to these threats. A portion of the McCullough Peaks South Paleontological Area is included in the PETM ACEC under alternatives D and F; the *Paleocene-Eocene Thermal Maximum* section describes management of and impacts to this area.

4.7.1.32 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The McCullough Peaks South Paleontological area is open to locatable mineral entry on 6,994 acres, open to mineral leasing (with primarily moderate constraints on 4,626 acres and major constraints on the remaining 8 acres), and primarily open to mineral materials disposal (6,567 acres). Mineral development is one of the threats to the paleontological and geological values of the area, and allowing this type of development with minimal restrictions could result in surface disturbance that would cause adverse impacts to the values of concern. Except for a small area of high-potential for sand and gravel, the low potential for bentonite and gypsum occurrence and very low development potential for oil and gas may minimize these adverse impacts.

The McCullough Peaks South Paleontological Area is primarily managed as open to ROW authorizations (5,709 acres), with the remainder managed as a ROW avoidance area (1,250 acres). Allowing ROW authorizations in the area would result in beneficial impacts to these authorizations. Managing this area as primarily open to ROW authorizations could result in adverse impacts to the values of concern by increasing the potential for surface disturbance and associated with ROW development.

Motorized vehicle use is limited to designated roads and trails in the area; thereby limiting access and use of certain roads in the area and limiting disturbance or degradation to the values of concern.

The McCullough Peaks South Paleontological Area is open to livestock grazing under Alternative A, which may result in adverse impacts to the paleontological values of concern in the area. However, impacts from concentrated livestock use, which can damage exposed paleontological resources, can be mitigated through proper livestock management that improves livestock distribution.

Applicable laws and regulations and the management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative A. These decisions include protective management, such as surveying and monitoring surface-disturbing activities for all PFYC 4 and 5 formations that would provide some protection to the paleontological values.

Alternative B

Management for the McCullough Peaks South Paleontological Area ACEC under Alternative B reduces adverse impacts from surface disturbance and development to the paleontological and geological values of concern in the area. Alternative B requires avoiding or prohibiting surface-disturbing activities in the McCullough Peaks South Paleontological Area ACEC, and prohibiting the use, occupation, construction, or maintenance of facilities that are inconsistent with the management direction and objectives for the area. Allowing minor surface-disturbing activities in the ACEC if they are preceded by a paleontological sensitivity survey and, if necessary, monitored during construction, would help to protect paleontological resources in the area. Restricting surface-disturbing activities may increase project costs and timeframes, but would continue to allow some activities while also protecting the integrity of fossil-bearing material in the area.

Withdrawing the McCullough Peaks South Paleontological Area ACEC from appropriation under the mining laws, managing the area as closed to mineral leasing, and closing it to mineral materials disposal and geophysical exploration could result in greater adverse impacts to mineral development than Alternative A. Restricting mineral development may result in greater beneficial impacts to the paleontological and geologic values in the area than Alternative A. As described for Alternative A, the low potential for mineral resources in the area may minimize these impacts.

Alternative B is more restrictive than Alternative A regarding ROW management, motorized vehicle use, and livestock grazing; therefore, adverse impacts to these resource uses are likely to be greater than under Alternative A. Alternative B manages the McCullough Peaks South Paleontological Area ACEC as a renewable energy and ROW avoidance area, limits motorized vehicle use to designated roads and trails, and allows livestock grazing under existing regulations provided it does not disturb the natural, educational, and scientific research values of the ACEC. This management would reduce the potential for surface disturbance and would provide increased flexibility to further restrict activities (such as livestock grazing and resource-degrading travel routes) determined to be adverse to the values of concern. Conversely, any restrictions on grazing could reduce the currently available 722 AUMs in the ACEC and adversely affect livestock grazing. Requiring paleontological sensitivity surveys prior to approval of minor ROW authorizations may have long-term impacts by increasing processing times of authorizations and potentially requiring mitigation, relocation, or modification of facilities if paleontological resources are found.

Alternative B allows fossil collection, excavation, or removal in the McCullough Peaks South Paleontological Area ACEC only under a permit issued by the Wyoming BLM State Director and only by institutions and individuals engaged in BLM-approved research and museum or educational projects that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and museums. Such requirements could, however, result in beneficial impacts by protecting the integrity of the resources and enabling the advancement of scientific knowledge in the area.

Alternative C

Alternative C does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

Management of and impacts associated with mineral development under Alternative C would be similar to those under Alternative A. The area is open to mineral leasing (with primarily moderate constraints on 3,951 acres, standard restrictions on 2,161 acres, and major constraints on the remainder), and open to mineral materials disposal on 6,772 acres.

ROW management in the McCullough Peaks South Paleontological Area under Alternative C is more restrictive than under Alternative A, but less than under Alternative B. The area is primarily an avoidance area for ROW authorizations (3,776 acres) and open for ROW authorizations (3,218 acres) on the remainder. Management of ROWs under Alternative C would result in greater beneficial impacts to the values of concern in the ACEC than Alternative A, but less than Alternative B.

Management of and impacts associated with motorized vehicle use under Alternative C would be the same as under Alternative A.

Applicable laws and regulations and management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative C. This management would be less restrictive to surface disturbance than Alternative A, because it does not require on-the-ground surveys for PFYC 4 formations.

Alternative D

Alternative D does not designate this area an ACEC. Part of the McCullough Peaks South Paleontological Area (4,958 acres) is within the proposed PETM ACEC. See the *Paleocene-Eocene Thermal Maximum* section for an analysis of the effects of management of this area.

Alternative E

Management of and impacts to values of concern in the McCullough Peaks South Paleontological Area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the McCullough Peaks South Paleontological Area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Rainbow Canyon

Alternatives B and E designate the Rainbow Canyon area as an ACEC (1,443 acres) (Maps 85 and 88); the other alternatives do not. The values of concern in the proposed Rainbow Canyon ACEC are paleontological resources in the form of dinosaurian and paleobotanical fossils, and weathered and eroded geologic and scenic features. Threats to this proposed ACEC include surface disturbance from mineral and ROW development.

4.7.1.33 Summary of Impacts by Alternative

Alternatives B and E would be the most effective for protecting visual resources, and the paleontological and geologic values of concern in the Rainbow Canyon area. These alternatives also would result in the greatest restrictions on mineral development, ROW authorizations, and other surface-disturbing activities; livestock grazing; and the excavation of paleontological resources. Alternatives A and C allow mineral development and are less restrictive to the authorization of ROWs and surface disturbance in areas with paleontological and visual resources than Alternative B. Alternative C would be the least restrictive for oil and gas development and ROW authorizations, and may therefore result in the

greatest potential for adverse impacts to the values of concern from surface disturbance due to these threats. Alternatives D and F manage mineral development similar to alternatives A and C and ROW authorizations similar to alternatives B and E.

4.7.1.34 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area is open to locatable mineral entry, open to mineral leasing (with moderate constraints), and open to mineral materials disposal. Mineral development is one of the threats to the area and allowing this type of development, with minimal restrictions, could result in surface disturbance that would cause adverse impacts to the values of concern. The 1,238 acres with potential bentonite occurrence would be the most likely location of minerals development; the development potential for oil and gas and sand and gravel are very low, and there are no areas of known or potential gypsum occurrence. The very low potential for most minerals may minimize the potential for adverse impacts to the values of concern.

The Rainbow Canyon area is primarily open to ROW authorizations (1,222 acres), with the remainder managed as a ROW avoidance area (221 acres). Managing most of this area as open to ROW authorizations could result in adverse impacts to the values of concern by increasing the potential for surface disturbance and ROW development.

Motorized vehicle use is limited to designated roads and trails, which may result in fewer roads available to motorized travel in the area, compared to areas limited to existing roads and trails.

The Rainbow Canyon area is open to livestock grazing under Alternative A. Livestock trampling and wallowing in areas of concentrated livestock use can damage exposed paleontological resources. While, in most instances, concentrated livestock use would result in adverse impacts to paleontological values, proper management of livestock grazing can mitigate these impacts by improving livestock distribution.

Applicable laws and regulations and management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative A. These decisions include protective management, such as surveying and monitoring surface-disturbing activities for PFYC 4 and 5 formations that may protect paleontological values of concern. The area under Alternative A is managed under VRM Class III objectives, which would allow for a more moderate change in the scenic quality rating units that encompass Rainbow Canyon than VRM Class II objectives. VRM Class III would allow for more contrasting elements to be present from surface-disturbing activities that are generated from ROW actions and mineral developments.

Alternative B

Management for the Rainbow Canyon ACEC under Alternative B reduces adverse impacts to the paleontological and geological values of concern from surface disturbance and development. Management under this alternative requires avoiding or prohibiting surface-disturbing activities in the Rainbow Canyon ACEC, and prohibiting the use, occupation, construction, or maintenance of facilities in the Rainbow Canyon ACEC that are inconsistent with the management direction and objectives for the area. Allowing minor surface-disturbing activities in the Rainbow Canyon ACEC if they are preceded by a paleontological sensitivity survey and, if necessary, monitored during construction, would help protect

paleontological resources. Restricting surface-disturbing activities could increase project costs and timeframes, but would continue to allow some activities while also protecting the integrity of fossil-bearing material in the area.

Withdrawing the Rainbow Canyon ACEC from appropriation under the mining laws, managing the area as closed to mineral leasing, and closing the area to mineral materials disposal and geophysical exploration may result in greater adverse impacts to mineral development than Alternative A. Restricting mineral development could result in greater beneficial impacts to the paleontological and geologic values in the area than Alternative A. As noted for Alternative A, impacts from the withdrawal are likely to be greatest on the 1,238 acres with known or potential gypsum occurrence; the low potential for other mineral resources in the area may minimize impacts from other types of mineral exploration and development.

Management under Alternative B is more restrictive than under Alternative A for ROWs and livestock grazing. Therefore, adverse impacts to these resource uses would be greater than under Alternative A. Alternative B manages the Rainbow Canyon ACEC as a renewable energy and ROW avoidance area and allows livestock grazing under existing regulations, provided it does not disturb the natural, educational, and scientific research values of the Rainbow Canyon ACEC. This management would reduce the potential for surface disturbance and would provide increased flexibility to further restrict activities (such as livestock grazing) determined to be adverse to the values of concern. Any restrictions on grazing could reduce the currently available 23 AUMs in the area and adversely impact livestock grazing.

Management of and impacts associated with motorized vehicle use under Alternative B are the same as under Alternative A.

Alternative B allows fossil collection, excavation, or removal in the Rainbow Canyon ACEC only under a permit issued by the Wyoming BLM State Director and only by institutions and individuals engaged in BLM-approved research, museum, or educational projects that provide for detailed recordation, reporting, care of specimens, and availability of specimens to other scientists and museums. Such requirements would, however, result in beneficial impacts by protecting the integrity of the resources and enable the advancement of scientific knowledge.

The area would be managed under VRM Class II objectives, which require contrasting elements created by surface-disturbing activities to be subordinate to the surrounding natural elements. VRM Class II objectives would assist in maintaining the values of concern more than alternatives A, C, D, and F.

Alternative C

Alternative C does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

Management of and impacts associated with locatable and salable mineral development under Alternative C would be similar to those under Alternative A. However, the management of leasable minerals would be the least restrictive of any alternative because the area is managed as open to mineral leasing with primarily standard constraints (1,433 acres).

ROW management in the Rainbow Canyon area under Alternative C is less restrictive than alternatives A and B. The Rainbow Canyon area is managed as open to ROW authorizations (1,443 acres). Fewer restrictions on ROWs could result in more adverse impacts to the values of concern compared to the other alternatives.

Management of and impacts associated with motorized vehicle use under Alternative C would be the same as under Alternative A.

Applicable laws and regulations and management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative C. This management is less restrictive to surface disturbance that could adversely impact values of concern than under Alternative A, because it does not require on-the-ground surveys for PFYC 4 formations on a case-by-case basis.

Alternative C would manage the area under VRM Class III and IV objectives, which do not require minimizing the contrasting elements created by surface-disturbing activities as a priority. Alternative C would allow for observable visual intrusions within the scenic quality rating units, to the degree which may alter the current visual resource rating to a lower quality rating.

Alternative D

Alternative D does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

Management of and impacts associated with mineral development under Alternative D would be the same as under Alternative A.

Under Alternative D, the Rainbow Canyon area is managed as a ROW avoidance area and impacts would be the same as those under Alternative B.

Management of and impacts associated with motorized vehicle use under Alternative D would be the same as under Alternative A.

Applicable laws and regulations and management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative D. These decisions include protective management, such as surveying and monitoring surface-disturbing activities for PFYC 4 and 5 formations and attaching standard Paleontological Resources Protection Stipulations for PFYC 1-5 formations that would provide some protection to the paleontological values, but less than under Alternative B.

Alternative D visual resource management of impacts associated with surface-disturbing activities would be the same as under Alternative C.

Alternative E

Management of and impacts to values of concern in the Rainbow Canyon area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Rainbow Canyon area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Paleocene-Eocene Thermal Maximum (PETM)

Alternatives D and F would designate the PETM, in the Clarks Fork Basin/Polecat Bench, Foster Gulch, and McCullough Peaks South areas, as an ACEC (14,906 acres) (Maps 87 and 89); alternatives A and C

would not. Under alternatives B and E, the area of the PETM ACEC is entirely within the proposed Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs (58,191 acres total) (Maps 85 and 88). The values of concern in the PETM ACEC are the same as those in the Clarks Fork Basin/Polecat Bench, Foster Gulch, and McCullough Peaks South ACECs (i.e., fossil resources and geochemical data from an ancient period of global warming). The PETM ACEC includes a portion of the deposits of these resources protected under the Alternative B ACECs (referred to here as the greater-PETM area). Threats to the area of the PETM ACEC include surface disturbance from mineral (oil and gas, mineral materials, and possible locatable mineral mining), recreational and OHV use, invasive and nonnative species infestations, and ROW development.

Management of and impacts from ACECs in the greater-PETM area under alternatives B and E, and management in this area without ACEC designations under alternatives A and C, are addressed in the *Clarks Fork Basin/Polecat Bench West Paleontological Area*, *Foster Gulch*, and *McCullough Peaks South* ACEC sections.

4.7.1.35 Summary of Impacts by Alternative

Only alternatives D and F designate the PETM ACEC. However, alternatives B and E manage ACECs that completely overlap this area, making them the most effective alternatives for protecting the paleontological and geological values of concern. In both the PETM ACEC area and the greater-PETM area covered by the Clarks Fork Basin/ Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs, alternatives B and E would be the most restrictive of oil and gas development, withdrawals, renewable energy development, ROW authorizations and other surface-disturbing activities, and motorized vehicle use. Under alternatives A and C, none of the area in the PETM ACEC or the greater-PETM area is designated as an ACEC for the protection of paleontological values of concern. Management under these alternatives generally would be the least restrictive of mineral use and would provide the least protection from surface disturbance for the paleontological resources in the area. Alternative A would be the least restrictive of ROW and motorized vehicle use, followed by alternatives C, D, and F.

4.7.1.36 Detailed Analysis of Alternatives

Alternatives A and C

Alternatives A and C do not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives. The proposed PETM ACEC is entirely within the Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs proposed under Alternative B. See the *Detailed Analysis of Alternatives* discussions for those ACECs for management of and impacts to this area under alternatives A and C.

Alternative B

Alternative B does not designate a PETM ACEC, but does manage a larger area as the Clarks Fork Basin/ Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs to protect the same values of concern. See the *Detailed Analysis of Alternatives* for the Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs for management of and impacts to this area under Alternative B.

Alternative D

Under Alternative D, the BLM designates a portion of the area managed as the Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs under Alternative B as the PETM ACEC to protect paleontological resources and geochemical data.

Allowing surface-disturbing activities and the use, occupation, construction, or maintenance of facilities that are consistent with the goals of the ACEC, would result in fewer adverse impacts, similar to those described for alternatives A and C in the Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs. In the greater-PETM area boundary proposed under Alternative B, impacts to paleontological resources would be the same as under alternatives A and C, because only standard restrictions on surface disturbance would apply. Alternative D restrictions throughout this area would be less effective for protecting paleontological resources than Alternative B, but also would cause fewer adverse impacts to project costs and timeframes associated with surface-disturbing activities, such as range improvements.

Under Alternative D, management of mineral development in the PETM ACEC and the greater-PETM area is less restrictive than under Alternative B and similar or slightly more restrictive than management under alternatives A and C. As with alternatives A and C, Alternative D manages most of the area as open for mineral leasing with moderate constraints; however, this alternative also applies a more restrictive NSO stipulation on the PETM ACEC itself and contains less area open with standard constraints on the greater-PETM area. Alternative D manages the PETM ACEC and the greater-PETM area as available for locatable mineral entry. However, unlike similar management under alternatives A and C, the area in the PETM ACEC would require a plan of operations for most locatable mineral exploration and development. The PETM ACEC is closed to mineral materials disposal, as is this area under Alternative B, and the greater-PETM area is managed as open to mineral materials disposal, similar to alternatives A and C. Although these restrictions would result in adverse impacts to mineral uses, these impacts may be minimized in the ACEC and the greater-PETM area because these areas consist of 9,933 acres of very low and 4,973 acres of low development potential for oil and gas, the low occurrence potential for bentonite, gypsum, and low development potential for sand and gravel across most of the area. Restricting mineral development could result in beneficial impacts to the values of concern for the ACEC by reducing the potential for destruction or degradation of paleontological values and the other adverse impacts often associated with surface disturbance (e.g., the potential spread of invasive species).

Similar to Alternative C, under Alternative D approximately half of the PETM ACEC and the greater-PETM area are open to ROW authorizations and half is managed as ROW avoidance areas. This management is more restrictive than Alternative A, but less restrictive than Alternative B. Alternative D would implement more restrictions on motorized travel within the PETM ACEC and the greater-PETM area than Alternative A, but fewer restrictions than alternatives B and C. Management of ROWs and motorized vehicle use under Alternative D would reduce the potential for impacts to these activities compared to Alternative B, but also would result in increased surface disturbance and other adverse impacts to the values of concern compared to that alternative. However, allowing ROW authorizations in the PETM only where consistent with the protection of paleontological resources would reduce these adverse impacts by allowing the further restriction of these activities where they would not be compatible with protecting the paleontological values of concern.

Management of and impacts from the collection, excavation, or removal of fossils in the PETM ACEC would be similar to in the Clarks Fork Basin/Polecat Bench West Paleontological Area, Foster Gulch, and McCullough Peaks South ACECs. In the greater-PETM area, the applicable laws, regulations, and

management described in Section 4.5.2 *Paleontological Resources* control the collection of fossils under Alternative D. These decisions include protective management, such as surveying and monitoring surface-disturbing activities for PFYC 4 and 5 formations and attaching standard Paleontological Resources Protection Stipulations for PFYC 1-5 formations, that would provide some protection to the paleontological values, but less than under Alternative B.

Alternative E

Management of and impacts to values of concern in the PETM under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the PETM under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Rattlesnake Mountain

Alternatives B and E designate the Rattlesnake Mountain area as an ACEC (19,137 acres) (Maps 85 and 88); the other alternatives do not. The values of concern to be managed for in the proposed Rattlesnake Mountain ACEC are special status species wildlife, varied vegetation communities and sensitive plants, and wildlife winter and transition habitat. Threats to this proposed ACEC include surface disturbance from mineral (including gravel pits) and ROW development, renewable energy developments (wind energy), timber extraction, heavy recreational and OHV use, and invasive, nonnative species infestations. These activities threaten rare plants and habitat for special status species, and have the potential to create disturbances for wintering wildlife.

4.7.1.37 Summary of Impacts by Alternative

Alternatives B and E would be the most effective for protecting the special status species, vegetation, and wildlife winter and transition habitat values of concern in the Rattlesnake Mountain area. This alternative would result in the least habitat fragmentation due to surface disturbance and the smallest potential for invasive species infestation. Alternative B also would result in the greatest restrictions on mineral development, ROW authorizations, renewable energy development, and surface-disturbing activities. Alternatives A, C, D, and F would allow mineral development and would be less restrictive to travel and surface disturbance. Alternatives D and F would be more restrictive of ROWs than alternatives A and C. Alternative C would be the least restrictive for oil and gas development and ROW authorizations (including renewable energy development), and may therefore result in the greatest potential for adverse impacts to the values of concern. Alternatives A, D, and F would result in the greatest potential for adverse impacts to wildlife due to travel-related disturbance during sensitive times of the year.

4.7.1.38 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area would be open to locatable mineral entry, open to mineral leasing (with primarily major constraints on 696 acres and moderate constraints on 10,181 acres), and open to mineral materials disposal. Mineral development would be most likely on the small areas with known or potential gypsum occurrence (184 acres) and sand and gravel (910 acres); there is low bentonite occurrence and the development potential for oil and gas is very low. Surface disturbance from mineral development is one of the threats and allowing this type of development, with minimal restrictions, would result in surface disturbance and increased potential for invasive species infestations. This type of development also would result in adverse impacts to special status species and wildlife winter and transition habitat due to increased fragmentation and increased potential for disturbance of wildlife during sensitive times of the year when these habitats are in use.

The Rattlesnake Mountain area is managed as open to ROW authorizations (9,188 acres) and as a ROW avoidance area (9,949 acres). Areas open to ROW authorizations would be more likely to experience surface disturbance, an identified threat to the values of concern, and adverse impacts similar to those from mineral development. Areas with fewer restrictions would benefit ROW authorizations by increasing the potential for development in these areas. Interest in ROW authorizations in the form of wind-energy development are of concern in this area. Development of wind energy would result in adverse impacts to the values of concern due to large wind turbines, construction activities, and required infrastructure (e.g., roads, transmission lines, facilities).

Alternative A limits motorized vehicle use primarily to designated roads and trails (18,662 acres), with a much smaller area limited to existing roads and trails (457 acres). Managing the area as primarily limited to designated roads and trails would reduce fragmentation of habitat and reduce stress on wildlife during sensitive times of the year.

Standard guidelines related to surface disturbance would apply in the area. Although these standard guidelines may reduce the severity of impacts to the values of concern from surface disturbance, adverse impacts still would be likely if surface-disturbing activities are authorized.

Alternative B

Management for the Rattlesnake Mountain ACEC under Alternative B reduces adverse impacts to the values of concern in the area by prohibiting surface-disturbing activities. Surface disturbance prohibitions would result in beneficial impacts to special status species and wildlife winter and transition habitat because it would reduce fragmentation, the potential for invasive species infestation, and the disturbance of wildlife during sensitive times of the year when these habitats are in use. This management is more restrictive to surface-disturbing activities in the Rattlesnake Mountain area compared to the other alternatives.

Withdrawing the Rattlesnake Mountain ACEC from appropriation under the mining laws, managing the area as closed to mineral leasing, and closing the area to mineral materials disposal and geophysical exploration would result in more adverse impacts to mineral development than Alternative A. Conversely, restricting mineral development would result in greater beneficial impacts to the values of

concern than Alternative A. However, the low potential for most mineral resources in the area may minimize these impacts.

Alternative B is more restrictive than Alternative A regarding ROWs and motorized vehicle use. The Rattlesnake Mountain ACEC is a ROW exclusion area, a renewable energy exclusion area, and seasonally closed to motorized and mechanized vehicle use on part and limited to designated roads and trails on the remainder. Under Alternative B, more restrictive ROW and travel management would result in greater adverse impacts to ROW and wind-energy development in this area, and would adversely affect the ability of the public to access the area compared to Alternative A by limiting the times of year and routes available for travel. Conversely, limiting travel seasonally would allow additional protection for wildlife during sensitive times of the year, and beneficial impacts to these values of concern would be greater under Alternative B than Alternative A.

Allowing and seasonally stipulating vegetative/silviculture treatments, invasive/nonnative pest species control, fuels management, and maintenance of existing facilities in the Rattlesnake Mountain ACEC would protect wildlife and special status species during sensitive times of the year, while still allowing maintenance and treatments to occur.

Alternative C

Alternative C does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives. Standard guidelines related to surface disturbance would apply, with impacts similar to those under Alternative A.

Management of and impacts associated with mineral development under Alternative C would be similar to Alternative A. The area is open to mineral leasing (with primarily moderate constraints on 159 acres).

The Rattlesnake Mountain area is managed as open to ROW authorizations (18,843 acres), with a smaller portion managed as a ROW avoidance area (294 acres). The area open to ROW authorizations would greater than under Alternative A, and the extent of adverse impacts to the values of concern described under Alternative A would be greater than under Alternative C. This alternative would be the most beneficial to ROW and wind developments of any alternative by managing the area with the least restrictions on ROW and renewable energy development.

Motorized vehicle use is managed primarily as limited with seasonal stipulations (13,709 acres), with a smaller area limited to designated roads and trails (19,118 acres). Impacts to and from travel would be similar to those described under Alternative B.

Alternative D

Alternative D does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives. Standard guidelines related to surface disturbance would still apply, with similar impacts as Alternative A.

Management of and impacts associated with mineral development under Alternative D would be similar to Alternative C. The area is available for locatable mineral entry, open to mineral leasing (with moderate constraints), and open to mineral materials disposal.

The Rattlesnake Mountain area is managed as a ROW avoidance area. Management of ROW authorizations would be less restrictive (and more beneficial to the values of concern) than under Alternative B, and more restrictive (and less beneficial to the values of concern) than under alternatives A and C.

Alternative D limits motorized vehicle use to designated roads and trails, and impacts would be the same as under Alterative A.

Alternative E

Management of and impacts to values of concern in the Rattlesnake Mountain area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Rattlesnake Mountain area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis under Alternative D is representative of the impacts anticipated under Alternative F.

Sheep Mountain

Alternatives B and E (25,151 acres) (Maps 85 and 88) and alternatives D and F (14,200 acres) (Maps 87 and 89) would designate the Sheep Mountain area as an ACEC; alternatives A and C would not. The values of concern in the proposed Sheep Mountain ACEC are varied vegetation communities, sensitive plants, and big game wildlife habitat.

4.7.1.39 Summary of Impacts by Alternative

Alternatives B, D, E, and F are the only alternatives that designate the Sheep Mountain area as an ACEC. Due to the larger size and more restrictive management, alternatives B and E would be the most effective for protecting the vegetation communities, sensitive plants, and big game wildlife habitat in the Sheep Mountain area due to resource use restrictions and travel designations. Management under alternatives B and E includes the greatest restrictions on ROWs, minerals development, and other surface-disturbing activities in the area, resulting in the greatest adverse impacts to these resource uses compared to the other alternatives. Alternatives B and E would be the most restrictive of travel in the area, and would therefore provide the greatest protection of the values of concern from fragmentation and disruption related to motorized vehicle use.

4.7.1.40 Detailed Analysis of Alternatives

Alternative A

Alternative A does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area would be open to locatable mineral entry, open to mineral leasing (with primarily major constraints on 7,934 acres and moderate constraints on the remaining 14,116 acres), and open to mineral materials disposal on 24,574 acres and closed on 579 acres. Allowing mineral development in areas open to minerals would result in beneficial impacts to these resource uses. Mineral development would result in surface disturbance and habitat fragmentation that would result in adverse impacts to vegetation and big game wildlife habitat values in the area.

The Sheep Mountain area is managed as open to ROW authorizations (19,475 acres) or as a ROW avoidance area (5,607 acres). Standard guidelines related to surface disturbance would apply. Alternative A limits motorized vehicle use primarily to designated roads and trails (23,316 acres), and limits motorized vehicle use in a smaller area to existing roads and trails (1,827 acres).

Standard guidelines related to surface disturbance would apply and may reduce the severity of impacts to the values of concern from surface disturbance. There would still be adverse impacts if surface-disturbing activities are authorized.

Alternative B

Under Alternative B, prohibiting surface-disturbing activities in the Sheep Mountain ACEC would restrict such activities as geophysical exploration and road construction, but would benefit vegetation communities, sensitive plants, and big game habitat by limiting the potential for fragmentation or invasive species infestations that would degrade vegetation and habitat.

Under Alternative B, restrictions on mineral development would result in adverse impacts to the use of these resources or beneficial impacts to the values of concern by reducing surface-disturbing activities and disruptions. The ACEC is withdrawn from appropriation under the mining laws and closed to mineral materials disposal. Adverse impacts to mineral resources would be greatest in areas with known or potential bentonite occurrence (1,178 acres) or sand and gravel (2,294 acres). The ACEC is closed to mineral leasing, but the development potential for oil and gas is very low to low and adverse impacts would be minimal.

Under Alternative B, the Sheep Mountain ACEC is a ROW and renewable energy avoidance area. Compared to Alternative A, this management is more restrictive to future ROW authorizations and ROW-related surface disturbance and disruption that would adversely affect the wildlife and vegetation values of concern. Therefore, management of ROWs and renewable energy would result in greater beneficial impacts to the values of concern in the ACEC compared to Alternative A.

A portion (13,242 acres) of the Sheep Mountain ACEC is seasonally restricted and the remainder (25,143 acres) is limited to designated roads and trails for motorized and mechanized vehicle use. Limiting or closing the ACEC to motorized vehicle use would result in adverse impacts to travel and access and beneficial impacts on the values of concern. Closing this area would eliminate disruption from motorized vehicles to wildlife and may reduce disturbance of vegetation and sensitive plants. Management under this alternative would be more restrictive to motorized vehicle travel, but would result in the greater beneficial impacts to the values of concern in the area compared to Alternative A.

Seasonally stipulating, where feasible, vegetative/silviculture treatments, invasive/nonnative pest species control, fuels management, and maintenance of existing facilities in the Sheep Mountain ACEC would protect wildlife during sensitive times of the year, while still allowing maintenance and treatments to occur.

Alternative C

Alternative C does not designate the area as an ACEC; the BLM manages the area in accordance with multiple use principles consistent with other resource objectives.

The area would be open to locatable mineral entry except on 165 acres, open to mineral leasing (with primarily moderate constraints on 5,026 acres, major constraints on 387 acres, and standard stipulations on 19,737 acres), and entirely open to mineral materials disposal. Management of minerals would allow

for the greatest level of mineral development in the area and would result in the greatest adverse impacts to the values of concern compared to the other alternatives.

ROW management in the Sheep Mountain area is open to ROW authorizations (19,865 acres), with a smaller portion managed as avoidance for ROW (5,288 acres). Standard guidelines related to surface disturbance would apply; however, the additional restrictions under Alternative B would not. Alternative C is less restrictive to ROW authorizations than Alternative A. Management of ROWs under Alternative C would result in the greatest adverse impacts to the values of concern in the area compared to the other alternatives.

Alternative C limits motorized vehicle use primarily to designated roads and trails (24,868 acres), and limits a smaller area to existing roads and trails (275 acres). Impacts to motorized travel are generally expected to be similar to Alternative A.

Standard guidelines related to surface disturbance would apply and could result in additional surface disturbance in the area compared to alternatives A and B, leading to potential increased degradation of the values of concern in the area.

Alternative D

Surface-disturbing activities are allowed in the Sheep Mountain ACEC and the larger area managed as an ACEC under Alternative B, reducing the potential for adverse impacts to activities such as ROWs and range improvement projects compared to Alternative B. Allowing these activities would result in adverse impacts to the values of concern similar to Alternative A, although these impacts would be reduced in the ACEC under Alternative D. Surface-disturbing activities in the ACEC are limited to slopes of 15 percent or less, except where needed to improve watershed function, wildlife habitat, or land health.

Alternative D does not pursue a withdrawal for the Sheep Mountain ACEC, except on a case-by-case basis to meet other resource objectives. Management of and impacts from locatable mineral entry under this alternative would be similar to Alternative A, and the adverse impacts to mineral uses and beneficial impacts to habitat identified under Alternative B would not occur except in areas withdrawn.

As under Alternative B, the Sheep Mountain ACEC is closed to mineral materials disposal and closed to mineral leasing; however, the larger area designated as an ACEC under Alternative B is available for locatable mineral entry, open to mineral materials disposal, and only managed as closed to oil and gas leasing on a portion (20,280 acres) under this alternative. Impacts in the Alternative D ACEC would be the same as under Alternative B; impacts in the larger area managed as an ACEC under Alternative B would be less adverse to the use of mineral resources. The less restrictive management of mineral uses under this alternative would reduce the beneficial impacts to the values of concern compared to Alternative B. As noted for Alternative B, the very low to low development potential for oil and gas would minimize both adverse impacts to leasing and the benefit of leasing restrictions on the values of concern under Alternative D. However, adverse impacts to mineral materials disposal would still exist in areas of high-potential for sand and gravel. Under Alternative D, management of and impacts from ROWs and renewable energy in the Sheep Mountain ACEC and the larger area designated as an ACEC under Alternative B would be the same as under Alternative B.

Under Alternative D, motorized vehicle use in the Sheep Mountain ACEC and most of the larger area managed under Alternative B is limited to designated roads and trails (25,143 acres). Impacts to motorized travel would be similar to Alternative A.

Similar to Alternative B, under Alternative D, the BLM can stipulate, where feasible, treatment and maintenance activities in the Sheep Mountain ACEC to protect wildlife, while still allowing maintenance and treatments to occur. In the larger area proposed as an ACEC under Alternative B, the standard guidelines related to surface disturbance and the management of other resource objectives would apply to these activities; therefore, under Alternative D, impacts in this area would be similar to Alternative A.

Alternative E

Management of and impacts to values of concern in the Sheep Mountain area under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Management of and impacts to values of concern in the Sheep Mountain area under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for cave and karst resources under Alternative D is representative of the impacts anticipated under Alternative F.

4.7.2 National Back Country Byways

This section describes the impacts of each alternative to National Back Country Byways, which are an important recreational resource on BLM-administered lands. These travel routes are frequently used and are susceptible to impacts over the long term. Adverse impacts to National Back Country Byways result from management actions that substantially limit or prevent public use. Beneficial impacts result from actions that enhance the use of National Back Country Byways. Direct impacts include any action that substantially alters the use of the byways. Indirect impacts include actions that alter the setting of the byways and influence user experiences.

The Red Gulch/Alkali Road National Back Country Byway is the only currently designated back country byway in the Planning Area (Map 90). Under Alternative B, two additional back country byways, the Hyattville Logging Road and the Hazelton (33-Mile) Road, are proposed for designation (Map 90).

4.7.2.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Under Alternative B, no additional land use constraints are associated with designation of the Hyattville Logging Road and the Hazelton (33-Mile) Road Back Country Byways.
- Impacts to other resources from management of the cultural values along the proposed and existing back country byways are discussed in Section 4.5.1 Cultural Resources.
- Establishment of the Hyattville Logging Road and the Hazelton (33-Mile) Road Back Country Byways will increase use of the roads and increase human presence in these areas.

4.7.2.2 Summary of Impacts by Alternative

National Back Country Byways are designated to protect important recreational travel routes; the primary impacts to these routes include management that limits or prevents public use. Designation of the Red Gulch/Alkali Road National Back Country Byway would continue under all alternatives. Alternatives B and E designate two additional back country byways, Hyattville Logging Road and the

Hazelton (33-Mile) Road. Alternatives D and F do not designate additional byways, but would consider additional designations on a case-by-case basis. Alternatives A and C do not designate additional byways. Designation of additional back country byways would provide beneficial impacts by increasing opportunities for interpretation and education. Management for the development of interpretive facilities and educational materials under alternatives B and E is more extensive than under alternatives A, C, D, and F, and may result in beneficial impacts to user experiences and increases in appropriate use that does not degrade the byways. Regardless of whether they are designated, adverse and beneficial impacts from the Red Gulch/Alkali Road National Back Country Byway, Hyattville Logging Road, and the Hazelton (33-Mile) Road on other resource values would be negligible under all alternatives.

4.7.2.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Management of the Red Gulch/Alkali Road National Back Country Byway does not change substantially across alternatives; therefore, all impacts are common to all alternatives.

Under all alternatives, the Red Gulch/Alkali Road National Back Country Byway continues its existing designation. Management of cultural and environmental interpretation and education along the byway would continue according to the Red Gulch/Alkali Road National Back Country Byway Interpretive Master Plan (BLM 1994a). Existing adverse and beneficial impacts from the Red Gulch/Alkali Road National Back Country Byway, Hyattville Logging Road, and the Hazelton (33-Mile) Road will continue under all alternatives regardless of designation and are considered negligible. Long-term adverse impacts from the current Type III and IV character of the roads (see *Glossary*) are the same as impacts from similar primitive roads in the Planning Area and include habitat fragmentation, fugitive dust, increased erosion, and potential spread of invasive, nonnative plant seeds and/or parts.

Alternative A

Developing educational materials for the Red Gulch/Alkali Road National Back Country Byway may result in beneficial impacts by increasing knowledge and appropriate use of the area. Beneficial impacts from the Red Gulch/Alkali Road National Back Country Byway include maintaining a viable transportation route, back country access, and recreation, wildlife, and scenic viewing opportunities. These benefits allow a positive change for residents and visitors, providing the opportunity to experience aesthetic appreciation, identify with a special place, improve perception of the quality of life, and improve the image of the area and its recreational opportunities. Environmental benefits include creating a sense of "ownership" and stewardship of the area, while protecting natural habitats and open space by reducing the temptation for users to engage in unethical outdoor behavior, such as off-road motorized use. Economic benefits include retaining recreational spending in local areas, increased contributions to local economies, and increased attractiveness of the area.

Potential adverse impacts from maintaining the back country byway include increased use of Red Gulch/Alkali Road and potential increases in soil erosion, road maintenance, and fugitive dust from traffic. In addition, increased human presence and activity in the area may adversely affect biological and cultural resources due to litter, unauthorized plant collection, the spread of invasive species, vandalism, and wildlife disturbance.

Alternative A does not designate other back country byways.

Alternative B

Alternative B would designate two additional back country byways, the Hyattville Logging Road and the Hazelton (33-Mile) Road.

Developing interpretive facilities (including interpretive pull-outs, parking areas, trailheads, etc.) on all back country byways (including the Red/Gulch Alkali Road National Back Country Byway), and publishing educational brochures displaying the multiple uses, resource values, and unique character of each byway would result in beneficial impacts by enhancing users' experiences and encouraging appropriate use that does not degrade the byways. Beneficial and adverse impacts from designating the additional two back country byways would be similar to those under Alternative A. However, the extent of impacts under Alternative B would be greater as the designations affect more areas, possibly including areas outside the Planning Area's jurisdiction, such as the Casper and Buffalo Field Offices, due to the influence and connectivity of the Hazelton (33-Mile) Road.

Alternative C

Developing educational materials for the Red Gulch/Alkali Road National Back Country Byway would result in the same beneficial impacts as Alternative A.

Alternative C does not designate other back country byways.

Alternative D

Alternative D retains the Red Gulch/Alkali Road National Back Country Byway and would consider the designation of new back country byways on a case-by-case basis. Beneficial and adverse impacts from maintaining the Red Gulch/Alkali Road National Back Country Byway and consideration of new byways would be the same as anticipated under Alternative A.

Impacts to National Back Country Byways under Alternative D would be the same as those described under Alternative A.

Alternative E

Impacts to National Back Country Byways under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis for National Back Country Byways under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Impacts to National Back Country Byways under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for National Back Country Byways under Alternative D is representative of the impacts anticipated under Alternative F.

4.7.3 National Historic Landmarks

The Heart Mountain Relocation Center National Historic Landmark is on BLM-administered mineral estate with BLM-administered surface in view of the site. National Historic Landmarks are very high profile by definition, so adverse impacts to these areas are more controversial than impacts to NRHP sites. Adverse impacts to the Heart Mountain Relocation Center National Historic Landmark would be

similar to those described in Section 4.5.1 *Cultural Resources*, with a greater emphasis on impacts to the viewshed of the National Historic Landmark. BLM actions that alter the scenic characteristics of the landscape around the Heart Mountain Relocation Center National Historic Landmark or adversely affect the viewshed would adversely impact the integrity of the National Historic Landmark and, therefore, could affect the historical significance of this resource. Beneficial impacts are those that preserve the setting around the National Historic Landmark to maintain its historical character and significance.

4.7.3.1 Methods and Assumptions

Certain projects, due to size or topography, may require consideration of visual intrusions into the setting beyond the foreground or middle-ground zones to comply with NHPA Section 106.

See Section 4.5.1 *Cultural Resources* for assumptions applicable to the impacts analysis for National Historic Landmarks.

4.7.3.2 Summary of Impacts by Alternative

The Heart Mountain Relocation Center National Historic Landmark is on BLM-administered mineral estate with BLM-administered surface in view of the site. Impacts to the National Historic Landmark principally result from activities that affect the site's historical setting (i.e., viewshed). Under all the alternatives, the 72-acre National Historic Landmark would be withdrawn from appropriations under the mining laws and protected from direct impacts from surface-disturbing activity associated with mineral development. The greatest adverse impacts to the National Historic Landmark would occur under Alternative A, which applies the fewest restrictions on mineral development within the viewshed of the National Historic Landmark (Map 93). Alternatives B and E restrict surface-disturbing mineral development in the viewshed of the National Historic Landmark to the greatest degree, resulting in the greatest beneficial impacts, followed by alternatives F, D, C, and A respectively.

4.7.3.3 Detailed Analysis of Alternatives

Impacts from surface-disturbing activities, resource uses, and proactive management actions may result in adverse and beneficial impacts to the Heart Mountain Relocation Center National Historic Landmark.

Impacts Common to All Alternatives

The BLM complies with NHPA Section 106 for all undertakings with the potential to affect historic properties (i.e., cultural resources eligible for, or listed on, the NRHP, including those designated as National Historic Landmarks). If historic properties are present, the BLM consults with the SHPO, Indian tribes, and other interested parties in evaluating the potential effects of the undertaking and seeking to resolve adverse effects to historic properties. These measures would avoid, minimize or mitigate such effects to the Heart Mountain Relocation Center National Historic Landmark under all of the alternatives.

Under all of the alternatives, the BLM pursues a withdrawal from appropriation under the mining laws for the 72 acres of BLM-administered mineral estate underlying private and other federal agency-administered surface lands in the Heart Mountain Relocation Center National Historic Landmark. Preventing mining activities on areas in the National Historic Landmark would result in beneficial impacts by maintaining the historic setting of the area to its historical significance.

Surface-disturbing activities and ROW development would have similar impacts on the Heart Mountain Relocation Center National Historic Landmark under all alternatives, but their intensity is likely to vary. Therefore, these impacts are analyzed under each alternative. Proactive management would result in varying beneficial impacts to the National Historic Landmark under each alternative.

Alternative A

Surface Disturbance

Oil and gas development, mining, and other surface-disturbing activities would threaten the historical landscape and viewshed around the Heart Mountain Relocation Center National Historic Landmark. Projected surface disturbance under Alternative A (Table 4-1) would result in the potential for alterations of the scenic characteristics in the surrounding landscape that may adversely affect the historical significance of the National Historic Landmark.

Resource Uses

ROW authorizations, especially for wind-energy development, also may cause visual impacts that may affect the setting and viewshed of the National Historic Landmark. Under Alternative A, the BLM considers renewable energy development on a case-by-case basis throughout the Planning Area and manages 940,943 acres as ROW avoidance areas and 61,147 acres as ROW exclusion areas. Less restrictive ROW management actions would allow for dispersed ROW development and the potential for visual impacts. Therefore, Alternative A would result in potential adverse impacts to the National Historic Landmark from ROW development.

Proactive Management

Other than the withdrawal specified under *Impacts Common to All Alternatives*, no alternative-specific proactive management actions are prescribed for the Heart Mountain Relocation Center National Historic Landmark under Alternative A.

Alternative B

Surface Disturbance

Impacts to the National Historic Landmark from surface disturbance would be similar to, but less than, under Alternative A. Projected surface disturbance under Alternative B (Table 4-1) would result in less potential for alterations of the scenic characteristics in the surrounding landscape that may result in adverse impacts to the setting and viewshed of the National Historic Landmark relative to Alternative A.

Resource Uses

Impacts to the National Historic Landmark from ROW development under Alternative B are similar to, but less than, under Alternative A. Under Alternative B, the Planning Area is open to renewable energy development unless managed as a renewable energy or ROW exclusion or avoidance area. The BLM manages 2,710,695 acres as ROW avoidance areas and 225,447 acres as ROW exclusion areas, with 251,203 acres open to renewable energy. This alternative consolidates new ROW development more than Alternative A, which may reduce the potential for impacts to the setting and viewshed of the Heart Mountain Relocation Center National Historic Landmark compared to the other alternatives.

Proactive Management

Under Alternative B, the BLM avoids surface-disturbing activities in view within 5 miles (7,367 acres) of the Heart Mountain Relocation Center National Historic Landmark, except within existing utility corridors; manages areas within 3 miles as closed to mineral leasing and applies a CSU stipulation in view within 5 miles or the visual horizon; and closes the area within 3 miles and in view within 5 miles to mineral materials disposal. These proactive management actions would provide a greater benefit to the National Historic Landmark, compared to Alternative A, by protecting the setting around the National Historic Landmark and contributing to the preservation of its historical integrity.

Alternative C

Surface Disturbance

Impacts to the Heart Mountain Relocation Center National Historic Landmark from surface disturbance would be similar to, but greater than, those under Alternative A. Projected surface disturbance under Alternative C (Table 4-1) would result in the greatest potential for alterations to the viewshed, resulting in adverse impacts to the setting of the National Historic Landmark.

Resource Uses

Impacts from ROW development near Heart Mountain Relocation Center National Historic Landmark under Alternative C would be similar to those described for Alternative A, but less than under Alternative A and more than under alternatives B and D. Under Alternative C, the Planning Area is open to renewable energy development unless managed as a ROW exclusion or avoidance area. The BLM manages 1,173,162 acres as ROW avoidance areas and 7,586 acres as ROW exclusion areas, with 1,428,360 acres open to renewable energy.

Proactive Management

Proactive management under Alternative C would result in fewer beneficial impacts to the Heart Mountain Relocation Center National Historic Landmark than under Alternative B. The BLM does not apply a buffer to prohibit surface-disturbing activities around the National Historic Landmark, but does manage areas within the footprint of the original Heart Mountain Urban Area (912 acres) as closed to mineral leasing and closes areas within ¼ mile (387 acres) and in view within 1 mile to mineral materials disposal.

Alternative D

Surface Disturbance

Impacts to the Heart Mountain Relocation Center National Historic Landmark from surface disturbance under Alternative D would be similar to those under Alternative A. Alternative D results in 3 percent more short-term and 17 percent more long-term surface disturbance than Alternative A, with a proportional degree of potential adverse impacts to the National Historic Landmark. Overall, surface disturbance under Alternative D would result in the second highest potential for adverse impacts to the National Historic Landmark.

Resource Uses

Impacts to the Heart Mountain Relocation Center National Historic Landmark from ROW development near the National Historic Landmark under Alternative D would be similar to impacts under Alternative

C, and more than impacts under Alternative B. Under Alternative D, the Planning Area is open to renewable energy development unless managed as a ROW exclusion or avoidance area. The BLM manages 2,408,662 acres as ROW avoidance areas and 40,802 acres as ROW exclusion areas, with 1,315,309 acres open to renewable energy.

Proactive Management

Proactive management under Alternative D would result in fewer beneficial impacts than under Alternative B, but more than under alternatives A and C. Measures to preserve the viewshed around the Heart Mountain Relocation Center National historic Landmark under Alternative D, including not authorizing undertakings of moderate or strong contrast, except ROWs within the utility corridors (Map 66); requiring all undertakings in the viewshed to have a visual contrast rating and visual simulation, as appropriate; and avoiding, minimizing and/or compensation for adverse impacts from all undertakings within the viewshed would protect the National Historic Landmark's historical setting and contribute to the preservation of its historical integrity. Alternative D also restricts mineral leasing in the vicinity of the National Historic Landmark similarly to, but more than Alternative C, and prohibits mineral materials disposal within the 72 acres of the National Historic Landmark Urban Center. Overall, proactive management actions under Alternative D would protect the historical setting of the National Historic Landmark more than alternatives A and C, but less than Alternative B.

Alternative E

Impacts to the Heart Mountain Relocation Center National Historic Landmark under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis for National Historic Landmarks under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Impacts to the Heart Mountain Relocation Center National Historic Landmark under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for National Historic Landmarks under Alternative D is representative of the impacts anticipated under Alternative F.

4.7.4 National Historic Trails and Other Historic Trails

The Nez Perce (Nee-me-poo or Nimi'ipuu) NHT is the only NHT in the Planning Area. A number of Other Historic Trails also pass through the Planning Area, including trails of importance to Native Americans, routes from the early historic period, such as the Bridger Trail, and roads and highways from the late 19th and early 20th centuries. Maps 91 and 92 illustrate the Nez Perce NHT and Other Historic Trails.

The Nez Perce NHT is managed to protect its historical values while providing recreation opportunities in a natural appearing landscape consistent with *The 1990 Nez Perce National Historic Trail Comprehensive Plan* and any revisions (USFS 1990). On the trail sections of the Nez Perce NHT, the only allowed use is hiking and horseback riding (USFS 1990) however, the Planning Area does not contain a designated trailhead at this time.

Congressional designation of a trail as part of the National Trails System signifies that the resource is of exceptional scenic, recreational, and/or historic value. NHTs and Other Historic Trails are fragile, nonrenewable resources that provide a direct and tangible link to human history in the Planning Area. As resources on public land under the jurisdiction of a federal agency, the BLM is responsible for their

protection and interpretation, and must consider their resource, qualities, values, and associated settings and the primary use or uses when making land use decisions.

Adverse impacts to trail resources are primarily the result of direct impacts from actions that disturb the soil or alter characteristics of the surrounding environment that contribute to the trail's significance. This includes the introduction of visual elements out of character with the existing scenery, or other actions that alter the setting or result in neglect of the resource to the extent that it deteriorates or is destroyed. For example, surface-disturbing activities that impact trail ruts are considered adverse impacts because the trail segments are nonrenewable. In contrast, actions that result in data collection and preservation of NHTs and Other Historic Trails can be considered beneficial impacts. Beneficial impacts also include proactive trail management, such as hardening NHT-related sites to protect the NHT resource while allowing for public use.

Indirect impacts to NHTs and Other Historic Trails primarily result from project-related increases or decreases in activity in the Planning Area. For example, the construction of a recreational facility may increase visitor use, which would result in an indirect impact to previously undisturbed trail segments. Recreation in particular is a complex issue, because actions taken to preserve historic values can result in both beneficial and adverse impacts for the resource, and for heritage tourism and trail enthusiasts. Beneficial impacts from recreation management is an extended knowledge and appreciation of the historical values, which enhances the beneficial outcomes desired by enthusiasts, which in turn fosters ethical use and support to sustain the unique resource values. Construction in an area some distance from a trail also can result in erosion or deposition at a trail location.

Because of the nonrenewable nature of NHTs, there is little distinction between short-term and long-term impacts. An exception to this would be visual impacts related to temporary construction or fire-related impacts. For example, a change in vegetation resulting from fire or clearing would be a temporary impact, as long as it did not lead to erosion of the trail. Similarly, if construction activity temporarily intruded into the trail's viewshed, this would be a temporary impact, as long as the construction itself did not directly affect the trail or result in a condition that may lead to indirect impacts.

4.7.4.1 Methods and Assumptions

This impact analysis employs BLM Manual 6280 (BLM 2012d) and trail management guidelines (BLM 1986b) to determine the impacts to NHTs and Other Historic Trails from the management of other resources, as described in this RMP. Other Historic Trails are trails eligible for listing on the NRHP, whether or not they have been listed. Completion of the evaluation step of Section 106 compliance may be necessary before moving forward with an undertaking that impacts a trail. Trails will be evaluated for eligibility based on the guidelines provided in the 1986 trails management guide, as interpreted in light of contemporary understanding of eligibility criteria.

Methods and assumptions used in this impact analysis include the following:

- Protection of NHTs and Other Historic Trails and related sites occurs in accordance with federal laws and BLM regulations, policy, and agreements, including the BLM National Programmatic Agreement (BLM, ACHP, and National Conference of SHPO 2012) and the Wyoming State Protocol (BLM and Wyoming SHPO 2014), regardless of whether the trails are specifically identified in the RMP.
- Direct and indirect impacts, including substantial interference with the nature and purposes of the NHT can result from a variety of natural and human-caused events, such as those that

physically alter, damage, or destroy all or part of the trail, and impact the resources, qualities, values, and associated settings, and the primary uses of the NHT; improve access, bringing increased use to an area, altering characteristics of the surrounding environment that contribute to the trail's importance; the introduction of visual or audible elements out of character with the trail or that alter its setting; and neglect of the trail to the extent that it deteriorates or is destroyed.

- The intensity of surface disturbance by alternative as identified in Appendix T equates to levels of development and, in turn, increased access to public lands.
- Current livestock management practices and wildlife use do not pose a threat to the Nez Perce NHT or Other Historic Trails, but improper management of livestock or concentrated herbivory could lead to accelerated deterioration of National Historic Trails or Other Historic Trails.
- The BLM looks favorably at opportunities to cooperate with private landowners to minimize or eliminate disturbance to NHTs and Other Historic Trails.
- Recognizing that historic trails often comprise numerous routes rather than a single trace, all protective zones begin at the outer edges of trails rather than at a centerline, which is difficult to define.
- Certain projects, due to size or topography, may require consideration of visual intrusions into the setting beyond the foreground or middle-ground zones to become consistent with the modern understanding of impacts, and to comply with Section 106 of the NHPA.

4.7.4.2 Summary of Impacts by Alternative

Principal impacts to the Nez Perce NHT, the only NHT in the Planning Area, and Other Historic Trails arise directly from development activities and intrusions into the viewshed that alter the environment that contributes to the trail's significance. These development activities and intrusions may impact other resources, qualities, values, and associated settings, and the primary use or uses of the NHT, including loss of trail-related recreation opportunities, and a decline in the visual, recreation, and natural trail settings. Alternatives B and E provide the greatest protection for these trails through the application of a larger management corridor for surface-disturbing activity (both NSO and CSU) and restrictions on motorized vehicle use. The larger acreage of special designations and greater limitations on resource use under Alternative E reduce the potential for direct and indirect adverse impacts to a greater extent than the other alternatives. Alternative C allows the greatest resource use and provides the least protection through special designations, but it does provide more effective proactive management, including NSO and CSU restrictions, than Alternative A. Alternative A, the existing management, includes the least effective proactive management, in part because of the change in understanding of the adverse impact of viewshed intrusions that has evolved since this management was developed. However, management under Alternative A would result in less resource use than Alternative C, and adverse impacts would likewise be less under this alternative. Alternatives D and F provide for similar protection to these trails, which is more than alternatives A and C, but less than alternatives B and E.

4.7.4.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Standard procedures have been developed over the years to help address potential adverse impacts to NHT resources. Because they are Congressionally Designated Trails, priority is given to avoiding,

minimizing and/or compensating impacts from development and use. Standard management and protection procedures, guided by the National Trails System Act and the NHPA, include avoidance, screening projects from the trails behind natural features, innovative redesign or camouflaging of projects, and using existing disturbances along trails for placement of projects. These standard procedures have protected NHT resources from adverse impacts and damage in many cases. However, if total avoidance has not been feasible, mitigation measures designed to minimize impacts to the NHTs and their historic settings have been continually improved and implemented over the years. All of the alternatives are guided by these standard procedures.

The BLM manages the Nez Perce NHT in accordance with the Nez Perce Comprehensive Management Plan (USFS 1990) guidance and direction, including any future revisions. For all federal undertakings that may impact NHTs and Other Historic Trails, the BLM complies with NHPA Section 106 before implementing the undertaking. Although resource avoidance is the preferred mitigation, other solutions may be reached. Section 106 compliance typically includes inventory, evaluation, and consultation with the SHPO.

Application of the standards specified in BLM trail management guidance, and in the 1986 historic trails plan (BLM 1986b), also will limit adverse impacts to trail resources. These standards include:

- Avoid impacts to all physical remains with good integrity.
- Avoid impacts to locales with good environmental integrity.
- Cross the setting where the integrity of setting has already been compromised.
- Avoid running a linear project parallel to a trail.
- Cross at 90 degrees using a dog-leg or S-curve.
- Relocate the proposed disturbance where it will be less visible from the trail (i.e., behind a rise).
- Restrict the width of a working ROW within a visual buffer on either side of a trail.
- Avoid any blading on a ROW within the National Trail Management Corridor if a track can do the job.
- Consider special rehabilitation measures (such as revegetation) which will help reestablish the integrity of the trail.
- Consider special interpretive measures (such as signing) which will help mitigate the impact of the project.

BLM Manual 6280, Appendix 1 (BLM 2012d) provides additional design features and BMPs that may be applied to avoid adverse impacts to the Nez Perce NHT site-specific permitting and plan implementation.

Allowable uses and management actions that may impact NHTs and Other Historic Trails include changes in ownership, access, and proactive NHT and Other Historic Trails management actions. Any surface-disturbing activity, regardless of type, on or adjacent to NHTs or Other Historic Trails may cause adverse impacts to contributing segments of the trails, or may cause substantial interference. Recreation and educational uses of the trails under any alternative may have both a beneficial and an adverse impact. Information about the trails may promote preservation, but also may encourage visitation and use, which may degrade trails. Under all alternatives, motorized vehicle use is anticipated to increase in the Planning Area, bringing greater access and the potential for greater adverse impacts. Travel on Nez Perce NHT trail segments in the Planning Area is limited to foot or horseback, which would limit the potential for these adverse impacts; however, unauthorized motorized vehicle use on the NHTs

or Other Historic Trails with similar restrictions may still adversely impact contributing segments of trails and desired recreational settings.

Visual impacts from development, such as wind turbines, or incompatible use, such as motorized vehicles on intact trails, are possible even with the applications of protective actions listed above. The existing plans considered the maintenance of a ¼-mile National Trail Management Corridor adequate protection in most trail situations, with the occasional application of a 5-mile National Trail Management Corridor a generous allowance that would provide protection to the viewshed of the Nez Perce NHT. However, with the introduction of new technology, particularly wind turbines that are often grouped into wind farms and visible from long distances, a ¼-mile National Trail Management Corridor may not adequately protect the Nez Perce NHT's viewshed. As setting has gained importance in determining the NRHP eligibility of significant trails, trail management must approach the application of viewshed criteria with flexibility, considering the distance from the resource and the type of intrusion when determining the impact. On a case-by-case basis, and as appropriate for some projects, project decisions will consider the importance of viewshed integrity in a resource's eligibility, and the distance necessary to protect its NRHP significance.

Alternative A

Surface Disturbance

The BLM avoids surface-disturbing activities in the vicinity of the Nez Perce NHT and Other Historic Trails under Alternative A. Standard compliance with NHPA Section 106 before approving an action would provide additional protection from direct impacts. If direct impacts are unavoidable, the BLM and the SHPO would consult to develop and implement a treatment plan to mitigate adverse impacts to contributing segments, which may result in project relocation. Detailed recording and mapping or interpretation are some of the techniques that may be used for mitigation, depending on the specific trail segment and the nature of the potential adverse impacts.

Restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations) under Alternative A provide additional protection for trail resources.

Resource Uses

Lands and realty actions on BLM-administered surface land can result in both beneficial and adverse impacts to the Nez Perce NHT and Other Historic Trails. The survey that would be required for NHPA Section compliance in the case of either disposal or acquisition would result in a beneficial impact to cultural resources because of data that furthers understanding of trail resources in the Planning Area. If contributing segments were identified during an inventory for disposal of lands, there would be an adverse impact due to a change in the protective measures for cultural resources. If the BLM acquired the land, the impact would be beneficial. Although land-tenure adjustment is classified as an adverse impact (in terms of Section 106), development of a treatment plan for contributing trail segments would mitigate that impact. The plan would be developed through consultation between the BLM and SHPO in compliance with Section 106 and BLM trail guidance.

Actions regarding renewable energy projects and linear resources, including ROWs, corridors, and recreational trails management may all impact the Nez Perce NHT and Other Historic Trails, not only adversely through direct disturbance of the trail, but indirectly because the routes traveled by trails may also be the best route for these other resource uses. Under Alternative A, the Nez Perce NHT and Other Historic Trails are provided with a maximum buffer from surface disturbance and visual impacts of

¼ mile. Renewable energy is one of the more problematic resource uses, because the infrastructure to exploit solar and wind energy may be highly visible, depending on the terrain, but the buffer to protect the trail viewshed is limited to ¼ mile. Some beneficial impacts may result from inventory and the identification of previously unrecorded segments. In all cases, adverse impacts must be mitigated in compliance with NHPA Section 106.

Travel management and recreation also may result in both direct and indirect, and adverse and beneficial impacts. Where recreational uses occur along the Nez Perce NHT and Other Historic Trails, use may degrade the surface of the trail or impact the viewshed from the trail. Improved access and construction of trailheads, educational signs, and/or kiosks may increase use of the trails and expose them to vandalism. Limiting vehicle travel to existing roads and trails on BLM-administered lands in most areas along the Nez Perce NHT and limiting travel to foot or horseback along the trail would reduce the potential for these adverse impacts.

Special Designations

Special designations would tend to have beneficial impacts to the Nez Perce NHT and Other Historic Trails. The main exception would be back country byways, which would indirectly and adversely impact historic trails resources through increased access. However, vehicle travel and heritage tourism on the segment of the Nez Perce NHT Auto Route, which runs concurrently with the Chief Joseph National Scenic Byway, may have beneficial impacts by imparting travelers with an extended knowledge and appreciation of the NHT's historical values.

Resources

The impact of fire and fuels management would be primarily adverse. Because of the unique nature of trails, there is little to distinguish between long- and short-term impacts, because once trail ruts or original markers are disrupted or destroyed, they cannot be restored. Use of a trail corridor to access a fire location for suppression, stabilization and rehabilitation, and creation of fire breaks, can all result in direct, adverse impacts. Approximately 70,000 acres of short-term disturbance from fire and fuels management are anticipated under Alternative A (Appendix T).

Cultural resources and VRM would both have direct and indirect beneficial impacts to the Nez Perce NHT and Other Historic Trails. Because management of both these resources overlaps with management of historic trails, the trails would benefit from protections and proactive activities for these other resources. The Nez Perce NHT and surrounding public lands are generally managed as VRM Class II, which would help to retain the integrity of the associated settings and scenic values for which the NHT was designated.

Proactive Management

Proactive management actions under Alternative A generally result in beneficial impacts to the Nez Perce NHT and Other Historic Trails but may provide inadequate protection in areas where development is permitted within trail viewsheds. Under existing management, an NSO stipulation is applied within ¼ mile of the Nez Perce NHT and Other Historic Trails. Because trails often comprise multiple traces, the ¼-mile National Trail Management Corridor extends from the outer edges of the overall trace (1,638 acres of BLM-administered surface land). Current management also avoids surface-disturbing activities in view within ¼ mile of both the Nez Perce NHT and significant segments of Other Historic Trails, including the Bridger Trail and Fort Washakie to Meeteetse to Red Lodge Trail.

Alternative B

Surface Disturbance

Surface disturbance affects fewer acres under Alternative B, and thus has less direct impact on the Nez Perce NHT and Other Historic Trails compared to Alternative A. As with Alternative A, actions that may physically impact the trails, particularly the Nez Perce NHT, would be limited through enforcement of a National Trail Management Corridor. Under this alternative, the National Trail Management Corridor would extend to areas in view within 5 miles of the Nez Perce NHT and Other Historic Trails, except within existing utility corridors. Additional protections come from an NSO restriction within 3 miles and a CSU stipulation in view within 5 miles of the Nez Perce NHT and Other Historic Trails. The same distances apply to mineral materials disposal.

As with the other alternatives, normal compliance with NHPA Section 106 before approving an action moderates the amount of actual disturbance. In addition, the BLM and the SHPO consult to develop and implement a treatment plan to mitigate adverse impacts to contributing trail segments.

Restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations) are greater under Alternative B than Alternative A, providing more protection for trail resources.

Resource Uses

Impacts related to lands and realty actions on BLM-administered surface land are anticipated to be similar to those for Alternative A; however the intensity varies by alternative. Compliance with the NHPA would still be required. More acreage may be acquired under Alternative B than under Alternative A, with the result that there would be more survey and identification of potentially NRHP-eligible trail segments under Alternative B.

Management of renewable energy projects and linear developments (e.g., ROWs, corridors, and travel and trails management), would result in similar, but of a reduced magnitude impacts, than under Alternative A. Alternative B provides a wider National Trail Management Corridor than Alternative A, and limits ROW authorizations within 5 miles for the Nez Perce NHT and Other Historic Trails (except within existing utility corridors). As with the other alternatives, renewable energy presents a special situation. Even the wider National Trail Management Corridor required under Alternative B may need to be expanded as the trails' viewsheds are considered on a case-by-case basis, depending on the terrain. In all cases, adverse impacts must be mitigated in compliance with NHPA Section 106.

Travel management and recreation would result in similar direct and indirect, and adverse and beneficial impacts as Alternative A; however, Alternative B provides for more recreational options and more anticipated disturbance than Alternative A. Improved access also may indirectly lead to impacts; however, limiting motorized vehicle use to designated roads and trails in view within 5 miles of the Nez Perce NHT or Other Historic Trails would limit the potential for activities that may degrade the surface of the trail or impact the trail viewshed to a greater extent than Alternative A.

Special Designations

Alternative B designates more special designation areas and includes greater restrictions on surface-disturbing activity within these areas than Alternative A. These additional restrictions would result in the greatest beneficial impact to NHTs and Other Historic Trails. However, Alternative B also designates more back country byways than Alternative A and develops more interpretative facilities than the other alternatives, which may increase adverse impacts through increased access, but may also have

beneficial impacts by promoting knowledge and appreciation of trail resources. Alternative B would therefore result in greater adverse and beneficial impacts than Alternative A.

Resources

The impact of fire and fuels management would be primarily adverse under Alternative B, but would have less impact compared to Alternative A due to its smaller projected acreage of related disturbance.

Alternative B provides more protection for cultural and visual resources than Alternative A, resulting in greater beneficial impacts to NHTs and Other Historic Trails. For example, Alternative B manages more of the Planning Area as VRM Class I and II, which would close or limit motorized vehicle use to designated roads and trails. Similar to Alternative A, the Nez Perce NHT and surrounding public lands are generally managed as VRM Class II, which would help to retain the integrity of areas outside of the National Trail Management Corridor that contribute to the associated settings and scenic values for which the NHT was designated.

Proactive Management

Proactive management actions under Alternative B emphasize resource protection in the vicinity of the Nez Perce NHT and Other Historic Trails through a 3-mile NSO and 5-mile CSU buffer, and viewshed buffers. In addition, this alternative allows wider buffers on a case-by-case basis for certain types of development, such as wind-energy developments. As mentioned above, use of motorized vehicles also is limited to designated roads and trails in view within 5 miles of trails. Because trails often comprise multiple traces, the Nez Perce National Trail Management Corridor extends from the outer edges of the overall trace. This National Trail Management Corridor is larger under Alternative B than Alternative A. Alternative B removes canals from the same type of consideration as trails, recognizing that the significance criteria for this resource type are different from those of other linear features, such as trails.

Alternative C

Surface Disturbance

Alternative C is projected to result in the greatest acreage of surface disturbance and, consequently, the greatest potential to the Nez Perce NHT and Other Historic Trails. As with the other alternatives, compliance with BLM management practices and the NHPA would limit adverse impacts through development of treatment plans and limitations on development within the Nez Perce National Trail Management Corridors.

Because management under Alternative C places a greater emphasis on resource use, there would be fewer restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations). Therefore, although there would be some additional protection for trail resources, it would be less than under alternatives A, B, or D.

Resource Uses

The Nez Perce NHT and Other Historic Trails would be affected by lands and realty management similar to Alternative A. As under the other alternatives, the survey required for NHPA Section 106 compliance in the case of either disposal or acquisition would result in a beneficial impact to cultural resources because of data that furthers understanding of trail resources in the Planning Area.

Under Alternative C, the management of renewable energy projects and linear developments (e.g., ROWs, corridors, and recreational trails management) would have greater impacts on the Nez Perce NHT and Other Historic Trails than actions under alternatives A, B, or D. Under this alternative, an NSO

restriction is applied, similar to Alternative A, but a 1-mile CSU stipulation is also added to protect the Nez Perce NHT. The areas around the Nez Perce NHT are closed to mineral materials disposal within ¼ mile or in view within 1 mile, and motorized travel is limited to designated roads and trails in view within ¼ mile. Similar restrictions are applied to Other Historic Trails, except within existing utility corridors where the trail lacks integrity or the viewshed has been compromised. Some beneficial impacts would result from the inventory and identification of previously unrecorded segments. In all cases, adverse impacts must be mitigated in compliance with NHPA Section 106.

Improved access, due to fewer limitations on motorized vehicle use, has the greatest potential to result in indirect adverse impacts under this alternative. Similarly, recreational development is greatest under this alternative, potentially leading to the greatest adverse impacts. However, installation of educational kiosks, diversion of traffic away from the historic trail to alternative routes, and general improved education would have a beneficial impact.

Special Designations

Beneficial impacts from special designations would be lowest under Alternative C. Having fewer special designations and, fewer restrictions within those areas would reduce the benefits to NHTs and Other Historic Trails. Back country byways, which may indirectly affect historic trails resources through increased access and interpretive opportunities, are managed similar to Alternative A.

Resources

As under the other alternatives, impacts from fire and fuels management would be primarily adverse. A greater emphasis on commodity production would increase the potential for adverse impacts. Alternative C would cause the most disturbance related to fire and fuels management compared to alternatives A, B, and D.

Under Alternative C, cultural and visual resources management would continue to result in both direct and indirect beneficial impacts to the Nez Perce NHT and Other Historic Trails, although the impacts would be less than under alternatives B and D. For example, motorized vehicle use is not limited by VRM class under Alternative C, whereas Alternative B restricts motorized vehicle use in these areas. Alternative C manages the Nez Perce NHT and surrounding public lands primarily as VRM Class III, which would allow activities within the viewshed, but outside of the National Trail Management Corridor, to adversely affect the associated settings and scenic values for which the NHT was designated to a greater extent than Alternative A.

Proactive Management

Proactive management actions under Alternative C would result in beneficial impacts to the Nez Perce NHT and Other Historic Trails. Under existing management, a NSO restriction is added within ¼ mile of the Nez Perce NHT and Other Historic Trails, Alternative C adds a CSU restriction within 1 mile of the Nez Perce NHT and Other Historic Trails. Exceptions occur where the trail's integrity or setting has been compromised. Areas within ¼ mile or in view within 1 mile also are closed to mineral materials disposal, and motorized vehicle use is limited to designated roads and trails, which would reduce access and associated impacts. Limiting motorized vehicle use to designated roads and trails within a ¼-mile of the Nez Perce NHT or Other Historic Trails would limit the potential for activities that may degrade the surface of the trail or impact the trail viewshed to a greater extent than Alternative A, which does not include specific restrictions on motorized vehicle use for purposes of protecting these trails.

As with the other alternatives, because NHT and Other Historic Trails often comprise multiple traces, the National Trail Management Corridor extends from the outer edges of the overall trace. The size of the

National Trail Management Corridors and associated restrictions under Alternative C are less than those required under alternatives B and D, but more than under Alternative A.

Alternative D

Surface Disturbance

The amount of surface disturbance projected under Alternative D is similar to Alternative A, falling between the amount of disturbance projected under alternatives B and C. As with Alternative A, actions that would directly affect these trails, particularly the Nez Perce NHT, would be limited due to management that restricts certain resource uses within the National Trail Management Corridor and areas within view of Other Historic Trails. In contrast to the other alternatives, Alternative D does not contain management specific to mineral leasing (e.g., NSO or CSU restrictions) or mineral materials disposal, instead controlling these uses through a more generalized management approach to mitigate their impacts. Under this alternative, the BLM avoids surface-disturbing activities and protects the foreground of the trails up to 3 miles or the visual horizon whichever is closer (the setting consideration zones) where setting is an important aspect of the integrity of the trail, and uses BMPs to avoid, minimize and/or compensate adverse impacts.

As with the other alternatives, required compliance with NHPA Section 106 before approving an action would reduce disturbance or adverse impacts to these trails. Additionally, the BLM and the SHPO consult to develop and implement a treatment plan to mitigate adverse impacts to contributing trail segments.

Restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations) under Alternative D would result in impacts similar to Alternative A.

Resource Uses

The types of impacts from lands and realty management are anticipated to be similar to those described under Alternative A, though the intensity of these impacts would be less than under alternatives A or C, and more than under Alternative B. In all cases, compliance with the NHPA is still required.

The management of renewable energy projects and linear developments (e.g., ROWs, corridors, and travel and trails management) would result in fewer adverse impacts than Alternative A. Alternative D provides protection via a wider National Trail Management Corridor than either alternatives A or C, but less than Alternative B. For Other Historic Trails, motorized vehicle use is constrained or guided by other resource management actions and does not have trails-specific requirements, in contrast to alternatives B and C. As with the other alternatives, renewable energy presents a special situation, whereby the trails' viewsheds are considered on a case-by-case basis, depending on the terrain. In all cases, adverse impacts must be mitigated in compliance with NHPA Section 106.

For other resource uses, including recreation and livestock grazing, impacts from management under Alternative D would be similar to those under Alternative A.

Special Designations

Alternative D designates more special designation areas and includes greater restrictions on surface-disturbing activity within these areas, resulting in a greater beneficial impact than alternatives A and C. In all cases, improved access also may indirectly lead to impacts. Although Alternative D has fewer back country byways than Alternative B, it has more than alternatives A and C, and may increase access to, and interpretive opportunities related to, historic trails in the vicinity of the byways.

Resources

The impact of fire and fuels management would be similar to that under Alternative A. Alternative D protects cultural and visual resources somewhat less than Alternative B, but more than either alternatives A or C, resulting in beneficial impacts to NHTs and Other Historic Trails. Alternative D manages the Nez Perce NHT and surrounding public lands as VRM Classes II and III, which would help to retain the integrity of areas outside of the National Trail Management Corridor that contribute to the associated settings and scenic values for which the NHT was designated. These beneficial impacts would be similar to, but somewhat less than Alternative A due to the larger area managed as VRM Class III under Alternative D.

Proactive Management

Proactive management actions under Alternative D emphasize avoidance of surface-disturbing activities and protection of the foreground of the Nez Perce NHT and Other Historic Trails. For the Nez Perce NHT, Alternative D requires the avoidance of surface-disturbing activity up to 3 miles or the visual horizon whichever is closer (the setting consideration zones) where setting is an important aspect of the integrity for the trail. BMPs are to be used to avoid, minimize and/or compensate adverse effects for the Nez Perce NHT and all Historic Trail segments. Motorized vehicle use is limited to existing roads and trails within 5 miles of the Nez Perce NHT, which would result in similar impacts as described for Alternative B. For Other Historic Trails, the foreground is to be protected up to 2 miles, and motorized vehicle use is constrained or guided by other resource management actions. In addition, consideration of wider buffers may be necessary on a case-by-case basis for certain types of development, such as wind-energy developments. Because trails often comprise multiple traces, the National Trail Management Corridor extends from the outer edges of the overall trace. This National Trail Management Corridor is larger under Alternative D than alternatives A and C, but smaller than Alternative B.

Alternative E

Surface Disturbance

Alternative E applies the same management corridor as Alternative B (refer to Map 91), and adverse and beneficial impacts to the Nez Perce NHT and Other Historic Trails from surface-disturbing activities would be similar to Alternative B. However, under Alternative E, additional restrictions on surface-disturbing activities along 31 miles of the Nez Perce NHT and Other Historic Trails would apply in areas overlapping the Greater Sage-Grouse Key Habitat Areas ACEC. These restrictions would include withdrawal from locatable mineral entry, closures to mineral materials disposal, ROW and renewable energy exclusion, and additional restrictions on allowable density and area of disturbance which would result in greater protection for these trails. Alternative E has the lowest amount of acres affected by surface disturbances, and thus has the least potential for direct impact on the Nez Perce NHT and Other Historic Trails of any of the alternatives.

In areas outside of the Greater Sage-Grouse Key Habitat Areas ACEC, restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations) and consultation and compliance requirements under NHPA Section 106 are the same as under Alternative B, and impacts would be the same as Alternative B.

Resource Uses

The management of resource uses under Alternative E, except for certain resource uses in the proposed Greater Sage-Grouse Key Habitat Areas ACEC, is the same as Alternative B; impacts to trail resources outside the ACEC would be the same as Alternative B, while impacts inside the ACEC would be less adverse. Lands in the Greater Sage-Grouse Key Habitat Areas ACEC are managed for potential acquisition, so more acreage may be acquired under Alternative E than any other alternatives, with resulting surveys that may identify other potential NRHP-eligible trail segments. All lands within the proposed Greater Sage-Grouse Key Habitat Areas ACEC are managed as excluded from ROW and renewable energy uses, which may reduce the magnitude of impacts from new developments on trail resources in the area compared to the other alternatives. Under Alternative E, the Greater Sage-Grouse Key Habitat Areas ACEC is closed to all types of mineral development, which may decrease the potential for adverse impacts from these types of activities.

Overall, additional protective management along certain trail segments in the Greater Sage-Grouse Key Habitat Areas ACEC would reduce adverse impacts to the Nez Perce NHT and Other Historic Trails; along all other portions, impacts from resources uses would be the same as Alternative B. As with all the alternatives, compliance with the NHPA would be required for all actions under Alternative E.

Special Designations

Alternative E designates more special designation areas and includes greater restrictions on surface-disturbing activity within these areas any other alternative. In addition to all the special designations made under Alternative B, Alternative E also designates the Greater Sage-Grouse Key Habitat Areas ACEC (1,232,583 acres). The addition of this ACEC would provide additional protection for the Nez Perce NHT and Other Historic Trails through greater restrictions on surface-disturbing activities. These additional restrictions would result in the greatest beneficial impact to the NHT and Other Historic Trails of any alternative from special designations management.

Resources

Fire and fuels management under Alternative E, except for areas in the proposed Greater Sage-Grouse Key Habitat Areas ACEC, is the same as Alternative B; impacts to trail resources outside the ACEC would be the same as Alternative B. Additional restrictions in the Greater Sage-Grouse Key Habitat Areas ACEC would limit access for fire management activities compared to the other alternatives, which may reduce adverse impacts from fire suppression, stabilization, and rehabilitation compared to the other alternatives.

VRM and cultural resource management under Alternative E is the same as Alternative B, and impacts to trail resources would be the same as Alternative B.

Proactive Management

Management of the Nez Perce NHT and Other Historic Trails under Alternative E is the same as Alternative B, and beneficial impacts to these trail resources would be the same as Alternative B.

Alternative F

Surface Disturbance

Alternative F applies the same management corridor as Alternative D (refer to Map 92), and adverse and beneficial impacts to the Nez Perce NHT and Other Historic Trails from surface-disturbing activities would be similar to those discussed under Alternative D. However, under Alternative F, the BLM would

apply additional restrictions on surface-disturbing activities along 24 miles of the Nez Perce NHT and Other Historic Trails located in the Greater Sage-Grouse PHMAs ACEC. These restrictions would include restrictions on leasable mineral development and more stringent allowable density and area of disturbance considerations, which may result in greater protection for these trails. Total projected surface disturbance under Alternative F is similar to alternatives A and D, less than Alternative C, and greater than alternatives B and E.

In areas outside of the Greater Sage-Grouse PHMAs ACEC, restrictions on surface-disturbing activities for the protection of other resources (e.g., soil, water, biological resources, and special designations) and consultation and compliance requirements under NHPA Section 106 are the same as Alternative D, and impacts would be the same as Alternative D.

Resource Uses

The management of resource uses under Alternative F, except for certain resource uses in the proposed Greater Sage-Grouse PHMAs ACEC, is similar to management under Alternative D; impacts to trail resources outside the ACEC would be the same as Alternative D while impacts inside the ACEC may be less adverse. Lands in the Greater Sage-Grouse PHMAs ACEC would limit motorized vehicle use to designated roads and trails, potentially limiting access in the area to a greater extent than alternatives A, C, and D, but less so than alternatives B and E. Within the ACEC, NSO restrictions within 0.6 mile of occupied greater sage-grouse leks may also benefit trail resources where they overlap with these leasable mineral surface restrictions.

Overall, additional protective management along certain trail segments in the Greater Sage-Grouse PHMAs ACEC may result a slight reduction in adverse impacts for the Nez Perce NHT and Other Historic Trails; along all other portions, impacts from resources uses would be the same as described under Alternative D. As with all the alternatives, compliance with the NHPA would be required for all actions under Alternative E.

Special Designations

Alternative F designates more special designation areas than alternatives A, C, and D, and includes greater restrictions on surface-disturbing activities within these areas, resulting in greater beneficial impacts than under those alternatives. Alternative F includes the same back country byways as Alternative D, and impacts would be the same as Alternative D.

Resources

Fire and fuels management under Alternative F, except for areas in the proposed Greater Sage-Grouse PHMAs ACEC, is the same as Alternative D; impacts to trail resources outside the ACEC would be the same as Alternative D. Additional restrictions in the Greater Sage-Grouse PHMAs ACEC would limit the ability to use prescribed fire and implement fuels reduction in certain habitats, potentially resulting in fewer adverse impacts from fire and fuels management than alternatives A and D.

VRM and cultural resource management under Alternative F is the same as Alternative D, and impacts to trail resources would be the same as Alternative D.

Proactive Management

Management of the Nez Perce NHT and Other Historic Trails under Alternative F is the same as Alternative D, and beneficial impacts to these trail resources would be the same as Alternative D.

4.7.5 Wild and Scenic Rivers

There are 20 waterways and associated waterway corridors (comprising 27,317 acres) in the Planning Area that have been identified as eligible for inclusion in the NWSRS due to their ORVs and free-flowing conditions (Map 94). Chapter 3 and Appendix F describe the process used to identify WSR eligible waterways (WSR eligible waterway segments) and lists the ORVs, tentative classifications (wild, scenic, or recreational), and suitability determinations for each. The WSR review contained in Appendix F was conducted separately from the RMP planning process to expedite the review process, resulting in a stand-alone WSR review report. Following the review and response to any public comments that address WSR recommendations presented in this document, the BLM will release the Record of Decision that contain the agency's WSR findings.

This section describes proposed management actions for WSR eligible waterway segments likely to result in impacts to other resources, resource uses, and special designations. This section also describes the effects of management actions on the ORVs and other WSR-related qualities identified in these areas (i.e., their free-flowing condition, water quality, and other values which determined their tentative classifications).

Adverse impacts from management of WSR eligible waterways result from actions that restrict resource uses or the management of resources; beneficial impacts are those that enhance other resource uses or the management of resources. Adverse impacts to WSR eligible waterways are those that diminish free-flowing conditions, ORVs, and characteristics that justified their tentative classifications; beneficial impacts are those that preserve and enhance these qualities. ORVs include scenic, recreational, geologic, fish, wildlife, cultural, historic, and other similar values (e.g., ecologic/biologic diversity, paleontological, or botanic values). Adverse impacts to ORVs generally result from surface-disturbing activities (such as mineral development, ROW and road construction, and vegetation treatment and timber harvesting) or other activities that can affect vegetation or damage resources, such as concentrated livestock grazing and off-road motorized vehicle use.

Direct impacts result from management actions prescribed to WSR eligible waterway segments that restrict other resource uses or activities. Direct impacts also result from resource uses or activities (or restrictions thereof) within WSR eligible waterway corridors that affect their tentative classifications. Indirect impacts include management actions prescribed to overlapping special designations (e.g., WSAs) that may contribute to the preservation of free-flowing conditions, ORVs, and characteristics that justified their tentative classifications.

4.7.5.1 Methods and Assumptions

Methods and assumptions used in this impact analysis include the following:

- Alternative A assumes the BLM continues the current interim management for the 20 eligible waterways.
- Alternatives B and E assume that all 20 eligible waterways are recommended to Congress, and subsequently accepted, as suitable for inclusion in the NWSRs.
- Alternatives C, D, and F assume that the BLM recommends none of the eligible waterways to Congress as suitable for inclusion in the NWSRS.
- Interim Management of WSRs may not be consistent with other resource values.
- Designating rivers as WSRs may attract more visitors to the area, and therefore, increase resource use.

4.7.5.2 Summary of Impacts by Alternative

Alternatives A, B, and E apply interim management to the 20 eligible waterway segments and associated waterway corridors to preserve their free-flowing conditions, ORVs, and characteristics that justified their tentative classifications; Alternatives B and E also recommend all of these waterways to Congress as suitable for inclusion the NWSRS. In contrast, under alternatives C, D, and F, the BLM does not recommend any of these eligible waterways to Congress as suitable for inclusion in the NWSRS and therefore does not apply interim management to preserve their ORVs and free-flowing conditions. The preservation of any ORVs or other WSR-related qualities identified in the waterway segments would be least effective under alternatives C, D, and F due to the greater intensity of resource uses allowed under these alternatives. Alternatives E, B, and A, respectively, are the most protective of WSR eligible waterway segments and would result in the greatest beneficial impacts to the free-flowing conditions, ORVs, and characteristics that justified their tentative classifications by restricting or limiting resource uses that could degrade these qualities. Due to the extent and intensity of the restrictions under alternatives B and E, the beneficial impacts to the WSR-related qualities and the adverse impacts to other activities and resource uses would be greatest under these alternatives. Alternatives C, D, and F, respectively, include the least restrictive management of several resource uses and would have the fewest adverse impacts on mineral development, livestock grazing, and timber harvesting.

4.7.5.3 Detailed Analysis of Alternatives

Waterway segments are only recommended for inclusion in the NWSRS or managed to preserve ORVs and the free-flowing conditions under alternatives A, B, and E. Under alternatives C, D, and F, no waterways in the Planning Area are recommended for inclusion in the NWSRS or managed for the purpose of protecting any WSR-related qualities or characteristics.

Table 4-35 summarizes acreages and allocations associated with resources and resource uses along the waterway segments managed under alternatives A, B, and E. For purposes of comparison, this table also lists the acreages and allocations of these same waterway segments under alternatives C, D, and F; no special management actions are specifically applied to protect the ORVs and other WSR-related qualities under these alternatives.

Table 4-35. Acres of Management in Wild and Scenic River Eligible and/or Suitable Segments by Alternative

	Mineral Development Restrictions (acres)			Rights-of-Way (acres)			Visual Resource Management (acres)				Travel Management (acres)				
	Mineral Materials Closure	Closed to Mineral Leasing	Withdrawn from Mineral Entry	Exclusion	Avoidance	Open	Class I	Class II	Class III	Class IV	Closed	Limited to Designated	Limited to Existing	Open	Seasonal Restrictions
Alternative A	21,780	17,261	17,849	11,004	15,625	657	5,389	18,227	1,498	2,176	12,523	10,793	2,089	0	1,898
Alternative B	25,815	26,303	23,719	22,284	5,022	11	18,582	8,559	0	176	22,638	2,276	3	0	2,389
Alternative C	8,809	7,869	6,390	0	16,159	11,158	5,389	17,579	1,691	2,656	5,675	13,548	5,773	0	2,309
Alternative D	14,623	14,324	6,337	0	27,012	416	5,391	21,048	700	176	5,672	18,169	838	0	2,591
Alternative E	26,372	26,303	25,125	24,270	2,742	305	18,582	8,559	0	176	21,925	2,105	174	0	3,102
Alternative F	14,623	14,471	6,337	0	27,012	305	5,391	21,048	700	176	5,672	18,866	176	0	2,591

Source: BLM 2013a

Impacts Common to All Alternatives

There is no "common-to-all management" specific to WSR eligible and/or suitable waterway segments. However, any management that results in restrictions on resource use, development, or surface-disturbing activities near to WSR segments may result in beneficial impacts by reducing the potential for impacts on ORVs or the free-flowing conditions or other characteristics of these waterways. Alternatively, management that decreases restrictions in areas near these waterway segments may result in adverse impacts by diminishing ORVs and other characteristics of the waterways.

Alternative A

Under Alternative A, the BLM has identified 20 WSR eligible waterway segments (see Chapter 3) and applies interim management to protect their free-flowing conditions and ORVs. Under interim management, the qualities that preliminarily qualified the waterway segments as eligible for inclusion in the NWSRS are protected, and the undeveloped nature of the waterways is preserved.

Surface Disturbance

Under Alternative A, surface-disturbing and disruptive activities are allowed on a case-by-case basis along nine WSR eligible waterways and portions of the Clarks Fork of the Yellowstone River and White Creek, while such activities are prohibited along the other eligible waterways. Prohibitions against surface disturbance would result in adverse impacts to mineral development, range improvement projects, watershed improvement projects, recreation development, and other types of actions that benefit these resources and resource uses, while case-by-case reviews may result in additional expense and delays for these types of actions. Prohibitions on and, to a lesser degree, case-by-case reviews of surface-disturbing activities would generally result in beneficial impacts to the ORVs and other WSR-related qualities along the eligible waterway segments because activities that degrade these qualities are not allowed.

Under this alternative, the BLM performs a case-by-case review of all proposed actions along all WSR eligible waterways and applies protective management, subject to existing rights, as appropriate. Case-by-case reviews may result in additional expense and delay for some projects, but requiring reviews of all these actions may result in additional mitigation or design considerations that protect the ORVs and other WSR-related qualities of the waterways.

Resource Uses

Management for eligible WSR segments under Alternative A is designed to preserve their ORVs and other WSR-related qualities, but also imposes restrictions that would adversely affect other resources and resource uses. Restrictions on mineral entry, leasing, and disposal under this alternative would result in adverse impacts to mineral resources. Under Alternative A, nine WSR eligible waterways are withdrawn (or partially withdrawn in the cases of Porcupine, Dry Medicine Lodge, and White creeks) from appropriation under the mining laws and closed to mineral leasing. Along seven WSR eligible water segments, including portions on the Paint Rock Creek Unit and Clarks Fork of the Yellowstone River, this alternative applies an NSO restriction and a seasonal NSO restriction (in the WFO only) on mineral leasing. Alternative A also limits geophysical exploration along 11 WSR eligible waterway segments, including portions of White Creek and Clarks Fork of the Yellowstone River, to foot access and allows geophysical exploration via existing roads and trails along three other segments. Management under this alternative closes 12 WSR eligible waterway segments, including portions of White Creek and Clarks Fork of the Yellowstone River, to recreational dredging for minerals and mineral materials

disposal. Closing the majority of the WSR eligible waterway corridors to mineral entry, leasing, and disposal and applying additional restrictions on exploration and surface occupancy in the remaining areas would result in adverse impacts to mineral resources (see Table 4-35). Restrictions on mineral exploration and development in these areas would reduce adverse impacts to vegetation, wildlife, cultural, and scenic quality-related ORVs.

Closing 13 eligible and waterways, including portions of White Creek and Clarks Fork of the Yellowstone River, to timber sale or harvesting would result in adverse impacts to forest products and beneficial impacts to these WSR eligible waterways ORVs. Adverse impacts to the use of forest products would result from these restrictions on forest management practices and the extraction of forest products. Closure to timber sale or harvesting would result in beneficial impacts to the protection of ORVs if these closures prevent surface-disturbing activities, habitat loss, damage to cultural resources, degradation of scenic quality, or other ORVs along these waterway segments.

Under Alternative A, the BLM manages four WSR eligible waterways, (including a portion of White Creek), as ROW exclusion areas, nine as ROW avoidance areas (including portions on the Paint Rock Creek Unit and Clarks Fork of the Yellowstone River), and the remainder as open to ROW authorizations subject to case-by-case approval. Management that restricts the ability to grant ROW authorizations would result in adverse impacts to ROW authorizations. Impacts from restrictions on ROW authorizations would be more in ROW exclusion areas.

Closure of eligible and suitable waterway segments to disposal actions would result in an adverse impact to lands and realty by prohibiting land disposals along the waterway corridors identified in Chapter 3. Prohibiting disposals in these areas may result in beneficial impacts to WSR eligible and suitable waterway segments by preventing the disposal of land that could subsequently be used in a manner that diminishes ORVs.

Under Alternative A, five WSR eligible waterway corridors are closed to motorized vehicle use and the use of motorized or mechanized vehicle ground equipment to suppress fires (including a portion of White Creek); nine are limited to designated roads and trails (including a portion of Clarks Fork of the Yellowstone River); and the remainder are limited to existing roads and trails. Travel management that restricts motorized vehicle use, particularly through closures or limiting travel to designated routes, would result in adverse impacts to access and recreational motorized travel by eliminating some potential routes.

Alternative A includes management for WSR eligible waterway corridors to prevent an increase in actual grazing use, which may result in adverse impacts to livestock grazing and beneficial impacts to waterway ORVs. Adverse impacts to livestock grazing may result if additional forage becomes available in the WSR eligible waterway corridors and it cannot be allocated to grazing permittees. Beneficial impacts from limiting the amount of grazing use to current levels may include a smaller risk of damage to the ORVs that are vulnerable to invasive species (i.e., scenic, wildlife, and other vegetation-related values) and, in situations where livestock grazing could become concentrated if additional use is allowed, less soil compaction and degradation of riparian/wetland areas.

Special Designations

WSR eligible waterways, where they intersect specially designated areas with additional and more restrictive management, such as WSAs, would be afforded additional protection. In the case of WSAs, Class I VRM objectives and non-impairment standards as directed by BLM Manual 6330, *Management of Wilderness Study Areas* (BLM 2012a) would benefit the ORVs and the free-flowing condition of the waterways and other resources within these corridors, including wildlife, vegetation, soils, watershed, and recreational settings and experiences. However, these additional management prescriptions may

preclude other resource management actions that may benefit those resources, for example, watershed development projects and wildlife development projects such as fish barriers.

Resources

Prohibitions on water impoundments, major diversions, or hydroelectric power facilities on all WSR eligible waterways under Alternative A would result in adverse impacts to water development projects and beneficial impacts to the protection of the free-flowing condition of the waterways.

Managing the corridors along two WSR eligible waterway segments as VRM Class IV and 12 segments (including portions on the Paint Rock Creek Unit, White Creek, and Clarks Fork of the Yellowstone River) as VRM Class II would result in adverse impacts to resource uses and development, but would benefit certain ORVs (see Table 4-35). Along WSR eligible waterway segments where there is no WSR-specific VRM objectives, visual resources are managed consistent with the underlying VRM classification in consideration of the need to avoid damaging the identified ORVs. Managing visual resources as VRM Class II would restrict the development and use of other resources because the allowable visual contrast would be limited and additional design consideration or mitigation may be required for certain activities. Management under stricter VRM Classes (i.e., Classes I and II) would be beneficial to the protection of scenic, recreational, and other ORVs that may be affected by surface-disturbing and other related activities. WSR eligible waterways are managed as VRM Class I where they intersect WSAs.

Alternative B

Under Alternative B, the BLM recommends to Congress that all 20 waterway segments identified as WSR eligible in Alternative A are suitable for inclusion in the NWSRS (see Chapter 3). To support this recommendation, the BLM applies specific management prescriptions to protect and enhance their free-flowing conditions, ORVs, and other wild, scenic, or recreational characteristics.

Surface Disturbance

Under Alternative B, surface-disturbing and disruptive activities are prohibited along all the WSR suitable segments and impacts would be similar to, but more extensive than, those under Alternative A. Closing lands along the Middle Fork of the Powder River, Paint Rock Creek Unit, and Dry Medicine Lodge Creek and other additional waterways under this alternative would provide only minimal added protection, because the case-by-case authorization of surface-disturbing activities under Alternative A would be used to protect the free-flowing condition and ORVs associated with these waterways.

Where appropriate, Alternative B applies protective management based on case-by-case reviews of discretionary actions proposed in the waterway corridors. Generally, the BLM would not approve such actions if they could result in adverse impacts to a WSR suitable waterways' free-flowing condition and ORVs.

Resource Uses

Impacts to and from mineral development and timber harvesting under Alternative B would be similar to Alternative A, except that the extent would be greater because more areas are closed to these activities (Table 4-35). All WSR suitable waterway segments would be withdrawn from appropriations under the mining laws and closed to mineral leasing. Unlike Alternative A, Alternative B also would close all segments to geophysical exploration. The management of mineral materials disposal would be the same as under Alternative A, though restrictions to protect other resources would mean more area along suitable waterways would be closed to disposals than under Alternative A. Alternative B also closes all WSR suitable waterway corridors to timber sale or harvesting. Management of minerals and

forest products under this alternative would be more effective at protecting and enhancing the ORVs than Alternative A, and would be more effective at preserving the tentative classification of these waterways, especially along Wild and Scenic waterways where watersheds and shorelines are to be maintained in a primitive or largely undeveloped state, respectively.

The BLM manages all WSR suitable waterway corridors as ROW exclusion areas and closes the majority to motorized vehicle use (see Table 4-35). Impacts of ROW management would be similar to those described for Alternative A, although to a greater extent because managing the WSR suitable waterways as ROW exclusion would prohibit ROW authorizations, even if effects on ORVs could be mitigated. Adverse impacts from travel and transportation management designations in along WSR suitable waterways under Alternative B would result in impacts similar to Alternative A, but to a greater extent because of increased restrictions that close or limit travel to designated roads and trails across a larger area. Similar to the beneficial impacts conveyed through more restrictive management of mineral use and forest products, the management of ROWs and CTTM under this alternative would be more effective at maintaining and enhancing the ORVs and tentative classifications of the waterways than management under Alternative A.

Under Alternative B, all WSR suitable waterway corridors would be closed to livestock grazing, and adverse impacts to this resource use would be greater than under Alternative A. Closing these areas to livestock grazing would remove AUMs associated with available forage and would result in reduced flexibility and increased operating costs for livestock grazing permittees in affected allotments. Although no conflicts between livestock grazing and the waterway segment ORVs have been identified, a closure may protect against future visual intrusions and impacts to vegetation and soils (e.g., invasive species infestations or damage to riparian/wetland vegetation) that could degrade certain ORVs.

Special Designations

WSR suitable waterways that intersect special designation areas with more restrictive management of resource uses would be afforded additional protection. WSAs, which are managed as VRM Class I to maintain their scenic qualities, would indirectly beneficially affect other resources, such as recreational settings and experiences and wildlife resources and associated habitat on WSR suitable waterways.

Resources

Management of water impoundments, major diversions, or hydroelectric power facilities would be the same as under Alternative A.

Under Alternative B, one WSR suitable waterway segment is managed as VRM Class IV, and the remainder are managed as VRM Class I (11 waterways) or Class II (8 waterways) (see Table 4-35). This management would be more restrictive than management under Alternative A and would effectively limit the types of visual intrusions along the WSR suitable waterways to only very minor activities that would not attract the attention of viewers. This more restrictive management would allow more effective maintenance of these waterways, tentative classifications and would provide additional protection and enhancement of scenic, recreational, and other ORVs that may be affected by surface-disturbing and other related activities compared to Alternative A. Where WSR suitable waterways intersect WSAs, other resource enhancement projects, such as the construction of fish barriers, may be precluded.

Alternative C

Under Alternative C, none of the waterway segments determined to be WSR eligible under Alternative A would be recommend to Congress as suitable, and the impacts to resources and resource uses under alternatives A and B would not occur. These waterway segments are released to other uses and no special management actions are specifically applied to protect the ORVs. Alternative C allows activities that may alter the ORVs identified under Alternative A, depending on restrictions from other program areas.

The BLM manages the sale and harvest of forest products consistent with other management objectives. This alternative implements the greatest amount of silviculture treatments to actively manage the forests and woodlands and would be less restrictive to the harvest of forest products than the other alternatives. These activities would increase the potential for adverse impacts to the ORVs and other WSR-related values of these waterways.

Alternative C generally includes the fewest restrictions on mineral exploration and development of any alternative and would result in the fewest impacts on minerals development of any alternative, and the largest adverse impacts to the ORVs and other WSR-related values (see Table 4-35).

Under Alternative C, management of ROW authorizations, VRM, and travel is similar but slightly less restrictive than under Alternative A (see Table 4-35) and impacts would generally be similar to those described for that alternative. Alternative C manages a greater area as open or avoidance areas for ROW than Alternative A. Alternative C ROW management would result in fewer adverse impacts to the location of ROWs, but greater adverse impacts to ORVs from more ROWs and fewer requirements for mitigation of these adverse impacts. In addition, disposal actions along the corridors would be consistent with other resource objectives, which would increase the risk of compromising the identified ORVs by disposing those lands within the corridors. Alternative C closes more acreage to motorized vehicle use than Alternative A and permits motorized vehicle use across a slightly smaller area on existing and designated roads and trails, which may result in a smaller potential for adverse impacts to the preservation of ORVs and other WSR-related qualities from motorized public access. Alternative C would not encourage new recreation opportunities on these waterways to the same degree as alternatives A and B.

Alternative C generally places the fewest restrictions on livestock grazing management and livestock forage production and utilization, and would be least restrictive to livestock grazing management in the waterway segments than the other alternatives. This would minimize the realization of beneficial impacts described for Alternative B.

Some of these waterway segments will remain protected under the management prescriptions of other resource programs such as ACECs and WSAs. However, these prescriptions may be eliminated if Congress decides to release the WSAs within these areas to multiple uses or the BLM does not carry forward these ACECs in future RMP revisions, at which time the waterway segments would lose any protective management prescriptions associated with these designations. Lack of these prescriptions would adversely affect the identified ORVs within the segments, as well as other resources such as wildlife, fisheries, scenic quality, and recreational resources that benefit from these management prescriptions.

Alternative D

The BLM used the RMP revision process as the suitability analysis to determine what eligible waterway corridors would be recommended for NWSRS inclusion. The comments BLM received regarding WSR suitability strongly opposed any designation of WSRs on BLM-administered public lands. As a result, none of the waterway segments are recommended for inclusion into the NWSRS under Alternative D. As under Alternative C, no special management actions are applied to protect the ORVs. Alternative D allows activities that may alter the ORVs identified under Alternative A, depending on restrictions from other program areas.

Mineral exploration and development under Alternative D is similar to management under Alternative C, and would result in similar types of impacts to the identified ORVs and other WSR-related values (see Table 4-35).

The BLM manages the sale and harvest of forest products consistent with other management objectives, and the impacts of this alternative on the identified ORVs would be similar to those described for Alternative C. Both the adverse and beneficial impacts from this management would occur to a lesser extent under Alternative D, because fewer acres would be available and timber harvests and treatments are managed for resource protection and enhancement, in addition to enhancing resource uses.

Under Alternative D, management of ROW authorizations, VRM, and travel is similar to Alternative A (see Table 4-35) and impacts would generally be similar to those identified under that alternative. Alternative D limits motorized vehicles to designated roads and trails on a similar acreage as Alternative A, and manages more area as closed to motorized use than alternatives A and C, but substantially less than Alternative B. In addition, Alternative D manages more acreage as ROW avoidance areas than Alternative C, which may reduce adverse impacts to the ORVs and other WSR-related qualities compared to that alternative by giving the BLM more ability to control ROW siting, apply additional mitigation, and close routes that are causing environmental damage. Impacts from disposal actions would be the same as Alternative C. New recreation opportunities would be encouraged similarly to Alternative C.

Alternative D places restrictions on livestock grazing management and livestock forage production and utilization similar to those under Alternative A. However, under Alternative D, these waterways would not be managed to prevent an increase in actual grazing use and the adverse impacts to livestock grazing and beneficial impacts to the ORVs would not occur.

Similar to Alternative C, some of these waterway segments ORVs would be protected under the management prescriptions of other resource programs, such as ACECs and WSAs. The protections from these special designations would be greater under this alternative however, as Alternative D includes a greater number of ACECs than alternatives A or C, but fewer than Alternative B. As described under Alternative C, these protective management prescriptions would not remain in effective if the WSAs or ACEC overlapping the waterway segment were released.

Alternative E

Impacts to ORVs and other WSR-related qualities s under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis for Wild and Scenic Rivers under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Impacts to ORVs and other WSR-related qualities under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for Wild and Scenic Rivers under Alternative D is representative of the impacts anticipated under Alternative F.

4.7.6 Wilderness Study Areas

WSAs are managed under BLM Manual 6330, *Management of Wilderness Study Areas*, which recently replaced the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (BLM 2012a). Management actions and resource uses in WSAs are subject to the nonimpairment standard under Manual 6330, ensuring that WSAs are not adversely affected by impairing their suitability for preservation as wilderness. There are no proposed actions contrary to managing the areas to protect their wilderness characteristics. Therefore, managing WSAs according to Manual 6330 preserves the wilderness character of the areas. The areas' naturalness, opportunities for solitude and primitive, unconfined recreation, and any special features that further qualify them for consideration as wilderness, would be preserved. At the same time, activities that would adversely affect the wilderness character of the areas would be prohibited.

Adverse impacts to WSAs are those that reduce wilderness characteristics in the area and reduce the potential for designation as wilderness. Beneficial impacts to WSAs are those that maintain or enhance wilderness characteristics or decrease evidence of human presence in these areas. Direct impacts result from management actions that may affect naturalness, opportunities for solitude, and opportunities for primitive, unconfined recreation within the boundaries of WSAs. Indirect impacts include management actions outside WSA boundaries that may affect wilderness characteristics.

4.7.6.1 Methods and Assumptions

Methods and assumptions used in the impact analysis include the following:

- All WSAs in the Planning Area will continue to be managed under the BLM Manual 6330, *Management of Wilderness Study Areas*, until such time as Congress either designates all or portions of the WSAs as wilderness or releases the WSAs, or portions of the WSAs, from any further consideration for wilderness and the lands revert back to general land use management.
- Wilderness management is subject to valid existing rights and the grandfather clause under all of the alternatives.
- The WSA designation is beneficial to the protection of air and watersheds, soil and water quality, ecological stability, plant and animal gene pools, archeological and historical sites, habitats for wildlife, and livestock grazing.

4.7.6.2 Summary of Impacts by Alternative

WSAs exist under all alternatives and are managed according to Manual 6330 (BLM 2012a), which restricts discretionary activities in WSAs to ensure that their suitability for Wilderness designation is not impaired. Overall, beneficial impacts to WSAs would be the greatest under alternatives B and E, followed by alternatives F, D, A, and C. Although there are limited discretionary actions the BLM can take that would affect WSAs, management under alternatives B and E would result in the greatest beneficial impacts to WSAs by emphasizing resource protection and limiting the potential for activities in and adjacent to WSAs that may adversely affect wilderness characteristics. Alternative C places the

fewest restrictions on activities that may diminish wilderness characteristics, and includes the fewest other resource protection measures that would benefit WSAs. Motorized vehicle use, which may be incompatible with the concept of primitive recreation and may affect perceptions of solitude, is least restricted in WSAs under Alternative C, followed by alternatives A, D, F, B, and E, respectively. Alternatives B, C, D, E, and F identify land-tenure adjustments that may result in beneficial impacts to WSAs by increasing the potential for and expediting the disposal of inholdings or the acquisition of areas with high wilderness characteristics values that increase the manageability of WSAs. Additionally, alternatives B, D, E, and F include provisions for the acquisition of inholdings within WSA boundaries that would result in beneficial impacts through the elimination of incompatible uses.

4.7.6.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Manual 6330 (BLM 2012a) allows for little flexibility in the management of a WSA, because no discretionary actions that adversely affect WSAs are allowed (mandated by the nonimpairment standard). Manual 6330 (BLM 2012a) prohibits surface-disturbing and most other disruptive activities and sets management guidelines aimed at the preservation of wilderness characteristics. However, Manual 6330 (BLM 2012a) respects valid existing rights and includes a grandfather clause that allows several resource uses and management actions not subject to the nonimpairment standard. Resource uses and management actions that may meet this definition, and potentially adversely affect WSAs, include mineral development; ROW maintenance and development and new temporary ROWs where there is no reasonable, less impairing, alternative access available; or valid existing rights where the BLM has determined that application of the nonimpairment standard would unreasonably interfere with the exercise of those rights.

Valid existing mining claims not subject to the nonimpairment standard may adversely affect wilderness characteristics, primarily through surface disturbance and facilities development. WSAs are closed to mineral leasing and mineral materials disposal under all alternatives, protecting wilderness values from adverse impacts from new mineral leasing. Existing ROW maintenance requiring vehicle use and new ROW authorizations necessary to develop valid existing rights may adversely affect wilderness characteristics in WSAs through surface disturbance and facilities development.

Invasive species are anticipated to spread under all alternatives and may adversely affect the naturalness of WSAs. Invasive species control is permitted in WSAs according to Manual 6330 (BLM 2012a). Vegetation treatments to control the spread of invasive species may result in short-term adverse impacts to wilderness characteristics due to mechanical clearing, prescribed fire, or other treatments that disturb the naturalness of WSAs. However, invasive species control would result in long-term beneficial impacts by maintaining natural vegetative communities and helping to meet vegetation management objectives.

Other special designations in WSAs, such as ACECs and WSRs, may be beneficial to wilderness characteristics in WSAs if their management increases resource restrictions or actions that protect or increase wilderness characteristics in the WSA. The Spanish Point Karst ACEC, designated under all alternatives, would provide additional protection for cave and karst resources in the Trapper Creek and Medicine Lodge WSAs.

WSAs are managed as VRM Class I areas under all of the alternatives, which is beneficial to the maintenance of wilderness characteristics because VRM Class I areas are managed to preserve the

existing character of the landscape. However, activities that alter the visual landscape are allowed in areas adjacent to WSAs if they conform to the VRM for the area.

While the types of impacts to WSAs under each alternative are similar, the magnitude of these impacts would vary based on specific management and allocations under each alternative.

Alternative A

Restrictions on motorized vehicle use in WSAs would provide beneficial impacts to the preservation of wilderness characteristics. Motorized vehicle use may be incompatible with the concept of primitive recreation, and may affect perceptions of solitude by increasing noise levels and visitor contacts or by degrading the natural character of the landscape in areas where unauthorized pioneered routes have proliferated. Under Alternative A, motorized vehicle use is limited to existing primitive routes in the Cedar Mountain and Honeycombs WSAs, and limited to designated primitive routes in the Trapper Creek, Medicine Lodge, Alkali Creek, and McCullough Peaks WSAs (in those areas outside the Spanish Point Karst ACEC, which is closed to motorized vehicle use). The Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands WSAs are closed to motorized vehicle use under Alternative A to manage for maintaining their wilderness characteristics.

The proposed expansion of the Bobcat Draw Badlands WSA would result in beneficial impacts by restricting uses incompatible with the preservation of wilderness characteristics on an additional 1,290 acres. No other land acquisitions or disposal actions are proposed for WSAs under this alternative.

All WSR eligible waterway segments are managed to protect their free-flowing condition, ORVs, and tentative classifications. Segments of Medicine Lodge Creek and Trapper Creek lie within similarly named WSAs. Under Alternative A, these special designations include additional resource protection measures that prohibit surface-disturbing activities such as range improvements, exclude ROWs, and close these segments to motorized vehicle use. These protective measures would result in beneficial impacts to WSAs by further protecting wilderness characteristics.

Alternative B

Alternative B is more restrictive for motorized and mechanized vehicle travel and would be more beneficial to the preservation of wilderness characteristics such as opportunities for solitude and primitive recreation, compared to Alternative A. Management under this alternative maintains the closures under Alternative A and expands them to include all areas in the WSAs and mechanized vehicle travel. Closing the WSAs to motorized and mechanized use would result in adverse impacts to CTTM and motorized access within the WSAs. Users who once were able to access desired areas within the WSAs will either be displaced to alternative areas where they may not realize their desired settings and experiences, or access areas using alternative methods, such as horses.

Lands and realty management under Alternative B would provide the BLM flexibility to acquire WSA inholdings and may, therefore, have the greatest beneficial impact on eliminating any incompatible uses (e.g., extensive surface disturbances with strong visual contrast) occurring on these non BLM-administered parcels. The identification of land-tenure adjustments may result in beneficial impacts to WSAs by increasing the potential for and expediting the disposal of inholdings or the acquisition of areas with high wilderness characteristics values that increase the manageability of WSAs.

Under Alternative B, managing approximately 476,349 acres of lands with wilderness characteristics specifically to preserve their wilderness characteristics would decrease incompatible land uses adjacent to some WSAs, resulting in beneficial impacts to the wilderness characteristics in WSAs. Because many

of the lands with wilderness characteristics are adjacent to or surround the WSAs, adverse impacts to wilderness characteristics from adjacent land uses (e.g., intensive oil and gas development) would be limited along the boundaries of the WSAs.

Impacts to WSAs from WSRs would be similar to Alternative A, except that the Dry Medicine Lodge Creek WSR, a portion of which is in the Medicine Lodge WSA, includes additional management actions for resource protection under this alternative that would further protect the wilderness characteristics of the WSA.

Alternative C

Alternative C is the least restrictive for motorized vehicle use in WSAs and would be the least beneficial to the preservation of wilderness characteristics. Under Alternative C, motorized vehicle use is limited to designated primitive routes in all WSAs. Management of the Cedar Mountain and Honeycombs WSAs under Alternative C would provide greater protection of the areas' wilderness characteristics than management under Alternative A. The less restrictive designations in the remaining WSAs, especially Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands – closed to motorized vehicle use under Alternative A but limited to designated trails under Alternative C – would provide the least benefit to the preservation of wilderness characteristics of any alternative.

Under Alternative C, the BLM does not pursue the acquisition of inholdings, lands, or interests in lands within WSA boundaries, which would result in adverse impacts to WSAs by decreasing lands transactions that consolidate lands in WSAs and increase the ability to meet management objectives that help maintain or improve wilderness characteristics. Reducing the potential for land transactions in WSAs also would result in adverse impacts by reducing the flexibility to mitigate the effects of incompatible adjacent uses through land-tenure adjustments.

Under Alternative C, management of WSR eligible waterway segments would not benefit wilderness characteristics in the WSAs, because the BLM does not manage waterways to maintain their ORVs.

Alternative D

Alternative D is generally more restrictive of travel in WSAs than alternatives A or C, but less than Alternative B. Alternative D limits motorized vehicle use to designated roads and trails in the Cedar Mountain, Honeycombs, Trapper Creek, Medicine Lodge, and Alkali Creek WSAs (as under Alternative C), carries forward the McCullough Peaks Travel Management Plan (as under Alternative A), and closes the Owl Creek, Sheep Mountain, Red Butte, and Bobcat Draw Badlands to motorized vehicle use (as under Alternative A). Beneficial impacts to wilderness characteristics from travel management in these areas would be similar to those identified under alternatives A and B.

As under Alternative B, the BLM would have flexibility under Alternative D to acquire WSA inholdings or interests in lands within WSA boundaries, which could result in beneficial impacts by eliminating uses incompatible with the preservation of wilderness characteristics occurring on these non BLM-administered parcels. Alternative D also includes land-tenure adjustments that would increase the potential for and expedite the disposal of inholdings or the acquisition of areas with high wilderness characteristics values that increase the manageability of WSAs. Under Alternative D, the BLM does not manage WSR eligible waterway segments to maintain their ORVs or wilderness characteristics, so no beneficial impacts would be conveyed to WSAs where these areas overlap or adjoin other special designations.

Alternative E

Impacts to WSAs under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis for WSAs under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Impacts to WSAs under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for WSAs under Alternative D is representative of the impacts anticipated under Alternative F.

4.8 Socioeconomic Resources

4.8.1 Social Conditions

This section addresses the potential for the alternatives to have impacts on social conditions in the Planning Area, including direct, indirect, short-term, and long-term impacts. Laws, regulations, policies, and guidance considered in the analysis of social conditions are identified in Appendix B.

Potential impacts to social conditions include changes in population, such as fluctuations caused by economic boom and bust cycles; changes in the demand for housing and community services along with community fiscal conditions, which can affect the ability of state, regional, and local governments to supply community services such as education; and changes in community character, culture, and social trends.

The BLM does not directly manage social conditions in the Planning Area. However, BLM management actions have the potential to indirectly affect social conditions. For example, a decision to prohibit future oil and gas exploration or leasing on BLM-administered mineral estate may adversely affect job opportunities in the Planning Area, which may lead to a reduction in populations in parts of the Planning Area as residents move away to find job opportunities elsewhere (or as fewer people move to the Planning Area for jobs).

4.8.1.1 Methods and Assumptions

The Impact Analysis for Planning model (IMPLAN) was used to estimate socioeconomic impacts resulting from BLM management actions under the alternatives. IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the "ripple effect" (or "multiplier effect") of changes in sectors that may not be directly affected by management actions, but are linked to industries that are directly affected. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly affected) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

For example, an increase in oil and gas production implies more money would be spent on the maintenance of existing oil and gas equipment and/or new oil and gas equipment; this, in turn, implies more money would be spent in sectors that provide inputs to oil and gas support services or equipment sectors. These production and consumption or "input-output" relationships allow IMPLAN to estimate the indirect and induced impacts based on changes in production that may result from an alternative. Appendix Q provides technical assumptions and additional information about the IMPLAN model.

Impacts to social conditions associated with each of the alternatives were compared to existing conditions and trends in the Planning Area to establish a context for the impacts. Social impacts were classified broadly into three categories: impacts on population; impacts on housing and community services; and impacts on custom, culture, and social trends.

Assumptions used in this impact analysis include the following:

- Economic conditions, especially jobs, labor earnings, and economic output, will continue to drive population growth or decline in the Planning Area.
- Any population change that may reasonably be associated with the alternatives will likely be due to changes in employment opportunities.
- Federal, state, and local taxes will continue to be collected on minerals produced in the Planning Area.
- The pace and timing of economic development in the Planning Area will continue to depend on many factors beyond the management actions of the BLM. Because the pace of development in the Planning Area is driven largely by external forces such as worldwide economic trends and technological change, it is difficult to predict. Therefore, the economic impact analysis—which influences the social impact analysis because of the link between employment opportunities and population—assumes a relatively constant rate of development. Actual social and economic impacts may differ if the rate of development changes.

4.8.1.2 Summary of Impacts by Alternative

Social conditions are fundamentally influenced by economic conditions. Employment and income improve or detract from social conditions and quality of life; communities in the Planning Area have developed cultures associated with economic activities such as natural resource extraction, ranching, and recreation. Given the large portions of public land within the counties of the Planning Area, BLM management decisions have the potential to influence the community character and identity, even if the economic impact as measured by this analysis is minimal.

For the purposes of the analysis below, some impacts of the management alternatives on economic activities (e.g., restrictions to ROWs, travel management or seasonal restrictions) are not included in the quantitative estimates of impacts and derived discussions, but are recognized qualitatively when appropriate. Table 4-36 provides a summary of impacts on social conditions as discussed in this section for the alternatives. Although the table attempts to summarize impacts and characterize them as low, medium, or high, it does not classify these impacts as beneficial or adverse. Social impacts seen as beneficial to some people and groups may be seen as adverse to others. For instance, increased emphasis on resource conservation in alternatives B and E would result in a change from the current uses, which may be seen as a beneficial impact by wilderness advocates, but an adverse impact by oil and gas development and livestock grazing interests. In Table 4-36, high impacts are those that would result in substantial changes to an existing condition in a way that would affect a large number of people and/or endure for a long period of time; no high impacts were identified during this analysis. Low impacts are those that would affect a limited number of people and for a limited period of time. Impacts on population, housing, and community services would lie within typical annual fluctuations for the Planning Area. Impacts on quality of life and culture would not be expected to be noticeable by most people. Medium impacts are intermediate and fall between high and low impacts.

Under all alternatives, the social condition is expected to change. However, the greatest impact on social conditions under alternatives B and E would be from reduced oil and gas development and livestock grazing and increased emphasis on resource conservation and primitive recreational opportunities. Alternative E imposes additional constraints on disturbance in greater sage-grouse Key Habitat Areas when compared to Alternative B; however, based on the economic analysis in the Economic Conditions section, these additional constraints are expected to have little additional adverse impacts on employment and earnings. Under Alternative C, the greatest impact on social conditions

would result from decreased restrictions on oil and gas development compared to the other alternatives, which would bring more job opportunities, greater demand for community services, and greater tax revenues to local governments—allowing them to expand community services to meet the needs of a slightly higher population.

Alternatives D and F balance management emphasis between resource conservation and resource use, but are generally closer in line with resource use and development. Alternative F imposes additional constraints on disturbance in greater sage-grouse PHMAs when compared to Alternative D. Based on analysis in the Economic Conditions section, these additional constraints would restrict further economic activity in the oil and gas sector when compared to Alternative D. Impacts of Alternative F on population and public services associated with impacts on economic activity would be essentially the same as in Alternative D, but impacts on quality of life and local culture are expected to be greater than Alternative D.

Overall, alternatives E and B favor resource conservation over traditional industries such as livestock grazing, and the values associated with these industries when compared to alternatives F and D. Alternatives E and B may also enhance opportunities to engage in primitive forms of recreation in comparison to the other alternatives, while restricting motorized use of recreational sites, due to seasonal closures of greater sage-grouse Key Habitat Areas.

Table 4-36. Overall Impacts on Social Conditions by Alternative

Impact	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Impact on Population	Low Impact	Medium Impact (potential reductions focused in oil/gas service areas, which generally correspond to population centers)	Low Impact	Low Impact	Medium Impact (potential reductions focused in oil/gas service areas, which generally correspond to population centers)	Low Impact
Impact on Housing and Community Services	Low Impact	Medium Impact (due to potential population reductions)	Low Impact	Low Impact	Medium Impact (due to potential population reductions)	Low Impact
Consistency with Adopted County Land Use Plans	No Impact	Potential conflict with Hot Springs County Land Use Plan	No Impact	No Impact	Potential conflict with Hot Springs County Land Use Plan	No Impact
Impacts on Quality of Life and Local Culture	Low Impact	Medium Impact (change from recent trends would constitute greater emphasis on resource conservation at the expense of traditional industries such as livestock grazing)	Medium Impact (change from recent trends would constitute greater emphasis on resource development)	Low Impact	Medium Impact (change from recent trends would constitute greater emphasis on resource conservation at the expense of traditional industries such as livestock grazing)	Low to medium (due to restrictions and requirements for livestock grazing operators in Priority Habitat Management Areas)

Source: Based on the analysis of impacts to social conditions, as described in the text.

4.8.1.3 Detailed Analysis of Alternatives

The analysis of impacts on social conditions focuses on the effects of BLM-authorized actions. It is important to note that many other events outside of the BLM's control may alter economic and social trends. For instance, oil and gas prices may change as a result of an expansion or contraction of world or national economic activity, and this, in turn, may affect the pace of development or the quantity of development. Similarly, state and local laws regulating the subdivision of land may alter land ownership and development patterns, which may in turn affect open space and physical landscapes. Minimal or no changes to social conditions resulting from BLM actions does not imply that no change could occur, as other forces may drive changes in economic and social trends.

Impacts Common to All Alternatives

Humans and associated social and economic conditions are an integral part of ecosystem and community function in the Planning Area. Lifestyles, attitudes, beliefs, values, social structure, culture, and population characteristics affect and are affected by management actions made by the BLM in the Planning Area. In addition, both the Planning Area lands and BLM management of these lands have emotional meanings for many people. Varying viewpoints on economic development and conservation of natural resources are expected to cause controversy related to management of BLM-administered land and federal mineral estate.

Any population change that could reasonably be associated with the alternatives may be due to changes in employment opportunities. Employment opportunities related to activities on BLM-administered land and mineral estate include jobs in exploration, development, and production of minerals, including oil and gas, coal, locatable and salable minerals; jobs in livestock production; and jobs in various recreation activities. The economic analysis provides quantitative estimates of employment in the Planning Area from oil and gas exploration and development, grazing, and recreation activities on BLM-administered lands and mineral estate. These quantitative estimates are used to analyze impacts from management on population.

The social and economic values associated with BLM-administered lands include market values and nonmarket values. Market values are those related to goods and services that are typically bought and sold in markets. For example, commodities such as oil and gas, bentonite, crops, livestock products, and services such as outfitter trips and fishing guides are traded in markets. The production and sale of these goods and services result in jobs and income and the value of these goods to society can be readily expressed in monetary terms. Nonmarket values relate to things that people value, but are not generally bought or sold in markets. For example, many people may value the ability to see a mountain range from a certain vista point without human-caused impacts to visibility in the air. Some people value open vistas that lack structures, fences, wind turbines, or other signs of human development. Some people may place a high value on their ability to hunt or fish on public lands, and the satisfaction they derive from this ability may exceed the equivalent monetary cost of purchasing the same amount of food from the grocery store. Other people may value the knowledge that their offspring will enjoy clean air, open vistas, and the ability to fish and hunt. The common feature of these values is that they are generally not bought and sold like tangible goods and services, and for that reason are difficult to assign a monetary value. Other examples of nonmarket values include the satisfaction people derive from resources such as clean water, biological resources (e.g., wildlife), cultural resources, or even the satisfaction they derive from the knowledge that the BLM uses a particular fire management or invasive species control regime.

Some of the value associated with open space and other features is captured in markets. For example, the price of a house that overlooks a pristine mountain range may be higher than the price of a house that is identical in almost every respect but overlooks a cement factory. However, the ability to see an open landscape while driving along a highway is not likely to be captured in the market.

A related concept is that some changes in management may affect both market and nonmarket values. For instance, industrial development that substantially alters visual characteristics of the landscape may, over time, result in a lower number of tourists visiting the area and spending money in local hotels, restaurants, and shops. This decline in tourism would result in adverse impacts on employment and income. Such industrial development could also reduce the satisfaction of local residents who value open space resulting in adverse impacts on nonmarket values. On the other hand, the new industrial development would also generate jobs and income, and the net effect—if all values were to be expressed in the same metric (dollars)—could be beneficial or adverse.

Although economists have developed approaches to assign a monetary value to things that are not traded in markets, the approaches for doing so are often complex, controversial (due to the subjective nature of assigning a dollar value to something that is neither bought nor sold), and require considerable resources and time to analyze and interpret properly. For example, stated preference methods (e.g., surveys) are a common approach for placing a monetary value on clean air and open views. A survey may present people with images of a mountain vista with different degrees of haze superimposed and ask people to express how much they are willing to pay for the ability to see the vista with lower levels of haze for a certain number of days per year. However, research has shown that the survey design, sample size, and outreach methods can have a dramatic influence on the results. Due to the complexity and cost of implementing nonmarket valuation methods, quantifying these values was beyond the scope of this RMP revision. However, the BLM recognizes that changes in nonmarket values are likely correlated with level of resource protection and development under each alternative. The development of oil and gas resources and other minerals, as well as development of ROWs, renewable energy facilities, and other structures, may result in adverse impacts to nonmarket values under all alternatives. Furthermore, alternatives emphasizing resource development over conservation may result in greater impacts to nonmarket values.

Because of the close relationship between nonmarket economic values and how individuals in the Planning Area perceive their own quality of life, impacts on nonmarket values are discussed qualitatively in the section on Quality of Life and Local Culture.

With mounting economic pressures on the livestock sector, some ranch owners have raised money for retirement or other purposes by subdividing portions of their land into “ranchettes” and selling them to individuals. The sale of these ranchettes provides financial liquidity to ranchers who frequently have most of their assets in land but generally results in increased construction of fences, houses, and sometimes other structures (e.g., barns), resulting in changes to the visual landscape. Under all alternatives, this trend is likely to continue because it is fundamentally related to (1) the nature of the ranching business (principally, the fact that most ranchers’ assets are in land and the fact that profit margins are generally low and can turn negative in drought or other adverse conditions) and (2) state laws that govern property subdivision, under which county zoning laws cannot regulate subdivisions of 35 acres and larger. However, alternatives that adversely affect the profitability of ranching could serve to increase this trend. Because the subdivision of ranch land affects local culture and quality of life, impacts on this trend are discussed in the section on Quality of Life and Local Culture.

The economic and social analysis incorporates variations in pace of development over time. However, under all alternatives, the pace of development may differ from the rate assumed in the analysis. The BLM has limited control over the pace of development of leases because the agency only authorizes

economic activities such as oil and gas drilling and does not conduct these activities. An abrupt shift in the pace of development may result in short-term impacts (beneficial or adverse) on demand for housing and community services and on the supply of tax revenues from residences or businesses to support community services, due to short-term changes in job opportunities and the resulting change in immigration or emigration trends. Any such impacts may be more for smaller communities, which are less likely to be able to absorb a sudden increase in population or to continue to support existing infrastructure if the population were to suddenly decrease.

The BLM did consider an alternative that would regulate the rate of oil and gas development in the Planning Area, but determined that the holders of federal oil and gas leases have the right to develop those leases. In addition, the BLM determined that setting reduced or limited rates of development is more appropriately analyzed in site-specific NEPA documents. The BLM therefore eliminated this alternative from detailed analysis. For more information, see the *Alternatives Considered but Not Carried Forward for Detailed Analysis* section in Chapter 2.

Under all alternatives, the BLM continues to consider socioeconomic impacts of site-specific actions and incorporates socioeconomic issues into analyses of environmental, social, and economic impacts, such as the analyses required by NEPA for site-specific actions.

Alternative A

Impacts on Population

As noted under *Impacts Common to All Alternatives*, changes in employment opportunities may result in changes to population and demographics. Under Alternative A, activities on BLM-administered land and mineral estate related to oil and gas, livestock grazing, and recreation would support an average of 1,520 full-time and part-time jobs per year (Table 4-37) which represents approximately 3.8 percent of total employment in the Planning Area using 2011 employment statistics. It is important to note that this does not constitute an increase of 1,520 jobs per year over current employment, it more closely represents an estimate of the contribution of certain activities on BLM-administered lands and mineral estate to overall employment in the Planning Area.

Table 4-37. Comparison of Projected BLM-Related Earnings and Employment to 2011 Total Employment in the Four County Planning Area

Measure	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Forecasted annual earnings due to activities on BLM-administered surface[1] ($ millions)	$86.7	$38.5	$94.1	$83.9	$38.3	$83.8
Total labor earnings in 2011 ($ millions)	$2,269	$2,269	$2,269	$2,269	$2,269	$2,269
Forecasted annual earnings as a percentage of 2011 earnings	3.8%	1.7%	4.1%	3.7%	1.7%	3.7%
Forecasted annual employment due to activities on BLM-administered surface[1]	1,520	763	1,631	1,478	761	1,477
Total employment in 2011	37,066	37,066	37,066	37,066	37,066	37,066
Forecasted annual employment as a percentage of 2011 employment	4.1%	2.1%	4.4%	4.0%	2.1%	4.0%

Source: Forecasted annual earnings and employment are calculated based on the IMPLAN model, as described in the text. Earnings and employment for 2011 are from the Bureau of Economic Analysis (BEA 2013). Earnings are in millions of year 2011 dollars.

[1]Estimate of annual earnings and employment includes direct, indirect, and induced economic activity (the "multiplier effect").

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Approximately 77 percent of the job opportunities from activities analyzed using the IMPLAN model would be related to oil and gas development and production (1,177 jobs). Livestock grazing would contribute approximately 12 percent of the job opportunities (185 jobs) and recreation would contribute approximately 10 percent (158 jobs). These jobs would be dispersed geographically across the Planning Area because all three sectors operate across the Planning Area. Section 3.8 *Socioeconomic Resources* in Chapter 3 describes the geographic distribution of economic activities that occur on BLM-administered lands.

Job opportunities (and resulting increases or shifts in population) may concentrate in population centers such as Cody, Powell, and Worland. Management under Alternative A may not result in noticeable impacts to the current distribution of job opportunities in the Planning Area for a variety of reasons. Alternative A maintains current management where the contribution of economic activity on BLM-administered lands accounts for a relatively small proportion of jobs in the Planning Area (3.8 percent, according to the IMPLAN analysis of oil and gas, livestock grazing, and recreation for Alternative A). Also, the IMPLAN analysis considers jobs in all sectors, including those industries directly affected by BLM actions (e.g., oil and gas production) as well as those affected indirectly (e.g., retail jobs created by expenditures of workers in various industries). As a result, Alternative A would not alter the overall trend of BLM-authorized activities and associated population changes in the Planning Area.

Impacts on Housing and Community Services

Changes in population have the potential to change the demand for housing and community services such as roads, schools, and police and fire protection. As described in Chapter 3, county-wide vacancy rates in 2000 (the latest year for which data are available at this resolution) were 15.5 percent in Big Horn County, 17.2 percent in Hot Springs County, 13.1 percent in Park County, and 10.3 percent in Washakie County. These percentages represent approximately 800, 400, 1,600, and 400 vacant units in Big Horn, Hot Springs, Park, and Washakie counties, respectively. Vacancy rates for rental properties in the Planning Area have declined since 2001-2002. However, because Alternative A would not result in a change in direction of current BLM management, a change in either the total demand for housing and community services or its geographic distribution is not expected.

If development occurs slower or faster than the relatively steady pace assumed in the analysis, there may be short-term impacts on demand for housing and community services and on the supply of tax revenues from residences or businesses to support community services. It may be more difficult for smaller communities to absorb sudden changes of this nature. If national and international energy prices, operator business strategies, or other factors lead to a rapid pace of development there may be sudden short-term increases in demand for community services as a result of new jobs and increased population. However, local and state tax revenues collected from energy production could help to mitigate short-term increases in demand for services, since tax revenues help to pay for community services.

Consistency with Adopted County Land Use Plans

BLM land use plans must be consistent with state and local land use plans to the maximum extent consistent with federal law, including FLPMA. The BLM takes practical steps to resolve any identified conflicts between federal and local plans. Section 3.8.1 *Social Conditions* in Chapter 3 summarizes adopted land use plans for each of the counties. Alternative A would maintain existing policies for BLM land management and would not result in any inconsistencies or conflicts with existing county land use plans.

Impacts on Quality of Life and Local Culture

Historically, the communities in the Planning Area developed around a combination of resource-based industries, ranching, trade and commerce, and providing supplies and services to tourists. Quality of life for the people who live in the Planning Area depends on continued economic opportunities as well as features of the natural landscape. Alternative A continues current BLM management. Historically, these policies have contributed, along with other government policies and the actions of private firms and residents, to economic viability and resilience in the Planning Area. Despite these policies and actions, several communities in the Planning Area have experienced and continue to experience declines in population and increases in median age. The BLM believes that a balanced management approach continues to be best for improving the capability of communities to respond to technological, demographic, and economic change. Alternative A would allow other forces (beyond BLM-authorized actions) to drive changes to the economic, physical, and social conditions in the Planning Area.

Although there are groups with particular interests in the management of certain resources and resource uses (e.g., wilderness advocates, oil and gas interests, and ranchers), overall the residents of the Planning Area tend to support both conservation of natural resources and the economic viability of resource-based industries. For this reason, residents generally support multiple-use of BLM lands, including the development of mineral and energy resources, livestock grazing authorizations, continued access to BLM-administered lands for recreation, and conservation of wildlife and native vegetation.

Under this alternative, continued development of oil and gas wells, ROWs, and other human-made structures on the landscape would continue to result in decreases in nonmarket values associated with open space and the environment. Because Alternative A essentially represents continuation of current management, these decreases may be similar to historic trends. Under this alternative, subdivision of ranch land and related development and sale of "ranchette" parcels would continue, generally consistent with historic trends. The development of these "ranchette" parcels increases institutional challenges, such as those related to provision of community services and management of invasive plant species. In addition, the development of "ranchettes" may adversely affect the value of land as wildlife habitat by increasing the number of fences and other barriers to wildlife movement.

Alternative B

Impacts on Population

Under Alternative B, activities on BLM-administered land and mineral estate related to oil and gas, livestock grazing, and recreation would support an average of 763 full-time and part-time jobs per year, which represents approximately 2.1 percent of total employment in the Planning Area as of 2011 (Table 4-37). Compared to Alternative A, this represents a decrease of 757 jobs (approximate 50 percent decrease), or approximately 1.7 percent of employment using 2011 employment statistics. Most of these job losses are related to restrictions on development of oil and gas resources (705 jobs), with the remainder related to reduced livestock grazing (52 jobs). Due to restrictions on oil and gas development under Alternative B, more oil and gas wells may be drilled on nearby state or fee surface land, partially compensating for the projected employment decrease in that sector.

A decrease in employment opportunities may result in a decrease in population in the Planning Area as people may leave the area to seek employment elsewhere. The expected magnitude of any such decrease would be similar to the magnitude of employment loss but would be lower since some people (e.g., retired people) survive on unearned income and do not depend directly on employment for economic well-being. In other words, if 1.7 percent of employed people and their families leave the Planning Area, the population would decrease by less than 1.7 percent because some residents of the Planning Area are retired or otherwise non-working families.

Approximately 62 percent of the job opportunities from activities analyzed using the IMPLAN model would be related to oil and gas development and production under Alternative B (472 jobs). Livestock grazing would contribute approximately 17 percent of the job opportunities (133 jobs), and recreation would contribute approximately 21 percent (158 jobs). (Note that due to rounding, these sector breakouts do not necessarily add up to the total reported above.) These jobs would be dispersed geographically across the Planning Area as described under Alternative A. The average annual number of jobs supported by recreation activities would be the same across all alternatives; however, average annual jobs and income supported by oil and gas would decrease by approximately 60 percent compared to Alternative A, and jobs and income supported by livestock grazing would decrease by approximately 28 percent compared to Alternative A.

Job opportunities and job losses (and resulting shifts in population) in Alternative B may concentrate in population centers. Because the majority of job losses in Alternative B would be related to decreased oil and gas development, the greatest population changes would occur in areas that service oil and gas fields (e.g., Cody). Oil and gas fields occur throughout the basin, and overall the distribution of any job losses would also likely occur throughout the basin. Jobs and income lost in the livestock grazing industry would also affect workers throughout the Planning Area. The adverse effects on grazing operations from the loss of access to federal allotments could also result in substantial adverse financial

effects for some individual ranching operations, depending on how specific operations use the federal allotments and how important a role BLM-administered lands play in financing and production. The IMPLAN model does not account for "cascade" type effects such as the potential for individual operations to fail. Failing operations could have subsequent indirect impacts on social and economic conditions in communities. For example, a loss of individual grazing operations could result in reduced income for retail businesses that supplied the lost operations (e.g., feed and supply stores). Financial threats to grazing operations could increase land sales to residential developers and the spread of "ranchettes." Note, however, that the failure of individual operators does not necessarily mean that the operation will cease to exist or will immediately be developed into residential or ranchette parcels. Historically, many ranching and grazing operations have changed hands while being maintained in ranching and grazing. In some of these cases, the new owners have been less dependent on livestock grazing for financial security, so the emphasis of the operation may change but the operation does not cease to exist in its entirety. In other cases, subdivisions have sprung up, creating new challenges. This topic is discussed with further detail in the section on quality of life and local culture, below.

Impacts on Housing and Community Services

Alternative B may result in decreased population compared to Alternative A, which may result in decreased demand for housing and community services. Alternative B would also result in a reduced tax base for providing community services, as described in Section 4.8.2 *Economic Conditions*. The exact geographic distribution of these changes is not possible to predict because tax losses in specific jurisdictions would be driven by undetermined well locations; however, the restrictions on oil and gas development in Alternative B affect broad areas of land throughout the Planning Area, so the reductions in tax revenues would likely affect all communities that currently produce oil and/or gas.

Consistency with Adopted County Land Use Plans

As described under Alternative A, the BLM takes practical steps to resolve any identified conflicts between federal and local plans. Under Alternative B, increased restrictions on oil and gas development could be perceived as a conflict with the Hot Springs County Land Use Plan, which expresses concern about growing federal and state regulation on public lands that may slow or hinder economic development. Alternative B would not conflict with the adopted land use plans of Big Horn, Park, or Washakie counties.

Impacts on Quality of Life and Local Culture

As described under Alternative A, quality of life for the people who live in the Planning Area depends on continued economic opportunities as well as features of the natural landscape. Alternative B would reduce economic opportunities, but would also result in decreased air pollution and other adverse environmental impacts associated with development (e.g., oil and gas) compared to Alternative A.

As noted under Alternative A, residents generally support multiple-use of BLM lands, including the development of mineral and energy resources, livestock grazing authorizations, continued access of BLM lands for recreation, and conservation of wildlife and native vegetation. Alternative B would continue the BLM's current practice of allowing multiple-uses, but would prioritize resource conservation over resource uses such as oil and gas development. This may be inconsistent with the culture advocated by some interest groups (e.g., oil and gas interests, livestock ranchers) and may promote the culture advocated by others (e.g., wilderness advocates).

Under this alternative, continued development of oil and gas wells, ROWs, and other human-made structures on the landscape would continue to result in adverse impacts to nonmarket values associated with open space and the environment. However, because this alternative emphasizes resource

conservation, the magnitude of these decreases would be less than historic trends and less than under Alternative A.

From a distributional perspective, the withdrawal of livestock grazing areas in Alternative B would result in a substantial impact on a substantial number of allotments, and potentially on a substantial number of livestock operators. BLM currently allows grazing on 673 allotments in the Planning Area. Livestock grazing withdrawals on these allotments would result in the loss of at least half the AUMs on 44 percent of the allotments, the loss of at least three-quarters of the AUMs on 25 percent of allotments, and the loss of nine-tenths or more of the AUMs on 15 percent of the allotments in the Planning Area. Furthermore, the losses in Alternative B would affect allotments in all size categories, and allotments spread over the entire Planning Area. Some ranchers may be able to continue operating, albeit at a reduced level, by using more state and private land. However, many ranchers may be forced to cut back their operations, sell their ranch to another operator (consolidate operations), or find alternative ways to make a living. This would certainly result in substantial impacts on individual ranchers, and depending on potential "cascade" effects, could also result in accelerated subdivision of ranch land, sales of ranch land to residential developers, development of "ranchette" parcels, and the resulting conversion of ranch land to residential areas. However, as noted above, the failure of individual operators does not necessarily mean that the operation will cease to exist or will immediately be developed into residential or ranchette parcels.

Alternative C

Impacts on Population

Under Alternative C, activities on BLM-administered land and mineral estate related to oil and gas, livestock grazing, and recreation would support an average of 1,631 full-time and part-time jobs per year (Table 4-37), which represents approximately 4.4 percent of total employment in the Planning Area using 2011 employment statistics. Compared to Alternative A, which essentially represents the continuation of current trends, Alternative C would result in an increase of 111 jobs (approximate 7 percent increase), or approximately 0.3 percent of employment using 2011 employment statistics. These job increases would be associated with increased development of oil and gas resources.

An increase in employment opportunities may result in an increase in population in the Planning Area as people are drawn to the new jobs. The expected magnitude of any such increase would be similar to the magnitude of employment gained, as new employees move to the area with their families.

As shown in Section 4.8.2 *Economic Conditions*, approximately 79 percent of the job opportunities from activities analyzed using the IMPLAN model would be related to oil and gas development and production (1,289 jobs). Livestock grazing would contribute approximately 11 percent of the job opportunities (184 jobs), and recreation would contribute approximately 10 percent (158). These jobs would be dispersed geographically across the Planning Area as described under Alternative A. The average annual number of jobs supported by recreation activities and livestock grazing would be the same as Alternative A; however, average annual jobs supported by oil and gas would increase by approximately 10 percent compared to Alternative A.

Overall, Alternative C would result in more job opportunities and may result in increased population compared to the other alternatives. Although Alternative C would result in increased job opportunities and population compared to the other alternatives, it would still not considerably alter the relative distribution of job opportunities or substantially affect population increase or movement in the region due to the factors described under Alternative A.

Impacts on Housing and Community Services

Alternative C may result in increased population leading to higher demand for housing and community services compared to alternatives A, B, and D. Alternative C would result in a greater tax base for providing these services, as described in Section 4.8.2 *Economic Conditions*. The geographic distribution of these changes is not possible to predict because higher tax revenues in specific jurisdictions would be driven by undetermined well locations. Oil and gas occurs throughout the basin, and the RFD does not predict specific well locations.

An increase in population sometimes results in population growth that overwhelms the ability of town or county governments to provide services. This is not expected to occur as a result of the BLM's actions under Alternative C, for several reasons. First, the estimated increase would be spread over a relatively large area (four counties) and would likely "ramp up" over a relatively long time period. Second, based on county land use plans and information from city planning departments, rising population (at least on this scale) would not lead to the inability to provide infrastructure or community services. Several planning documents refer to the issue or problem of declining population, especially working-age population, and recommend increasing the use of public lands for development of oil and gas and other industries that can provide jobs. This implies that the supply of infrastructure and services exceeds the demand. This conclusion is also consistent with the descriptions of the infrastructure in counties' planning documents (e.g., the Big Horn County Land Use Plan, which describes the service capacity for each of the towns in Big Horn County for water, wastewater, and other services and, in virtually all cases, concludes there is plenty of available capacity). The primary concerns regarding the availability of community services relate to the way in which new land is developed (spatial density or boom/bust cycles), rather than the total quantity of new development. Alternative C would not affect the spatial density of development, nor would it make boom/bust cycles more likely or substantially more severe. As a result, Alternative C would not likely have substantial effects on the ability of local governments to provide services.

Consistency with Adopted County Land Use Plans

Similar to the other alternatives, the BLM takes practical steps to resolve any identified conflicts between federal and local plans. The increased pace of oil and gas development under Alternative C may be perceived as creating a conflict with the Big Horn County Land Use Plan, as this plan identifies a need to diversify the region's economy, pointing to the idea that it relies relatively heavily on mining and public sector activities. However, the county has other policy instruments to encourage economic diversification and the BLM's actions under Alternative C would not likely limit the county's ability to use these other instruments. As a result, there would not likely be a conflict with the Big Horn County Land Use Plan. Alternative C would not conflict with the adopted land use plans of Hot Springs, Park, or Washakie counties.

Impacts on Quality of Life and Local Culture

Alternative C would increase economic opportunities in the Planning Area more than alternatives A, B, and D, which may result in beneficial impacts on quality of life. However, Alternative C may also result in adverse impacts to air quality, wildlife, and other resources that improve quality of life related to natural characteristics.

Alternative C would prioritize the use of resources such as oil and gas development over the conservation of resource such as air quality and wildlife. This management approach would be consistent with the culture advocated by some interest groups (e.g., oil and gas interests) and would be inconsistent with the culture advocated by others (e.g., wilderness advocates).

Under this alternative, continued development of oil and gas wells, ROWs, and other human-made structures on the landscape would continue to result in decreases in nonmarket values associated with open space and the environment. However, because this alternative emphasizes resource use and development, the magnitude of these decreases would be greater than historic trends and greater than under the other alternatives. Under this alternative, subdivision of ranch land and related development and sale of "ranchette" parcels would continue and would result in impacts similar to Alternative A. This continuation would generally be in line with historic trends, because Alternative C would have relatively little impact on the economics of ranching.

Alternative D

Impacts on Population

Under Alternative D, activities on BLM-administered land and mineral estate related to oil and gas, livestock grazing, and recreation would support an average of 1,478 full-time and part-time jobs per year (Table 4-37), which represents approximately 4.0 percent of total employment in the Planning Area using 2011 employment statistics. Compared to Alternative A, which essentially represents the continuation of current trends, Alternative D would result in a decrease of 42 jobs (approximate 3 percent decrease), or approximately 0.1 percent of year 2011 employment. Most of these job decreases would be associated with decreased development of oil and gas resources.

As shown in Section 4.8.2 *Economic Conditions*, approximately 77 percent of the job opportunities from activities analyzed using the IMPLAN model would be related to oil and gas development and production (1,135 jobs). Livestock grazing would contribute approximately 13 percent of the job opportunities (185 jobs), and recreation would contribute approximately 11 percent (158). (Note that due to rounding, these sector-level figures do not necessarily match the total reported above.) These jobs would be dispersed geographically across the Planning Area, as described under Alternative A. The average annual number of jobs supported by recreation activities and livestock grazing would be identical to that under Alternative A; however, average annual jobs supported by oil and gas would decrease by approximately 4 percent compared to Alternative A.

Overall, Alternative D would result in a slight decrease in job opportunities and, therefore, may result in a slight decrease in population compared to Alternative A. Alternative D would result in more job opportunities than Alternative B, but less than Alternative C. Because the change in population and employment would be very small, spread over time, and spread throughout the Planning Area, Alternative D would not considerably alter the relative distribution of job opportunities or substantially affect population increase or movement.

Impacts on Housing and Community Services

Alternative D may result in a small decrease in population compared to Alternative A, which may result in a small decrease in demand for housing and community services. Alternative D would also result in a slightly reduced tax base from oil and gas production (about 6 percent) for providing community services, as described in Section 4.8.2 *Economic Conditions*. Geographically, the change in job opportunities—and related impacts on housing and community services—would be spread across the Planning Area and would be spread over time.

Consistency with Adopted County Land Use Plans

Similar to the other alternatives, the BLM takes practical steps to resolve any identified conflicts between federal and local plans. Alternative D continues the BLM's historical policy of balanced resource conservation and development, which encourages diversified economic activities by providing opportunities for developers to extract resources (e.g., oil and gas extraction) as well as develop industries that are sustainable in the very long term (e.g., renewable energy). Alternative D does not conflict with the adopted land use plans of Big Horn, Hot Springs, Park, or Washakie counties.

Impacts on Quality of Life and Local Culture

Alternative D would provide economic opportunities in the Planning Area very similar to, although slightly less than, Alternative A. Alternative D would also result in some beneficial impacts to air quality, wildlife, and other resources that improve quality of life related to natural characteristics. The balanced management approach under Alternative D could increase the quality of life in the long term and increase the economic viability and sustainability of communities.

Alternative D would balance the use of resources such as oil and gas reserves with the conservation of resources such as air quality, open space, and wildlife habitat. Alternative D balances the culture advocated by some interest groups (e.g., oil and gas interests) with those of others (e.g., wilderness advocates). Alternative D provides for resource development and associated job opportunities while managing for nonmarket values associated with open space and natural characteristics.

Under this alternative, subdivision of ranch land and related development and sale of "ranchette" parcels would continue and would result in impacts similar to Alternative A. This continuation would generally be in line with historic trends, because Alternative D would have relatively little impact on the economics of ranching.

Alternative E

Impacts on Population

Under Alternative E, activities on BLM-administered land and mineral estate related to oil and gas, livestock grazing, and recreation would support an average of 761 full-time and part-time jobs per year, which represents approximately 2.1 percent of total employment in the Planning Area counties as of 2011 (Table 4-37). Although Alternative E places additional restrictions on energy development in greater sage-grouse Key Habitat Areas in comparison to Alternative B, it is not expected to result in a perceptible change in the number of jobs supported by oil and gas, livestock grazing, and recreation in comparison to that alternative (for additional details, please see *Leasable Minerals – Oil and Gas*, *Recreation*, and *Livestock Grazing Management*). Therefore, impacts on population would be the same as those described under Alternative B, which would include a decrease of 759 jobs (approximate 50 percent decrease) compared to Alternative A. Using 2011 employment statistics, these job losses represent approximately 2 percent of total employment in the Planning Area counties.

A decrease in employment opportunities may result in a decrease in population in the Planning Area as people may leave the area to seek employment elsewhere. As with the other alternatives, the expected magnitude of any such decrease would be similar to the magnitude of employment loss but would be lower since some people (e.g., retired people) survive on unearned income and do not depend directly on employment for economic well-being.

Approximately 62 percent of the job opportunities from activities analyzed using the IMPLAN model would be related to oil and gas development and production under Alternative E (470 jobs). Livestock

grazing would contribute approximately 18 percent of the job opportunities (133 jobs), and recreation would contribute approximately 21 percent (158 jobs). These jobs may be dispersed across the Planning Area; however, those cities with a higher concentration of oil and gas support activities businesses, as well as housing centers for oil and gas workers, could experience greater impacts.

Impacts on Housing and Community Services

Anticipated population and tax revenue decreases under Alternative E are similar to Alternative B and greater than under the other alternatives; resulting impacts on housing and community services would be the same as described under Alternative B. This population decrease may result in reduced demand for housing and community services compared to existing conditions. Alternative E would result in a reduced tax base for providing community services similar to that described under Alternative B (see *Economic Conditions* for additional information). The exact geographic distribution of these changes is not possible to predict because tax losses in specific jurisdictions would be driven by undetermined well locations; however, the restrictions on oil and gas development under Alternative E affect broad areas of land throughout the Planning Area, so the reductions in tax revenues would likely affect all communities that currently produce oil and/or gas.

Consistency with Adopted County Land Use Plans

BLM takes practical steps to resolve any identified conflicts between federal and local plans. The Hot Springs County Land Use Plan expresses concern about growing federal and state regulation on public lands that may slow or hinder economic development. Similar to Alternative B, but to a greater extent due to additional conservation measures for greater sage-grouse, restrictions on oil and gas development under Alternative E could be perceived as a conflict with the Hot Springs County Land Use Plan. Alternative E would not conflict with the adopted land use plans of Big Horn, Park, or Washakie counties. These plans simultaneously advocate both the economic use of lands and open spaces and the preservation of wildlife habitat.

Impacts on Quality of Life and Local Culture

In general, quality of life impacts would be the same as those described under Alternative B. Quality of life for the people who live in the Planning Area is closely interconnected with continued economic opportunities as well as features of the natural landscape. Alternative E would reduce economic opportunities from oil and gas development and livestock grazing, but would also result in decreased air pollution and other adverse environmental impacts associated with development compared to the other alternatives.

Residents generally support multiple-use of BLM-administered lands, including the development of mineral and energy resources, livestock grazing authorizations, continued access to BLM-administered lands for recreation, and conservation of wildlife and native vegetation. Alternative E would continue BLM's current practice of allowing multiple-uses, but would prioritize resource conservation over resource uses such as oil and gas development and livestock grazing. This resource conservation focus would be especially evident in areas like the Greater Sage-Grouse Key Habitat Areas ACEC, where many resource use activities would be restricted or prohibited. This may be inconsistent with the culture advocated by some interest groups (e.g., oil and gas interests, livestock ranchers) and may promote the culture advocated by others (e.g., wilderness advocates).

Under Alternative E, the continued development of oil and gas wells, ROWs, and other human-made structures on the landscape would continue to result in adverse impacts to nonmarket values associated with open space and the environment. However, because this alternative emphasizes resource

conservation, the magnitude of these decreases would be less than under the other alternatives and less than overall historic trends.

The withdrawal of a large portion of the Planning Area from livestock grazing under Alternative E would result in the same adverse impacts on allotments and livestock operators as described under Alternative B, including potential reductions in operations and ranch consolidations and/or sales.

As under Alternative B, residents of the Planning Area would be affected by restrictions to recreational opportunities beyond what is reflected in *Economic Conditions*. This is because the economic impacts of recreational activities only capture changes to non-resident recreation that would affect expenditures made in the Planning Area. In addition to affects from non-resident expenditures, seasonal travel restrictions in greater sage-grouse Key Habitat Areas and other wildlife habitats under Alternative E would limit motorized vehicle use in those areas for all recreationists on BLM-administered land, and in effect favor primitive recreational uses; these effects would be the same as under Alternative B.

Alternative F

Impacts on Population

Under Alternative F, activities on BLM-administered land and mineral estate related to oil and gas, livestock grazing, and recreation would support an average of 1,477 full-time and part-time jobs per year (Table 4-39), which represents approximately 4.0 percent of total employment in the Planning Area counties using 2011 employment statistics. Compared to Alternative A, which essentially represents the continuation of current trends, Alternative F would result in a decrease of 43 jobs (approximate 3 percent decrease), or approximately 0.1 percent of year 2011 employment. These job decreases would be associated with decreased development of oil and gas resources.

As shown in *Economic Conditions*, approximately 77 percent of the job opportunities from activities analyzed using the IMPLAN model would be related to oil and gas development and production (1,134 jobs). Livestock grazing would contribute approximately 13 percent of the job opportunities (185 jobs), and recreation would contribute approximately 11 percent (158). (Note that due to rounding, these sector-level figures do not necessarily match the total reported in Table 4-40.) These jobs would be dispersed geographically across the Planning Area, as described under Alternative A. In comparison to Alternative A, the average annual number of jobs supported by recreation activities and livestock grazing would be nearly the same, while the number of jobs supported by oil and gas would decrease by approximately 4 percent.

Alternative F would result in a slight decrease in job opportunities compared to Alternative A, potentially causing a slight decrease in population. Because the change in population and employment would be very small, spread over time, and spread throughout the Planning Area, Alternative F would not considerably alter the relative distribution of job opportunities or substantially affect population increase or movement. However, it should be noted that the ability to draw definitive conclusions for the relationship between job opportunities and population among the alternatives may be limited, to a degree, by the input-output nature of the IMPLAN model.

Impacts on Housing and Community Services

Alternative F may result in a small decrease in population compared to Alternative A, which may in turn decrease the demand for housing and community services. Alternative F would also result in a slightly reduced tax base from oil and gas production compared to Alternative A. Geographically, the change in job opportunities—and related impacts on housing and community services—would be spread across the Planning Area and would be spread over time.

Consistency with Adopted County Land Use Plans

Similar to the other alternatives, the BLM would take practical steps to resolve any identified conflicts between federal and local plans. Similar to Alternative D, Alternative F would continue BLM's historical policy of balanced resource conservation and development, but with slightly greater emphasis on resource conservation in greater sage-grouse PHMAs. In general, Alternative F encourages diversified economic activities by providing opportunities for developers to extract resources (e.g., oil and gas extraction), as well as develop industries that are sustainable in the very long term (e.g., renewable energy). Alternative F would not conflict with the adopted land use plans of Big Horn, Hot Springs, Park, or Washakie counties. These plans simultaneously advocate both the economic use of lands and open spaces, as well as the preservation of wildlife habitat.

Impacts on Quality of Life and Local Culture

Economic opportunities in the Planning Area under Alternative F would be slightly less than under Alternative A. Alternative F would also result in greater beneficial effects to air quality, wildlife, and other resources that improve quality of life related to natural characteristics than under alternatives A or C.

Alternative F employs a balanced management approach and would continue BLM's current practice of allowing multiple-uses of public lands, as opposed to a single species management. However, under Alternative F, additional measures related to the conservation of resources (particularly in greater sage-grouse PHMAs) would place additional emphasis on wildlife habitat concerns over economic development compared to management under alternatives A or D.

Under this alternative, subdivision of ranch land and related development and sale of "ranchette" parcels would continue and would result in impacts similar to those of alternatives A and D, although some uncertainty exists on the effects of this alternative on ranchers, due to the added restrictions when compared to Alternative D. This continuation would generally be in line with historic trends.

4.8.2 Economic Conditions

This section addresses the potential for the alternatives to result in impacts on economic conditions in the Planning Area, including direct, indirect, short-term, and long-term impacts. Laws, executive orders, regulations, policies, and guidance considered in the analysis of economic conditions are identified in Appendix B.

Potential impacts include changes in regional economic output, employment, and earnings, and in tax revenues for the local, state, and federal governments. The economic modeling analysis assumes direct and indirect impacts occur simultaneously even though in reality these impacts may take time to work their way through the economic sectors in the analysis area. For example, an action to permit gas exploration and production may result in the direct infusion of money into several economic sectors and indirect infusions into related sectors, such as retail, accommodation, and food services and education and other social services. In economic modeling, these impacts would be assumed to occur instantaneously. Continued direct infusion of money into the Planning Area's economy created by the decision to lease oil and gas would be analyzed over the life of the project, which in this case is likely to represent a multi-year period of production. As a result, the analysis of impacts to economic conditions is designed to account for the economic activity produced by planning decisions over time. The impacts are estimated on an annual basis through 2028 based on the estimated annual direct impact of the alternatives.

4.8.2.1 Methods and Assumptions

The analysis in this section is based on the IMPLAN model as described at the beginning of the Socioeconomic Resources section. IMPLAN focuses on employment and labor earnings and does not explicitly address non-labor income such as transfer payments (e.g., Social Security), investment earnings, or rent. As a result, the focus of this analysis is limited to the segment of the economy that is based on work-related income. The effects of non-labor income should be considered when interpreting the results of the IMPLAN model as substantial portions of income in some locations in the Planning Area come from non-labor income (e.g., Park County where nearly 40 percent of personal income is from non-labor income).

Assumptions used in this analysis include the following:

- Employment, earnings, and output are indicators of economic and population change.
- BLM-influenced activities alter economic conditions. Economic benefits to the Planning Area accrue from BLM-influenced activities, such as oil and natural gas development, livestock grazing, and recreation. Economic benefits to the Planning Area also accrue from wildlife grazing, to the extent that wildlife grazing contributes to the availability of and demand for recreational activities. Conversely, the possibility of economic losses to the Planning Area due to BLM-influenced activities is recognized and evaluated.
- Indirect and induced benefits due to minerals, livestock grazing, and recreation can reasonably be estimated by the IMPLAN model. (The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the Planning Area.)
- Recreation-related expenditures by residents occur in the region, but do not represent new money coming into the Planning Area; therefore, the analysis of economic impacts from recreation considers only recreation expenditures of nonresidents in the four-county Planning Area. In other words, there is a multiplier effect associated with nonresident recreation-related spending because it results in an input of new money into the Planning Area. By comparison, it is assumed that recreation-related expenditures of people who live within the Planning Area would generally be spent within the area (although not necessarily on the same activities), given the set of possible management actions represented by the range of alternatives analyzed.
- The analysis of direct and indirect impacts associated with oil and gas activity considers only activities on BLM-administered surface and federal mineral estate. The cumulative analysis considers activities on state and fee land and mineral estate.
- For livestock grazing, the analysis reflects a "worst-case" assumption that all acres impacted by surface-disturbing actions (from all the sources listed in Appendix T) are lands currently permitted for grazing; thus, the number of acres available for grazing in 2027 is the number of acres available under each alternative, minus acres that are affected in the long term by surface-disturbing actions (and withdrawals). In addition, the analysis of grazing reflects the assumption that surface-disturbing actions occur at a constant rate over time.
- For livestock grazing, the analysis of baseline AUMs available and reductions in AUMs is adjusted for the ratio of authorized use to active use, which is calculated based on the long-term average of authorized and active (use) AUMs for the Planning Area from 1988 to 2012. This long-term average is 64 percent. Appendix Q contains additional details regarding this adjustment.

The pace and timing of economic development in the Planning Area depends on many factors beyond BLM management. These include national and international energy demand, supply, and prices; operator business strategies; production conditions within the Planning Area; and demand and supply

for agricultural products. Because the future pace of development in the Planning Area is unknown, this analysis assumes a relatively constant rate of development. Therefore, actual impacts may differ if the rate of development changes substantially (e.g., there may be boom and bust type short-term impacts that would differ from long-term impacts).

The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the Planning Area. As a result, the calibrated model does a better job of generating multipliers and the subsequent impacts that reflect the interaction between and among the sectors in the Planning Area, compared to a model using unadjusted national coefficients. Specifically, worker productivity in oil and gas production is higher in Wyoming and more of the hay used for livestock feed is produced within the region, compared with national averages. Key variables used in the IMPLAN model were filled in using data specific to Wyoming, including employment estimates, labor earnings, and total industry output.

Appendix Q describes the economic analysis method in more detail, along with detailed assumptions and factors for the analysis.

4.8.2.2 Summary of Impacts by Alternative

Based on the data from the IMPLAN model, as well as qualitative analysis from other sectors, output, employment, and tax revenues resulting from activities on BLM-administered land and mineral estate would be highest under Alternative C and lowest under Alternative E. Alternative A would result in the second-highest level of economic activity, and Alternative D the third-highest.

The most important drivers of economic activity influenced by BLM management, respectively, are oil and gas activity and livestock grazing. Oil and gas production would be highest under Alternative C, followed by alternatives A, D, and F; the lowest oil and gas production would occur under alternatives B and E. It is also worth pointing out that the Oil and Gas Management Areas proposed under alternatives C, D, and F would facilitate oil and gas development by, among other things, exempting these areas from seasonal development and other restrictions. This would help operators to smooth their exploration, development and production cycles, which would help smooth seasonal employment cycles during the year. In alternatives B and E, where Oil and Gas Management Areas would not apply, seasonal restrictions could contribute to a seasonal "boom and bust" cycle with some production, development or maintenance workers being subject to seasonal access restrictions.

Livestock grazing closures and curtailed activity, if they occur, would result in disruptions and impacts to the economic contribution of livestock grazing in the local economy as well as the social fabric of the communities in which they operate. Some jobs and associated earnings would be lost. This is documented in the tables in this section. Note that if a ranch closes due to the loss of part of its federal allotment, but its other private assets (e.g., capital and land) are absorbed by another ranching operation, that transfer of use from one owner to another would not generally be expected to have adverse effects on overall regional employment. However, the loss of the federal grazing land would have adverse effects, and it is those impacts that are measured by the analysis.

Economic activity from livestock grazing would be similar under alternatives A, C, D, and F, but substantially lower under alternatives B and E. Additional restrictions and requirements for livestock grazing in PHMAs under Alternative F could result in adverse effects to economic activity compared to alternatives A and D; however, at present it is not possible to quantify the changes in livestock grazing economic activity that would result from these restrictions. Earnings, output, and employment from recreation would be similar across all the alternatives.

Economic activity from other sectors not modeled using IMPLAN, including renewable energy, locatable minerals, and salable minerals, would be greatest under alternatives A, C, D, and F, and lowest under alternatives B and E. However, at present it is not possible to quantify effects from renewable energy, locatable minerals, and salable minerals.

Alternative C would result in the highest earnings and employment, followed by alternatives A, D, F, B, and E. Table 4-37 includes additional information on projected earnings and employment related to activities on BLM-administered areas to the levels in 2011. Alternative A would result in approximately $87 million in earnings and 1,520 jobs annually from BLM-administered land and resources. Alternatives B and E would generate about $38 million in earnings and 763 jobs; Alternative C would generate approximately $94 million in earnings and 1,631 jobs; Alternative D would generate about $84 million in earnings and 1,478 jobs; and Alternative F would result in $84 million in earnings and 1,477 jobs annually from BLM-administered land and resources.

It is useful to compare the differences in earnings and employment across alternatives, not only in absolute terms, but also to the size of the regional economy. The earnings associated with Alternative A represent approximately 3.8 percent of the total earnings in the Planning Area counties compared to 2011 earnings (Table 4-37). Earnings associated with BLM-administered lands under alternatives B, C, D, E, and F constitute 1.7, 4.1, 3.7, 1.7, and 3.7 percent of year 2011 earnings, respectively. The average employment associated with activities on BLM-administered land under alternatives A, B, C, D, E, and F represents about 4.1, 2.1, 4.4, 4.0, 2.1, and 4.0 percent of employment for counties in the Planning Area in year 2011, respectively (Table 4-37). This provides a useful perspective on the relative importance of BLM-administered lands in the overall regional economy and also shows that the difference between alternatives—relative to the regional economy—is small. For example, the difference in employment projected between alternatives A and B would be just 2.0 percentage points of employment in year 2011 (4.1 minus 2.1), which would certainly be noticeable (it would be as if the unemployment rate increased by 2.0 percentage points), but would not likely lead to wholesale changes in regional economic activity. The difference in annual employment between alternatives A and F would barely be noticeable in regional statistics, with a 0.1 percentage point change, which is not likely noticeable for most residents or workers. Other national, state, and regional policies and trends, such as the value of the dollar, federal fiscal and monetary policy, and global oil prices, would have a substantially larger impact on economic activity in the Planning Area.

The data presented in Table 4-37, as well as the other tables in this section showing the results of the economic model analysis, reflect direct and indirect impacts on economic conditions. For example, the earnings and employment information in this section include oil and gas, livestock grazing, and recreation sectors as well as all other sectors that are connected such as retail, food service, hotels and other accommodation services, and social services such as education and health care. These jobs may be dispersed across the Planning Area; however, those cities with a higher concentration of oil and gas support activities businesses, as well as housing centers for oil and gas workers, could experience greater impacts.

4.8.2.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

The focus of the following analysis is on the resource activities most likely to be affected by land management decisions, including oil and gas, livestock grazing, and recreation. Management of resource programs or constraints (as described in the alternatives) that affect oil and gas, livestock

grazing, and recreation (e.g., surface-disturbing activities that affect the amount of land available for grazing) are included in the analysis. Also included are restrictions on ROWs and corridors, since the BLM's RFD for oil and gas, which provides estimated numbers of oil and gas wells and production, incorporates the restrictions on ROWs and corridors. Restrictions on new ROWs would tend to be a negligible factor in the decision to develop additional oil and gas wells in fields that are already producing, but may be an important factor in a decision to develop a new field.

Economic impacts related to other resources, such as locatable and salable minerals and renewable energy, are addressed outside the framework of the IMPLAN model. Impacts to economic conditions related to renewable energy management actions are described below for each alternative. For locatable and salable minerals, the BLM expects to meet market demand and respond to applications so that the production of these minerals would not vary across the alternatives being considered. Thus, the sections below on impacts under each alternative do not include earnings, jobs, or output related to locatable or salable minerals, such as bentonite. This does not mean production of these minerals or other activities not modeled in IMPLAN are unimportant (e.g., see Section 3.8.2 *Economic Conditions* in Chapter 3 for information on current employment and payroll from bentonite mining and processing). For more information on minerals, refer to Section 4.2.1 *Locatable Minerals* and Section 4.2.7 *Salable Minerals*.

Under all alternatives, the BLM generally expects to meet market demand and respond to applications for locatable minerals and mineral materials and does not anticipate that the production of these minerals would vary across the alternatives being considered. The different alternatives include varying restrictions on mineral entry and mineral materials disposal; however, restrictions may have a minor impact on overall economic conditions compared to current conditions.

Changes in economic activity have impacts on federal, state, and local tax revenues. While all sectors of the economy contribute to tax revenues, the analysis of tax revenue impacts focuses on oil and gas production because almost all of the measurable variation in economic activity among alternatives is related to oil and gas.

The focus of this analysis is on regional earnings and output, employment, and tax revenue, with the region defined as the four-counties in the Planning Area. The IMPLAN model is run at a regional (multi-county) scale, with the mathematical relationships that describe linkages between sectors aggregated to the four-county level. Because of this mathematical aggregation, it is not possible to identify total economic impacts for an individual community. For additional information on the structure of the IMPLAN model and specific assumptions made for the economic modeling analysis, refer to Appendix Q, *Economic Impact Analysis Methodology*.

Alternative A

Impacts on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative A for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $87 million per year between 2009 and 2028, and regional output would average approximately $639 million per year, resulting from development and activities on BLM-administered land and mineral estate. The net present value of the stream of regional output, discounted at a 7 percent real discount rate (OMB 1992), would be approximately $7.3 billion over 20 years. Table 4-38 summarizes and compares sector-level breakouts for earnings and output by alternative.

Alternative A would maintain the current management approach of permitting renewable energy development on a case-by-case basis. This may result in adverse impacts by increasing uncertainty for individual firms considering developing renewable energy in the Planning Area.

The BLM generally expects to meet market demand for locatable minerals and mineral materials and respond to applications consistent with current management. Alternative A would maintain the current management approach with respect to leasing of BLM-administered lands for exploration and development, and may have little to no change compared to current conditions.

Table 4-38. Average Annual Impacts on Earnings and Output, by Sector and Alternative for the Planning Area

Sector	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Impacts on Annual Average Earnings (millions of 2011 $)						
Oil and Gas	$77.7	$31.2	$85.1	$75.0	$31.0	$74.9
Livestock Grazing	$5.9	$4.2	$5.9	$5.9	$4.2	$5.9
Recreation	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1
Total[2]	**$86.7**	**$38.5**	**$94.1**	**$83.9**	**$38.3**	**$83.8**
Impacts on Annual Average Output (millions of 2011 $)						
Oil and Gas	$607.7	$243.5	$665.1	$586.2	$242.7	$585.8
Livestock Grazing	$19.8	$14.2	$19.7	$19.7	$14.2	$19.7
Recreation	$11.6	$11.6	$11.6	$11.6	$11.6	$11.6
Total[2]	**$639.1**	**$269.4**	**$696.4**	**$617.6**	**$268.6**	**$617.2**
Impacts on Net Present Value of Output Over 20 Years (millions of 2011 $)[1]						
Oil and Gas	$6,976.6	$2,795.2	$7,635.4	$6,729.6	$2,786.4	$6,725.7
Livestock Grazing	$209.4	$163.1	$208.7	$209.3	$163.1	$209.4
Recreation	$120.0	$120.0	$120.0	$120.0	$120.0	$120.0
Total[2]	**$7,306.0**	**$3,078.4**	**$7,964.1**	**$7,059.0**	**$3,069.6**	**$7,055.0**

Source: Calculated using the IMPLAN model, as described in the text.

[1]Net present value from 2009 to 2028, discounted at 7 percent (rate from OMB 1992).
[2]Due to rounding, totals may not be additive.

IMPLAN Impact Analysis for Planning model

Impacts on Employment

Employment is a function of the level of economic activity (sales and purchases) among economic sectors. Thus, employment impacts are closely related to impacts on economic output. An increase in output implies an increase in employment and vice versa.

Based on the IMPLAN model, regional employment under Alternative A for the modeled sectors would average approximately 1,520 jobs per year between 2009 and 2028 due to activities on BLM-administered lands and mineral estate. The number of jobs is expressed as "annual job equivalents," where one annual job equivalent (AJE) represents 12 months of employment. For example, one AJE could represent two jobs for 6 months each, or one job for 12 months. AJEs may represent either full-time or part-time jobs. Table 4-39 provides a comparison of jobs by sector under the alternatives.

Average annual earnings per job would differ for each of these sectors, but would be the same under all alternatives. Based on the IMPLAN model, earnings per job (expressed in year 2011 dollars) would average:

- Between $55,000 and $65,000 for jobs in oil and gas well drilling and completion.
- Between $61,000 and $75,000 for jobs in oil and gas production.
- Between $20,000 and $36,000 for jobs associated with cattle and sheep grazing.
- Between $19,000 and $20,000 for recreation-related jobs.

Table 4-39. Average Annual Impacts on Employment, by Sector and Alternative for the Planning Area

Sector	Number of Jobs[1]					
	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Oil and Gas	1,177	472	1,289	1,135	470	1,134
Direct	*614*	*246*	*672*	*592*	*245*	*591*
Indirect & Induced	*563*	*226*	*617*	*543*	*225*	*543*
Livestock Grazing	185	133	184	185	133	185
Direct	*106*	*76*	*105*	*106*	*76*	*106*
Indirect & Induced	*79*	*57*	*79*	*79*	*57*	*79*
Recreation	158	158	158	158	158	158
Direct	*131*	*131*	*131*	*131*	*131*	*131*
Indirect & Induced	*27*	*27*	*27*	*27*	*27*	*27*
Total[2]	**1,520**	**763**	**1,631**	**1,478**	**761**	**1,477**
Direct	***850***	***453***	***908***	***828***	***452***	***828***
Indirect & Induced	***670***	***310***	***723***	***650***	***309***	***649***

Source: Calculated using the IMPLAN model, as described in the text.

[1]Number of jobs is in annual job equivalents (AJE), where one AJE represents 12 months of employment. For instance, one AJE could represent one job for 12 months, or two jobs for 6 months.
[2]Due to rounding, totals may not be additive.

IMPLAN Impact Analysis for Planning model

Table 4-40 provides information on employment, disaggregated by economic sector, that would be associated with activities on BLM-administered land in each alternative. In each table cell, the first figure is the comprehensive impact (including indirect and induced impacts from related sectors) and the second figure, in parentheses, is the direct impact only. In all alternatives, mining is the sector with greatest employment, most of it directly related to activities on BLM land. The other leading sectors are arts, entertainment, and recreation services; agriculture and agricultural services; retail trade; construction; and business services. With the exception of business services, all of these sectors would see contributions from both direct and indirect/induced activity.

Table 4-40. Average Annual Impacts on Employment, by Subsector and Alternative for the Planning Area

Sector	Number of Jobs[1] Total Contribution (Direct Contribution)[2]					
	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Agriculture & Agricultural Services	139 (106)	100 (76)	139 (105)	139 (106)	98 (75)	139 (106)
Mining (includes oil and gas services)	581 (564)	233 (226)	637 (618)	561 (544)	232 (225)	560 (543)
Utilities	7 (0)	3 (0)	7 (0)	6 (0)	3 (0)	6 (0)
Construction	128 (33)	52 (13)	140 (36)	124 (32)	52 (13)	124 (32)
Manufacturing	14 (1)	6 (1)	15 (1)	13 (1)	6 (1)	13 (1)
Wholesale Trade	51 (28)	21 (11)	55 (30)	49 (27)	21 (11)	49 (27)
Retail Trade	135 (32)	79 (32)	144 (32)	132 (32)	78 (32)	132 (32)
Transportation & Warehousing	23 (0)	10 (0)	25 (0)	22 (0)	10 (0)	22 (0)
Information	12 (0)	6 (0)	13 (0)	11 (0)	6 (0)	11 (0)
Finance & Insurance	32 (0)	15 (0)	35 (0)	31 (0)	15 (0)	31 (0)
Real Estate & Rentals	61 (23)	28 (9)	66 (25)	59 (22)	28 (9)	59 (22)
Business Services (e.g., administrative)	111 (0)	50 (0)	121 (0)	108 (0)	49 (0)	108 (0)
Social Services	73 (0)	33 (0)	79 (0)	71 (0)	33 (0)	71 (0)
Arts/Entertainment/ Recreation Services	164 (83)	120 (83)	170 (83)	161 (83)	120 (83)	161 (83)
Other Services	74 (13)	41 (13)	78 (13)	72 (13)	41 (13)	72 (13)
Institutions	17 (0)	7 (0)	18 (0)	16 (0)	7 (0)	16 (0)

Source: Calculated using the IMPLAN model. Due to rounding, totals may not match exactly the totals reported in other tables in this section.

[1]Number of jobs is in annual job equivalents (AJE), where one AJE represents 12 months of employment. For instance, one AJE could represent one job for 12 months, or two jobs for 6 months.
[2]The total contribution includes indirect and induced economic activity from related sectors (i.e., "upstream" and "downstream" sectors that supply materials and labor, or benefit from spending by workers in the sectors directly affected). For more information see the economic model description in the text.

IMPLAN Impact Analysis for Planning model

Impacts on Tax Revenue

Projected tax revenues for Alternative A resulting from oil and gas production on BLM-administered mineral estate would average $54.0 million per year for federal royalties, $25.9 million per year for state severance taxes, and $29.5 million per year for local ad valorem taxes. Because specific well locations are not known at this time, there is not sufficient data to apportion the local tax receipts to individual counties. Table 4-41 provides a summary and comparison of tax revenues from oil and gas production for the alternatives.

Table 4-41. Estimated Oil and Gas Tax Revenues by Alternative for the Planning Area (millions of 2011 $)

Tax Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Federal mineral royalties	$54.0	$21.6	$59.1	$52.1	$21.6	$52.1
State severance taxes	$25.9	$10.4	$28.4	$25.0	$10.4	$25.0
Local ad valorem production taxes	$29.5	$11.8	$32.3	$28.5	$11.8	$28.5
Total[1]	**$109.5**	**$43.9**	**$119.8**	**$105.6**	**$43.8**	**$105.6**

Source: Calculated based on the IMPLAN model and state, federal, and local tax rates, as described in the text.

[1]Due to rounding, totals may not be additive.

IMPLAN Impact Analysis for Planning model

Alternative B

Impacts on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative B for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $38.5 million per year between 2009 and 2028, and regional output would average approximately $269 million per year, due to activities on BLM-administered land and mineral estate. The net present value of the stream of regional output, discounted at a 7 percent real discount rate (OMB 1992), would be approximately $3.1 billion over 20 years. Table 4-38 summarizes and compares sector-level breakouts for earnings and output by alternative.

Under Alternative B, 1,244,948 acres are renewable energy exclusion areas and an additional 1,691,663 acres are managed as avoidance areas. Approximately 251,203 acres (8 percent of BLM-administered surface) would be open to renewable energy development. Alternative B could increase development in areas open to renewable energy development compared to Alternative A, since it would decrease uncertainty for firms considering developing renewable energy in the Planning Area.

Alternative B would limit or restrict the amount of land open to exploration and development of these minerals more than Alternative A. However, restrictions may have a minor impact on overall economic conditions compared to current conditions.

Impacts on Employment

Based on the IMPLAN model, regional employment under Alternative B for the modeled sectors would average approximately 763 jobs per year between 2009 and 2028 due to activities on BLM-administered land and mineral estate. Alternative B would result in fewer jobs compared to Alternative A. Table 4-39 provides a comparison of jobs by sector under the alternatives.

Impacts on Tax Revenue

Projected tax revenues for Alternative B resulting from oil and gas production on BLM-administered mineral estate would average $21.6 million per year for federal royalties, $10.4 million per year for state severance taxes, and $11.8 million per year for local ad valorem taxes. Because specific well locations are not known at this time, there is not sufficient data to apportion the local tax receipts to individual

counties; however, the restrictions on oil and gas development under Alternative B affect broad areas of land throughout the Planning Area, so the reductions in tax revenues (relative to Alternative A) would affect virtually all communities that currently produce oil and gas. Table 4-41 provides a summary and comparison of tax revenues from oil and gas production for the alternatives. Implementation of Alternative B would result in less estimated oil and gas tax revenues compared to Alternative A.

Alternative C

Impacts on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative C for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $94 million per year between 2009 and 2028, and regional output would average approximately $696 million per year, due to activities on BLM-administered land and mineral estate. The net present value of the stream of regional output, discounted at a 7 percent real discount rate (OMB 1992), would be approximately $8.0 billion over 20 years. Table 4-38 summarizes and compares sector-level breakouts for earnings and output by alternative.

Under Alternative C, approximately 148,416 acres renewable energy exclusion areas and 1,611,040 acres are avoidance areas. Approximately 1.4 million acres (45 percent of the BLM-administered surface in the Planning Area) would be open to renewable energy development. Management of renewable energy under Alternative C could increase development compared to alternatives A and B, since it would reduce restrictions and open more area to renewable energy development. Similar to alternatives B and D, allocation of areas open to renewable energy could also increase renewable energy development by decreasing uncertainty for firms considering developing renewable energy in the Planning Area.

Alternative C would increase the amount of land open to exploration and development of locatable minerals and would slightly decrease the amount of land open to exploration and development of salable minerals compared to Alternative A (refer to Section 4.2 *Mineral Resources*). However, decreased restrictions and more areas open to mineral development may only have a minor impact on the regional economic conditions compared to current conditions.

Impacts on Employment

Based on the IMPLAN model, regional employment under Alternative C for the modeled sectors would average approximately 1,631 jobs per year between 2009 and 2028 due to activities on BLM-administered land and mineral estate. Alternative C would result in the greatest number of jobs compared to the other alternatives. Table 4-39 provides a comparison of jobs by sector under the alternatives.

Impacts on Tax Revenue

Projected tax revenues for Alternative C resulting from oil and gas production on BLM-administered surface would average $59.1 million per year for federal royalties, $28.4 million per year for state severance taxes, and $32.3 million per year for local ad valorem taxes. Because specific well locations are not known at this time, there is not sufficient data to apportion the local tax receipts to individual counties. Table 4-41 provides a summary and comparison of tax revenues from oil and gas production for the alternatives. Implementation of Alternative C would result in the greatest estimated oil and gas tax revenues compared to the other alternatives.

Alternative D

Impacts on Regional Earnings and Output

Based on the IMPLAN model, regional earnings under Alternative D for the modeled sectors (oil and gas, grazing, and recreation) would average approximately $84 million per year between 2009 and 2028, and regional output would average approximately $618 million per year, due to activities on BLM-administered land and mineral estate. The net present value of the stream of regional output, discounted at a 7 percent real discount rate (OMB 1992), would be approximately $7.1 billion over 20 years. Table 4-38 summarizes and compares sector-level breakouts for earnings and output by alternative.

Under Alternative D, 372,110 acres are renewable energy exclusion areas, and 1,500,395 acres are avoidance areas. Approximately 1,315,309 acres (41 percent of BLM-administered surface) would be open to renewable energy development. Similar to alternatives B and C, allocation of areas open to renewable energy development under Alternative D could increase development in areas open to renewable energy since it would decrease uncertainty for firms considering developing renewable energy in the Planning Area.

Alternative D would increase the amount of land open to exploration and development of locatable minerals and the amount of land open to exploration and development of salable minerals compared to Alternative A (refer to Section 4.2 *Mineral Resources*). However, decreased restrictions and more areas open to mineral development may have only a minor impact on economic conditions compared to current conditions.

Impacts on Employment

Based on the IMPLAN model, regional employment under Alternative D for the modeled sectors would average approximately 1,478 jobs per year between 2009 and 2028 due to activities on BLM-administered land and mineral estate. Table 4-39 provides a comparison of jobs by sector under the alternatives.

Impacts on Tax Revenue

Projected tax revenues for Alternative D due to oil and gas production on BLM-administered surface would average $52.1 million per year for federal royalties, $25.0 million per year for state severance taxes, and $28.5 million per year for local ad valorem taxes. Because specific well locations are not known at this time, there is not sufficient data to apportion the local tax receipts to individual counties. Table 4-41 provides a summary and comparison of tax revenues from oil and gas production for the alternatives. Implementation of Alternative D would result in more estimated oil and gas tax revenues than Alternative B, but less than alternatives A and C.

Alternative E

Impacts on Regional Earnings and Output

Based on the IMPLAN model, regional earnings and output under Alternative E would be estimated to be similar to those under Alternative B for the modeled sectors (oil and gas, grazing, and recreation). Alternative E includes the greatest area of ROW exclusion and the most restrictive management on allowable surface disturbance of any alternative due to the inclusion of the Greater Sage-Grouse Key Habitat Areas ACEC. However, the management of new oil and gas leasing, motorized vehicle use restrictions and seasonal closures, recreation, and livestock grazing under Alternative E is similar to

Alternative B (for details, please see *Leasable Minerals – Oil and Gas*, *Recreation*, and *Livestock Grazing Management).*

Regional earnings under Alternative E would average approximately $38.3 million per year, and regional output would average approximately $269 million per year, due to activities on BLM-administered land and mineral estate. The net present value of the stream of regional output would be approximately $2.8 billion over 20 years. Table 4-38 summarizes and compares sector-level breakouts for earnings and output by alternative.

Under Alternative E, 1,945,204 acres would be renewable energy exclusion areas. This represents 700,256 acres more than under Alternative B. An additional 988,459 acres are managed as avoidance areas. Approximately 254,151 acres (8 percent of BLM-administered surface) would be open to renewable energy development, the same as under Alternative B. Despite the greater acreage of exclusion areas, the BLM expects that wind-energy development on BLM-administered lands would be approved at the same rate as under Alternative B (see *Renewable Energy* for details).

Alternative E imposes the most restrictions on the development of locatable and salable minerals in the Planning Area of any alternative, and could result in the greatest restrictions to economic activity from these types of mining compared to any other alternative. However, at present it is not possible to quantify effects from locatable and salable minerals management changes among the alternatives, for lack of reliable and geographically detailed production forecasts.

Impacts on Employment

Based on the IMPLAN model, regional employment under Alternative E for the modeled sectors would average approximately 761 jobs per year between 2009 and 2028 due to activities on BLM-administered land and mineral estate. Alternative E would result in the least number of jobs compared to the other alternatives. Table 4-39 provides a comparison of jobs by sector under the alternatives.

Impacts on Tax Revenue

Projected tax revenues for Alternative E resulting from oil and gas production on BLM-administered mineral estate are estimated to be the same as under Alternative B. As in Alternative B, estimated tax revenues under Alternative E would average $21.6 million per year for federal royalties, $10.4 million per year for state severance taxes, and $11.8 million per year for local ad valorem taxes. Estimated oil and gas tax revenues under Alternative E would be the same as under Alternative B, and would be the less than any of the other alternatives. Table 4-41 provides a summary and comparison of tax revenues from oil and gas production for the alternatives.

Alternative F

Impacts on Regional Earnings and Output

Based on the IMPLAN model, regional earnings and output under Alternative F for the modeled sectors (oil and gas, grazing, and recreation) would be similar to but slightly less than under Alternative D due to additional NSO restrictions for oil and gas development in greater sage-grouse PHMAs. This NSO restriction would reduce estimated oil and gas development when compared to alternatives A and D. The change in AUMs under Alternative F would be similar to Alternative D (see *Livestock Grazing Management* for details).

Regional earnings from activities on BLM-administered land and mineral estate under Alternative F would average approximately $84 million per year, and regional output would average approximately $617 million per year. The net present value of the stream of regional output would be approximately

$7.1 billion over 20 years. Table 4-38 summarizes and compares sector-level breakouts for earnings and output by alternative.

Under Alternative F, 292,949 acres are managed as renewable energy exclusion areas, and 2,507,581 acres as avoidance areas. Approximately 607,429 acres would be open to renewable energy development. Although restrictions on ROW development under Alternative F in the Greater Sage-Grouse PHMAs ACEC may increase costs associated with this development relative to Alternative D, the BLM expects development of renewable energy on BLM-administered lands to be similar to that described under Alternative D.

Alternative F imposes similar restrictions to the development of locatable and salable minerals as Alternative D, but also includes additional restrictions on surface-disturbing activities within the Greater Sage-Grouse PHMAs ACEC that may restrict economic activity compared to alternatives A and D. Due to the lack of reliable production forecasts, it is not possible to quantify effects from locatable and salable minerals management changes among the alternatives at present.

Impacts on Employment

Based on the IMPLAN model, regional employment under Alternative F for the modeled sectors would average approximately 1,477 jobs per year between 2009 and 2028 due to activities on BLM-administered land and mineral estate. Table 4-39 provides a comparison of jobs by sector under the alternatives.

Impacts on Tax Revenue

Implementation of Alternative F would result in greater estimated oil and gas tax revenues than alternatives B and E, but less than for alternatives A or C. Projected tax revenues for Alternative F due to oil and gas production on BLM-administered surface would average $52.1 million per year for federal royalties, $25.0 million per year for state severance taxes, and $28.5 million per year for local ad valorem taxes. Table 4-41 provides a summary and comparison of tax revenues from oil and gas production for the alternatives.

4.8.3 Health and Safety

Health and safety, as discussed in this document, includes AMLs, natural geologic hazards, and hazardous wastes and materials. Each of these hazards is analyzed in this section.

Direct impacts to health and safety would result from management of AMLs, geologic hazards, and hazardous materials and wastes that increase the potential for and risk of accidents in the areas in which AMLs, geologic hazards, or hazardous waste and materials spills or releases occur. Indirect impacts result from management that results in potential impacts to health and safety in a different time and space in which the AML, geologic hazard, or hazardous spills occurs.

Adverse impacts result from management that increases the potential for accidents and risks to health and safety. Beneficial impacts result from management the decreases the risk or potential for accidents associated with AMLs, geologic hazards, or hazardous wastes and materials.

Short-term impacts result from management that affects health and safety within 5 years. Short-term impacts include impacts to health and safety at the site of a hazardous waste spill. Long-term impacts to health and safety are those that occur and result after a period of more than 5 years. Long-term impacts may include the accumulation of hazardous wastes in water, air, or other resources that would affect health and safety.

4.8.3.1 Methods and Assumptions

Assumptions used in this impact analysis include the following:

- Most AML sites in the Planning Area (Map 95) are identified and characterized.
- "The BLM will set as its highest AML physical safety action priority the cleaning up of those AML sites situated at locations: (a) where a death or injury has occurred and the site has not already been addressed; or (b) situated on or in immediate proximity to developed recreation sites and areas with high visitor use" (BLM 2000). AML sites adversely affecting watersheds are also a high priority. The BLM continues to support the Wyoming DEQ AML Division in reclaiming AML sites on public surface.
- No assumptions were identified for natural geologic hazards.
- All new hazardous materials and waste sites are identified and characterized.
- Resource development activities identify any possible generation of hazardous waste.
- No substantial new hazardous materials uses and/or waste generation occurs within the Planning Area.
- The BLM's Hazard Management and Resource Restoration Program responds to all hazardous material releases on public surface. Emergency cleanup actions are implemented on sites posing a substantial threat to the public and/or the environment.

4.8.3.2 Summary of Impacts by Alternative

Beneficial impacts to health and safety from management of AML sites occur under all alternatives; however, alternatives B, D, E, and F would have the most beneficial impacts, followed by Alternative A, and then Alternative C. Under all alternatives, the BLM and Wyoming DEQ will identify and plan for remediation of AML sites which would reduce potential adverse impacts to health and safety. Alternative C could result in the greatest risk to health and safety from the management of AMLs by not prioritizing sites for reclamation and by allowing activities in mitigated AMLs.

Principle impacts to health and safety from geologic hazard areas would result from management that increases activities in geologic hazard areas and subsequently increases the risk and potential for accidents in these areas. Providing warning signs for geologic hazards would result in similar impacts under all the alternatives. Under Alternative A, there is no specific management for activities in geologic hazard areas, compared to the prohibition of activities under Alternative B, and allowing activities in mitigated geologic hazard areas under alternatives C, D, and F. Adverse impacts to health and safety associated with geologic hazard management would be the least under alternatives B and E, followed by alternatives C, D, and F, and greatest under Alternative A.

Under all alternatives, the impacts from management of hazardous wastes and materials would be the same. The potential for impacts may vary by alternative based on the level of mineral activity under the alternatives. Alternative C would result in the greatest amount of mineral activity, and as a result, may increase the generation, storage, and transport of hazardous materials, which could increase the potential for health and safety impacts compared to the other alternatives. Under all alternatives, an active remediation program remains in place and hazardous materials in the Planning Area are managed to reduce risk to people and the environment.

4.8.3.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Abandoned Mine Lands

To reduce the threat of physical and environmental impacts from AML sites, the BLM will remediate sites based on risk.

Long-term beneficial impacts to health and safety would result from the Wyoming DEQ, AML Division continuing work with the BLM to mitigate hazards associated with AML sites in the Planning Area.

Implementation of the alternatives is not anticipated to result in additional AML sites or increase the risks at AML sites that may adversely affect health and safety.

Natural Geologic Hazards

Natural geologic hazards in the Planning Area are managed to reduce risks to the public by providing warnings and, where appropriate, developing mitigation measures to avoid and minimize impacts associated with geologic hazards.

Implementation of the alternatives would not result in any increase in the potential for geologic hazards; however, management may decrease the risks and potential impacts to health and safety resulting from geologic hazards.

Developing a geologic hazards database that ranks threats to public health and safety, informing applicants and project proponents of geologic hazards, and developing mitigation may reduce impacts to health and safety from geologic hazards by providing resources that would reduce the risk to humans from geologic hazards.

Hazardous Wastes and Materials

Increases in human presence and activity associated with recreation, mineral activity, and ROW development increase risks associated with generation, use, transportation, and storage of hazardous wastes and materials. Mineral activities are the most likely activities to increase the risk of hazardous wastes and materials to health and safety.

Impacts to health and safety from the management of hazardous waste and materials would be the same under all alternatives as there are no separate management actions for hazardous waste the differ among the alternatives.

Implementing hazardous materials management activities will address human health and environmental risks from hazardous materials. Due to the increase in recreational activity throughout the Planning Area, particularly in areas such as Rattlesnake Ridge outside of Worland, and in proximity to oil and gas fields, H_2S poses an increasing threat to public health and safety. In order to reduce the risks to public health, all H_2S plans would comply with Onshore Order #6, which identifies "uniform national requirements and minimum standards of performance expected from operators when conducting operations involving oil or gas that is known or could reasonably be expected to contain hydrogen sulfide." In addition, the BLM will mitigate safety concerns associated with H_2S through signs, warning sirens, and public education. All of these management actions would reduce the potential for human health and safety risks from H_2S. Any potential impacts to health and safety from H_2S would increase in relation to the level of mineral activity that releases H_2S.

Hazardous materials in the Planning Area are managed to reduce risks to visitors, employees, and the environment, to restore contaminated lands, and to carry out emergency-response activities, as per appropriate laws, policies, and regulations. Management to reduce risk and contamination would reduce potential impacts to health and safety from hazardous wastes. Substantive indirect impacts related to risks from hazardous materials during remediation could exist.

Preparing Environmental Site Assessments on lands acquired or conveyed and notifying the public of conveyance of public lands affected by hazardous substances would reduce the potential for health and safety impacts from hazardous wastes. The preparation of Environmental Site Assessments would also ensure that contaminated lands are not conveyed out of federal ownership in keeping with Comprehensive Environmental Response, Compensation and Liability Act and ensure that the BLM would not acquire contaminated lands.

Requiring Hazardous Spill Response Plans for all projects involving hazardous materials would reduce the potential for adverse impacts to health and safety. Hazardous Spill Response plans would provide a strategy for responding to hazardous materials spills that would reduce short-term health and safety impacts from spills. Reporting spills and releases of chemicals, petroleum products, and produced water to the BLM, Wyoming DEQ, and Wyoming Oil and Gas Conservation Commission as required by Notice to Lessees-3A (DOI 1997), would reduce the potential for both short-term and long-term impacts to health and safety by controlling spills and facilitating an appropriate response to hazardous materials spills.

Alternative A

Alternative A would result in direct beneficial impacts to health and safety by conducting inventory of hazards at AML sites and prioritizing sites for reclamation in coordination with Wyoming DEQ.

Allowing activities in AML areas on a case-by-case basis may result in adverse impacts to health and safety by increasing the potential for accidents and risks associated with activity in these areas.

Implementation of Alternative A would result in beneficial impacts to health and safety by providing warning signs for geologic hazards. Warning signs would identify hazards and reduce the potential for accidents associated with geologic hazards.

Alternative B

Under Alternative B, as under Alternative A, AML sites are inventoried for hazards and prioritized for reclamation in coordination with Wyoming DEQ. However, Alternative B has a greater beneficial impact compared to Alternative A by identifying AML sites with warning signage and erecting protective fencing around shafts and adits. Additionally, under Alternative B activities are prohibited within ¼ mile of AML areas to further reduce risk to health and safety compared to Alternative A.

Identifying geologic hazard sites with warning signs would result in the same impact as described under Alternative A. However, inventorying geologic hazards and prohibiting activities in geologic hazard areas would reduce impacts to health and safety beyond Alternative A by further reducing the potential for accidents and health and safety risks in these areas.

Alternative C

Alternative C would result in fewer beneficial impacts than Alternative A by conducting inventory of AML sites but not prioritizing sites for reclamation. Additionally, allowing activities in mitigated AMLs may

result in adverse impacts to health and safety by increasing the potential for accidents and risks associated with activities in these areas. Impacts associated with allowed activity in AMLs would be greater than the other alternatives.

Alternative C has fewer beneficial impacts than Alternative B but more than Alternative A by providing warnings for geologic hazards and identifying hazards on a case-by-case basis. Under Alternative C, activities are allowed in mitigated geologic hazard areas, which may result in adverse impacts to health and safety by increasing the potential for accidents and risks to health and safety in these areas compared to the other alternatives.

Alternative D

Management under Alternative D would inventory AML sites for hazards and erect warning signs and protective fencing in a similar fashion as Alternative B, resulting in similar beneficial impacts. Adverse impacts may result from allowing activities in AML areas, but requiring avoidance, minimization and/or compensation may reduce the risk to human health and safety in these areas.

Safety measures taken to reduce the risks associated with geologic hazard sites would be the same as Alternative C, resulting in similar impacts.

Alternative E

Impacts to health and safety under Alternative E would be the same as those described under Alternative B; therefore, the impacts analysis for health and safety under Alternative B is representative of the impacts anticipated under Alternative E.

Alternative F

Impacts to health and safety under Alternative F would be the same as those described under Alternative D; therefore, the impacts analysis for health and safety under Alternative D is representative of the impacts anticipated under Alternative F.

4.8.4 Environmental Justice

This section addresses the potential for the alternatives to have disproportionate adverse impacts on minority and low-income populations, including direct, indirect, short-term, and long-term impacts. Laws, regulations, policies, and guidance considered in the analysis of disproportionate adverse impacts are identified in Appendix B.

Because the analysis of disproportionate adverse impacts depends on the impacts identified from management of resources, definitions of adverse impacts as they apply to environmental justice issues are closely related to the definitions of adverse impacts in other resource areas (e.g., social resources). For example, the displacement of a mobile home park that houses a low-income population in order to build a new road may be a disproportionate direct impact. An example of a disproportionate indirect impact would be a reduction in social services to low-income individuals that may result from decreased tax revenues as a result of decreased mineral production.

4.8.4.1 Methods and Assumptions

Since the analysis of disproportionate adverse impacts is based on other resource impacts, the assumptions for this analysis include the assumptions of other resource areas as they relate to the identification and analysis of impacts. In addition, this analysis assumes that the latest available demographic data from the United States Census and other sources accurately represent the population in the Planning Area.

In accordance with the BLM and CEQ guidance for assessing environmental justice in the planning process, an area is considered to contain a minority population if either the minority population of the impacted area exceeds 50 percent or the percentage of minority population in the impacted area is meaningfully greater than the percentage in the general population. The "general population" is defined as a relevant comparison area, such as the state.

The minority population in the four Planning Area counties in 2010 ranged from 5 percent (Hot Springs) to 16 percent (Washakie), compared with a state average of 14 percent. Only Washakie County has a higher minority population than the state. At the town level, one town in Washakie County (Worland) has a minority population higher than the state average. This town and Washakie County generally, have a relatively high concentration of minority population, as defined in BLM and CEQ guidance (compared to the state).

In terms of low-income populations, in 2007-2011 Hot Springs County had a poverty rate of 14 percent, which exceeds the state level of 10 percent. In 2000 (the latest year for which town-level data are available), several town across the Planning Area had a poverty rate higher than the state, and only a few towns had a lower rate. Thus, there are concentrations of low-income populations within several regions of the Planning Area, as defined in BLM and CEQ guidance.

4.8.4.2 Summary of Impacts by Alternative

The alternatives would be identical with respect to potential impacts on minority and low-income populations. No particular BLM actions proposed in the alternatives would cause disproportionate adverse impacts on minority or low-income populations. The BLM has considered all input from persons regardless of their race, ethnicity, income status, or other social and economic characteristics.

4.8.4.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

The demographic conditions in the Planning Area indicate concentrations of low-income populations throughout the Planning Area, and concentrations of minority populations in the town of Worland and Washakie counties. However, there are no direct or indirect impacts of the alternatives that would impact these populations in a different way than the general population within the Planning Area. For example, the lower economic activity associated with Alternative B would cut across all sectors of the economy—from higher-skill managerial jobs to lower-skill service jobs. Thus, there would be no identifiable environmental justice issues or direct or indirect impacts associated with any of the alternatives that are specific to any minority or low-income community or population as defined in Executive Order 12898 or BLM IM 2002-164 (BLM 2002b).

While minority and low-income populations exist in the Planning Area, no particular BLM actions proposed in any of the alternatives have been identified as causing disproportionate adverse impacts on these populations.

Environmental justice guidance also requires that the BLM provides opportunities for people of all backgrounds to have a meaningful voice in the planning process. The BLM has provided numerous opportunities in a variety of different formats and has considered all input from persons regardless of their race, ethnicity, income status, or other social and economic characteristics. Refer to Chapter 5 for a description of public involvement activities associated with the RMP revision.

4.8.5 Tribal Treaty Rights

Adverse impacts to tribal treaty rights and trust responsibilities include, but are not limited to, limitations on access to tribal hunting, fishing, or resource collection areas reserved by treaty, economic issues, and other resource use and access issues. Beneficial impacts could include protection of culturally important archeological sites or sites of traditional or religious importance, and preservation of access to resources. Direct impacts are those that immediately affect resources, whether the impact is to access of the resource or its physical condition. Indirect impacts are related to improved access and can take the form of loss of setting through increased visitation, or reduction in the availability of a plant or animal resource through loss of habitat or over-hunting.

Because archeological sites that may be of cultural importance are finite resources, short-term impacts are the same as long-term impacts. However, impacts to plant or animal resources may be mitigated through conservation plans.

Impacts are identified in consultation with the appropriate tribal groups. The CYFO and WFO coordinate and consult with appropriate Native American groups to identify and consider their concerns in BLM land use planning and decision-making. Interested tribes review proposed land use planning decisions and other major BLM decisions for consistency with tribal land use and resource allocation plans; however, no treaty rights pertain directly to BLM-administered lands within the Planning Area.

4.8.5.1 Methods and Assumptions

Although there are no tribal treaty rights within the Planning Area, the following three assumptions guide the approach to planning that may involve non-treaty Tribal issues:

- All tribally sensitive sites in the Planning Area have not been identified.
- Identification of tribally sensitive sites will benefit heritage resources.
- Tribal consultation benefits heritage resources.
- See Section 4.5.1 *Cultural Resources* for additional assumptions applicable to the impacts analysis for Tribal Treaty Rights.

4.8.5.2 Summary of Impacts by Alternative

There are no tribal treaty rights or trust responsibilities within the Planning Area and as such there are no differences in impacts between the alternatives. Under all alternatives, the BLM would continue to consult with interested tribes regarding issues of importance to the tribes.

4.8.5.3 Detailed Analysis of Alternatives

Impacts Common to All Alternatives

Because no tribal treaty rights or trust responsibilities are known within or mandated by the CYFO or WFO, management actions on the part of the BLM would have no impact on such rights. Each alternative has measures to protect cultural resources, including those related to traditional uses and practices; however, there are no differences among the alternatives in managing tribal treaty rights and trust responsibilities. These are discussed and analyzed in Section 4.5.1 *Cultural Resources* of this chapter. The BLM consults and coordinates with potentially affected tribes as part of the planning process and will continue to consult with interested tribes regarding resource management issues of interest to the tribes. In accordance with federal regulations and policy (e.g., NHPA) the BLM will consult with potentially affected tribes for site-specific actions under all alternatives.

4.9 Cumulative Impacts

The CEQ defines cumulative effects as:

"The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7)."

The Bighorn Basin RMP Revision Project addresses the three components of this definition of cumulative effects as follows:

1. *Incremental impacts of the RMP revision*. The incremental impacts of the action (i.e., the revision of the three RMPs), are described for each resource in the preceding sections of this chapter as direct, indirect, short-term, and long-term impacts.
2. *Impacts from all past and present actions*. The impacts from past and present actions are captured in the baseline conditions presented in *Chapter 3 – Affected Environment*. As discussed in that chapter, the description of the current affected environment reflects past and present actions.
3. *Reasonably foreseeable future actions*. Other reasonably foreseeable future actions are identified in Appendix T and the total projected surface disturbance from these actions appears in the following section.

The analysis of cumulative impacts serves to place the projected incremental impacts from the proposed alternatives in the context of past, present, and future impacts. Combining the projected impacts of proposed alternatives with past, present, and future impacts necessarily involves projections and constrains analyses. Public documents prepared by federal, state, and local government agencies are the primary sources of information regarding past, present, and future actions. Speculative or uncommitted projects are not included in the projections. Analyses are limited, primarily due to incomplete documentation of all past and present impacts on private and public lands; challenges in predicting potential impacts for reasonably foreseeable future actions; the programmatic and strategic nature of proposed alternatives; the unknown nature and pace of resource uses and technological changes that could occur; and changing circumstances related to agency priorities, policies, and the economy. These limitations are addressed through the methods and assumptions described in the following section.

This section identifies 42 reasonably foreseeable future projects and actions in or adjacent to the Planning Area. The breakdown of the 42 projects by agency includes five BLM RMPs, one BLM Programmatic Wind Energy EIS, one BLM Programmatic Energy Distribution Corridor EIS, one BLM Programmatic Geothermal Leasing EIS, four County Land Use Plans, seven Conservation District Plans, six Watershed Plans, one Wyoming Department of Agriculture Strategic Plan, three Wyoming Game and Fish Department Plans, one Wyoming State Water Plan for the Wind/Bighorn River Basin, two Wyoming Statewide Outdoor Recreation and Trail Plans, one Wyoming State Historic Preservation Office Statewide Plan, one USFWS Plan, two NPS General Management Plans, one Wyoming State Plan, three County FMPs, one NPS FMP for Yellowstone National Park, and one National Fire Plan. Many of these plans have already been adopted, in which case the reasonably foreseeable actions stem from the ongoing implementation of the plans.

4.9.1.1 Methods and Assumptions

The CEQ suggests cumulative impact analyses should focus on meaningful impacts, and not exhaustively analyze all possible cumulative impacts (CEQ 1997b). Therefore, the analysis in this RMP and EIS focuses on past, present, and future actions anticipated to have environmental impacts similar to the kinds of impacts identified for implementing the alternatives including but not limited to those resulting in meaningful impacts to historically important resources, those with a potential for violating legal standards or laws, or other identified projects or actions in the geographic area of analysis (i.e., the Cumulative Impact Assessment Area [CIAA]) that relate to the identified cumulative impact issues.

To address the effects of these actions, the analysis is structured around a series of cumulative issue statements (described later in this section) that capture the major cumulative impacts in the CIAA. The BLM developed these issue statements using:

1. Issues identified during scoping.
2. Internal scoping (i.e., the professional judgment of BLM resource specialists and Cooperating Agencies).
3. A review of other reasonably foreseeable future actions in the CIAA.
4. Consideration of context and intensity of potential impacts.

For the cumulative impacts analysis, the BLM paid particular attention to: impacts to public health and safety; controversial issues or those with a substantial public interest; the uniqueness of resources affected; potential for violation of legal standards or laws; and potential impacts to legally protected resources.

To focus the scope of cumulative impact analysis, cumulative issues were considered in the context of baseline conditions (*Chapter 3 – Affected Environment*), the incremental impacts on individual resources described in this chapter, the actions and decisions described in the reasonably foreseeable future projects (Table 4-43), and the following factors as modified from the CEQ's *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997b):

- Does the affected resource have substantial value relative to legal protection and/or ecological, cultural, economic, or social importance?
- Are reasonably foreseeable future actions anticipated to have environmental impacts similar to the kinds of impacts identified for RMP alternatives?
- Have any recent or ongoing NEPA analyses of similar actions in the geographic area identified important adverse or beneficial cumulative impact issues?
- Has the impact to the resource been historically important, such that the importance of the resource is defined by past loss, past gain, or investments to restore resources?

The cumulative impact analysis was further bound by considering the following factors:

- *Timeframe* – Timeframes are based on the duration of the direct and indirect effects of the proposed action and alternatives (the life of the RMP for most issues).
- *Geographic area* – The geographic area of analysis, or the CIAA, covers different geographic areas depending on the specific resource being evaluated. For the most part, the CIAA is the Bighorn Basin (including the portions in Montana) except for 1) issues involving air quality, for which the CIAA will be the affected air sheds and nearby Class I areas; 2) water quality, particularly surface water, which will include drainage areas flowing into and out of the Planning

Area (e.g., Wind River, which turns into the Bighorn River); and, 3) social and economic conditions, for which the CIAA is the four counties that overlap the Planning Area.

- *Analytical assumptions* – see the Assumptions for Analysis below.

4.9.1.2 Assumptions for Analysis

The BLM used the following methods and assumptions in the analysis of cumulative impacts:

- Projections for future oil and gas development activities are based on the *Reasonable Foreseeable Development Scenario for Oil and Gas* (BLM 2014a).
- For the purposes of estimating surface disturbance from reasonably foreseeable actions, for non-BLM activities (excluding oil and gas), the amount and density of activities is generally assumed to be the same for BLM and non-BLM actions, regardless of land ownership. Appendix T contains further information on these assumptions and the acreage of projected surface disturbance by alternative from non-BLM actions. Specific assumptions include:
  - The cumulative impacts from non-BLM mineral actions (excluding oil and gas) are based on the percent BLM vs. non-BLM mineral estate in the Planning Area.
  - The cumulative impacts from other non-BLM development activities are based on the percent BLM vs. non-BLM-administered surface in the Planning Area.
- The context and intensity of non-BLM activities are not anticipated to vary by alternative because these activities do not directly depend on management actions and allowable uses set forth in the RMP alternatives.
- Cumulative impacts, such as soil erosion, spread of invasive species, and habitat fragmentation, are anticipated to increase with the amount of surface disturbance (Table 4-42).
- Actions undertaken by private persons and entities are included and considered in public documents prepared by federal, state, and local government agencies. These public documents are often a source of information for actions undertaken by private entities.
- For the estimation of air quality emissions, the context and intensity of non-BLM activities are not anticipated to vary by alternative. The BLM estimates that on private and fee (i.e., non-federal) land in the Planning Area, there are 201 existing conventional gas wells and 1,342 existing oil wells. At the end of the planning cycle, the BLM projects the drilling of 511 new oil and gas wells on non-federal mineral estate in the Planning Area (BLM 2014a). The BLM used this information to estimate emissions from oil and gas wells for the 2015 and 2024 emission projection years. For natural gas emissions, cubic feet of natural gas produced during the planning cycle on non-federal mineral estate was estimated using expected natural gas production in 2015 and 2024 from projected federal wells in the Planning Area.
- For cumulative impacts associated with other activities (i.e., non-oil and gas), the amount and density of activities is assumed to be the same for both BLM and non-BLM actions; therefore, the analysis of non-BLM salable and locatable mineral activities is based on the proportional mineral estate ownership in the Planning Area (74 percent federal and 26 percent non-federal). The calculation of cumulative impacts for air quality from non-mineral, non-BLM activities is based on the proportion of surface ownership in the Planning Area (56 percent BLM-administered and 44 percent non BLM-administered). Alternative A continues management under the existing plans and is, therefore, assumed to provide the best baseline from which to estimate future emissions for non-BLM actions. Since the context and intensity of non-BLM actions are not anticipated to vary by alternative, the emissions from non-BLM actions estimated under Alternative A were carried forward under alternatives B, C, D, E, and F.

The majority of projects identified in Table 4-43 are programmatic and/or strategic in nature; therefore, the exact intensity or location of anticipated impacts cannot be quantified. For more quantitative analysis, the BLM projected the anticipated surface disturbance and air emissions from non-BLM reasonably foreseeable actions for the entire Planning Area (Appendix T). The estimates of reasonably foreseeable actions in Appendix T are based on historic and trend information, as well as the proportion of public to non-public land in the Planning Area. In addition to estimating reasonably foreseeable actions for BLM and non-BLM actions, Appendix T also projects short-term and long-term surface disturbance. Long-term surface disturbance describes the disturbed area remaining following reclamation. Table 4-42 summarizes projected surface disturbance for BLM and non-BLM reasonably foreseeable actions identified in Appendix T.

Where appropriate, analyses of historic and current trends are used to assess cumulative impacts. For example, the subdividing of private land in rural areas is expected to continue in the future.

Table 4-42. Cumulative Surface Disturbance in Acres from BLM and Non-BLM Reasonably Foreseeable Actions

Action	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Total Acres Short-Term Disturbance from BLM Actions	136,253	73,940	245,642	140,175	71,829	137,064
Total Acres Reclaimed from BLM Actions	120,607	63,047	204,157	121,869	62,008	119,384
Total Acres Long-Term Disturbance from BLM Actions	15,646	10,893	41,485	18,306	10,676	17,663
Total Acres Short-Term Disturbance from Non-BLM Actions	24,129	26,183	24,154	24,135	26,183	24,129
Total Acres Reclaimed from Non-BLM Actions	14,494	16,573	14,494	14,498	16,573	14,494
Total Acres Long-Term Disturbance from Non-BLM Actions	9,636	9,610	9,661	9,638	9,610	9,636
Cumulative Long-Term Acres from Disturbance	25,282	20,502	51,146	27,944	20,412	27,299

Source: Appendix T

BLM Bureau of Land Management

Most projects identified in Table 4-43 are ongoing and provide a management framework for site-specific actions implemented during the life of the various projects. Though they are considered in this cumulative impacts analysis, refer to Chapter 3 – *Affected Environment*, for a detailed description of site-specific past and present (i.e., ongoing) actions. Only those reasonably foreseeable future actions resulting from the 42 projects identified in Table 4-43 and Appendix T are considered in this cumulative impacts analysis.

Table 4-43. Summary of Reasonably Foreseeable Future Actions

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	Cave and Karst Resources	**Mineral Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Travel and Transportation Management	Recreation	Lands with Wilderness Characteristics	Livestock Grazing Management	**Special Designations**	ACECs	Scenic or Back Country Byways	National Historic Trails	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
BLM RESOURCE MANAGEMENTS PLANS AND OTHER FEDERAL PLANS AND ANALYSES																																	
Approved Resource Management Plan for Public Lands Administered by the Bureau of Land Management Buffalo Field Office Final Environmental Impact Statement (BLM 2001a)		X	X	X	X		X	X	X	X	X		X		X		X	X	X		X		X				X		X	X	X	X	
Final Resource Management Plan/Environmental Impact Statement for the Lander Resource Area (BLM 1986b)		X	X	X	X		X	X	X	X	X		X		X		X	X	X		X		X				X		X	X	X	X	
Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States (BLM 2005d)																X	X																
Final Environmental Impact Statement Resource and Management Plan Billings Resource Area, 1983		X	X	X	X		X	X	X	X	X		X		X		X	X	X		X		X				X		X	X	X	X	
Programmatic Environmental Impact Statement, Designation of Energy Corridors on Federal Land in the 11 Western States (DOE/EIS-0386) (DOE and BLM 2008)																X	X																
Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (BLM and USFS [U.S. Forest Service] 2008)							X																										
Record of Decision and Approved Pinedale Resource Management Plan (BLM 2008h)		X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Record of Decision and Approved Casper Resource Management Plan (BLM 2007g as amended)		X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X

Table 4-43. Summary of Reasonably Foreseeable Future Actions (Continued)

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	Cave and Karst Resources	**Mineral Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Travel and Transportation Management	Recreation	Wilderness Characteristics	Livestock Grazing Management	**Special Designations**	ACECs	Scenic or Back Country Byways	National Historic Trails	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
COUNTY PLANS																																	
Big Horn County Land Use Plan		X	X	X	X		X		X				X		X		X				X								X	X			
Hot Springs County Land Use Plan		X			X		X		X		X	X	X						X		X		X			X	X				X		
Park County Land Use Plan				X	X				X		X		X		X		X													X			
Washakie County Land Use Plan		X			X		X		X		X	X						X	X		X						X				X		
CONSERVATION DISTRICTS																																	
South Big Horn CD Long Range Plan					X				X												X												
Hot Springs County CD Plan				X	X				X												X												
Meeteetse CD Land Use Management and Resource Conservation Plan 2010		X		X	X		X	X	X		X	X	X			X	X	X	X		X	X							X	X			
Cody CD Long Range Plan				X	X				X																								
Shoshone CD Plan				X	X			X											X		X												
Powell Clarks Fork Conservation District Plan			X	X					X										X		X												
Washakie County CD Plan			X	X	X				X		X								X		X												
WATERSHED PLANS																																	
Big Horn River Watershed Plan					X			X	X									X	X		X										X		
South Big Horn County, Wyoming Watershed Plan					X		X		X										X		X										X		
Greybull Watershed Draft Plan					X																												
Shoshone Water Management Plan 2006				X	X				X									X	X		X								X	X	X		
Shoshone River Watershed Plan Draft 2008				X	X				X									X	X		X								X	X	X		
Bitter Creek Watershed Plan					X				X												X										X		

Table 4-43. Summary of Reasonably Foreseeable Future Actions (Continued)

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	Cave and Karst Resources	**Mineral Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Travel and Transportation Management	Recreation	Wilderness Characteristics	Livestock Grazing Management	**Special Designations**	ACECs	Scenic or Back Country Byways	National Historic Trails	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
STATE AGENCY PLANS																																	
Wyoming Dept. of Agriculture Strategic Plan 2005																					X												
Wyoming Game and Fish Strategic Habitat Plan									X										X		X												
Wyoming Game and Fish Greater Sage-Grouse Conservation Plan				X	X		X		X										X		X												
Wyoming Game and Fish Final Wyoming Gray Wolf Management Plan 2007									X																								
Wyoming State Water Plan Wind/Bighorn River Basin 2003					X						X					X			X		X												X
Wyoming Statewide Comprehensive Outdoor Recreation Plan (2003)																		X	X														
Wyoming Statewide Trails Plan 2004																		X	X						X		X						
Wyoming SHPO Comprehensive Statewide Historic Preservation Plan 2007-2015											X		X																				
FEDERAL AGENCY PLANS																																	
Shoshone National Forest Plan		X		X	X		X	X	X			X							X	X	X					X	X		X	X			
Bighorn National Forest Plan			X	X	X		X	X	X		X	X	X					X	X	X	X												
United States Fish and Wildlife Service Wyoming Plan					X				X			X																					
United States EPA Region 8 Wyoming State Implementation Plans		X										X	X																				

Table 4-43. Summary of Reasonably Foreseeable Future Actions (Continued)

Resource Plans	**Physical Resources**	Air Quality	Geology	Soil	Water	Cave and Karst Resources	**Mineral Resources**	**Fire and Fuels Management**	**Biological Resources**	**Heritage and Visual Resources**	Cultural Resources	Paleontological Resources	Visual Resources	**Land Resources**	Lands and Realty	Renewable Energy	Rights-of-Way and Corridors	Travel and Transportation Management	Recreation	Wilderness Characteristics	Livestock Grazing Management	**Special Designations**	ACECs	Scenic or Back Country Byways	National Historic Trails	Wild and Scenic Rivers	Wilderness Study Areas	**Socioeconomic Resources**	Social Conditions	Economic Conditions	Health and Safety	Environmental Justice	Tribal Treaty Rights
FIRE MANAGEMENT PLANS																																	
Yellowstone National Park Fire Management Plan		X						X	X		X																						
Big Horn County Mountain Community Wildfire Protection Plan								X	X																								
Park County Community Wildlife Protection Plan								X	X																								
Washakie County Community Wildfire Protection Plan								X	X																								
National Fire Plan				X				X	X																								

ACECs Areas of Critical Environmental Concern
BLM Bureau of Land Management
CD Conservation District
Dept. Department
EPA Environmental Protection Agency
SHPO State Historic Preservation Office

4.9.1.3 Cumulative Impacts

The cumulative impacts discussion is organized according to the following seven cumulative issues:

Cumulative Issue 1: The cumulative impact on air quality with regard to public health and welfare within the Planning Area and protected Class I areas outside the Planning Area.

Cumulative Issue 2: The cumulative impact of activities that disturb soil or vegetation cover on water quality.

Cumulative Issue 3: The cumulative impact of management actions on habitat for wildlife and special status wildlife species.

Cumulative Issue 4: The cumulative impact of management actions on global climate change.

Cumulative Issue 5: Cumulative impacts of management actions and constraints on recreation opportunities.

Cumulative Issue 6: The cumulative impact of management actions and projected development on the economic and social conditions of local communities.

Cumulative Issue 7: The cumulative impact of management actions on greater sage-grouse. [*Please see Chapter 7 of this document for the greater sage-grouse cumulative effects analysis*.]

To focus the cumulative impact analysis, the BLM determined the seven cumulative issues by using the approach described under Methods and Assumptions. Review of the EISs and associated plans for all 42 projects (Table 4-43) revealed that most reasonably foreseeable actions could be expected to produce environmental impacts similar to the incremental impacts identified for the RMP alternatives. Some resources (i.e., special status species, air quality) that could be affected by reasonably foreseeable future actions have substantial value relative to legal protection and/or ecological, economic, or social importance. Exceeding legal standards or thresholds protecting these resources is not anticipated from the cumulative impacts of BLM and non-BLM actions; however, the programmatic nature of most reasonably foreseeable actions prohibits precise prediction of cumulative impacts. As a result, subsequent environmental impact analysis during project implementation will include more detailed and site-specific analyses of cumulative impacts.

Cumulative Issue 1: The cumulative impact on air quality with regard to public health and welfare within the Planning Area and protected Class I areas outside the Planning Area.

Cumulative Impact Assessment Area

The Bighorn Basin and federal Class I areas within 100 miles.

Analysis of Cumulative Impacts

Base year (2008) and anticipated annual air emissions by alternative for 2018 are organized by project scenario and resource as shown in tables 4-46 through 4-57 for alternatives A through F (tables located at the end of *Cumulative Impacts*). These tables identify each anticipated emission category for projected BLM actions, projected non-BLM actions, and the cumulative total of these actions.

Typical sources contributing to potential cumulative impacts on air quality would include emissions from conventional oil and gas development, vehicle operations associated with mining activities, and general vehicular activity from local residents and tourism. In addition, open burning of agricultural fields, which is a traditional practice in the CIAA, would, along with wildland fires and prescribed burns, result in impacts on air quality from emissions of particulates and polyaromatic hydrocarbons and temporarily reduce visibility in areas. Permitted stationary sources of air emissions, such as the Western Sugar factory in Lovell, Wyoming would also continue to contribute to cumulative impacts on air quality.

Overall, air quality in the Bighorn Basin is good. Some concentrated emission sources may have health impacts to certain local residents. The *Washakie County Comprehensive Plan* notes that a number of emission sources in the county contribute to poor air quality which can disproportionately impact the county's senior and disabled population, who are more susceptible to dust and smoke than the general population (Washakie County 2012). Local policy that encourages land use and development that does not result in new, significant deteriorations of existing air quality would help to maintain current air quality, reduce air quality degradation, and protect public health. However, increases in population would likely bring more development and the potential for more emission sources that could degrade air quality in the Bighorn Basin.

BLM and non-BLM reasonably foreseeable actions are anticipated to increase emissions in the Planning Area over the life of the plan. For the Planning Area, the cumulative air quality impacts (as measured against NAAQS and WAAQS) are anticipated to have the same intensity on BLM- and non BLM-administered lands because it is assumed the density of activities are the same in both areas. This conclusion also assumes that cumulative impacts to air quality are equally distributed across the CIAA. Because of proposed development restrictions on BLM-administered land, the potential for adverse cumulative impacts to air quality are anticipated to be the least under Alternative E, which places the greatest restrictions on resource uses and management actions that contribute emissions, followed by alternatives B, F, D, and A. Cumulative emissions are projected to be highest under Alternative C due to fewer proposed development restrictions on BLM-administered land. Cumulative emissions within the Planning Area are not anticipated to result in air quality impacts that exceed NAAQS or WAAQS given the rather small amount of emissions from BLM and other activities.

Cumulative Issue 2: The cumulative impact of activities that disturb soil or vegetation cover on water quality.

Cumulative Impact Assessment Area

The Bighorn Basin and the reaches of Owl Creek.

Analysis of Cumulative Impacts

The *Soil, Water,* and *Biological Resources – Vegetation* sections in this chapter describe how surface disturbances, changes in vegetation cover, and other activities affect water quality by increasing or decreasing sediment loads in waterways or otherwise affecting water quality. In general, the more surface disturbance that occurs across the CIAA, the greater the potential impact to water quality. Adverse impacts to water quality would result from both short- and long-term disturbances, even though a majority of the area where surface disturbance is projected to occur on both BLM-administered land and state and private lands would be reclaimed. Sediment loading is of particular concern in Bighorn Lake, which provides for municipal and industrial water supplies and is a major recreation destination (USACE and BOR 2009).

Surface Water Quality

In the CIAA, stream-bank degradation and erosion and gully erosion, due to poor vegetative cover and surface disturbances, are the predominant sources of excessive sediment in waterways. On BLM-administered and private and state lands, surface disturbance caused by mineral and other development, the construction and maintenance of ROWs, and vegetation treatments (e.g., prescribed burns and mechanical fuels treatments) all contribute to short- or long-term losses of vegetation and increased sedimentation. In addition to surface-disturbing activities, impacts to water quality can result from a variety of other activities that can damage or remove vegetation and soil (e.g., improperly managed livestock grazing, OHV recreation, surface discharge of produced water, and concentrated use of riparian areas by wildlife). Sediment loading, along with other water quality issues such as the introduction of fecal coliform bacteria, occurs from private lands in the CIAA due to agricultural activities (e.g., irrigation runoff) and urban and rural subdivision development (Washakie County Conservation District 2006). Even given the high natural background sediment production in the Planning Area (USACE and BOR 2009; Washakie County Conservation District 2006), the South Big Horn Conservation District (2006) notes, "although flow from the rangelands and deserts contribute the majority and peak suspended sediment discharges to the rivers, irrigation wastewater significantly increases the sediment load in streams." The cumulative impacts of BLM and non-BLM actions on water quality would likely be most pronounced along waterbodies with impaired water quality, such as those on the Wyoming DEQ's 303(d) list (Wyoming DEQ 2008). The conditions of these waterbodies are partially linked to upland conditions, and they can carry large amounts of sediment downstream when surface flows occur.

As Table 4-42 shows, cumulative surface-disturbance acreage is projected to be highest under Alternative C and the lowest under alternatives B and E; Appendix T includes a breakdown of disturbance by activity. Proper management of surface-disturbing and other activities that can damage vegetation cover in the CIAA would lessen sediment loading and associated adverse impacts to water quality. The application of BMPs on private land is not required in many instances and, therefore, their application would likely be inconsistent across the CIAA. In addition, the management under each RMP alternative (see Chapter 2 *Resource Management Alternatives*) protects BLM-administered lands via restrictions on surface-disturbing and other activities and reclamation requirements of disturbed areas. This management would vary by alternative and would not apply to lands under state and private ownership. The scale and effectiveness of this protective management would be greatest under Alternative B, where the focus is on resource protection, and lowest under Alternative C, where the focus is on resource use and commodity production. As a result, cumulative impacts to water quality due to sediment loading are anticipated to be the most under Alternative C, followed by alternatives A, D, F, B, and E. However, even with the proper application of relevant guidelines, BMP, and restrictive management of resource uses across the CIAA, impacts to water quality from human activity would still continue to occur under all alternatives.

Programs related to education and coordination by Conservation Districts and county zoning regulations that attach minimum lot sizes to residential development may reduce sediment loading of streams in the CIAA. However, if trends associated with the subdivision of larger ranches into ranchettes continues across the Planning Area, and predicted population trends for Park and Big Horn counties occur (see Section 3.8.1 *Social Values*), increased building (e.g., residences or barns) and infrastructure construction, and the associated expansion of impermeable surfaces across the CIAA may lead to additional sediment loading of waterways. Depending on factors such as the type of development and the sediment contribution of the land use it replaces (e.g., agricultural rotational crops), such impacts may be beneficial.

Produced water from oil and gas development is regulated by the Wyoming DEQ, which establishes standards for water quality parameters such as total dissolved solid loads. Proper application of Wyoming DEQ water quality standards (Wyoming DEQ 2002) would lessen the potential for the introduction of water not meeting effluent limits, but this additional water would still result in adverse impacts to stream banks and gully erosion from altered flow regimes. The limited surface discharge of produced water anticipated in the Planning Area would limit the scale of these impacts.

Riparian Areas

In addition to general impacts from surface disturbance, BLM and non-BLM actions that affect riparian/wetland areas can result in substantial impacts to bank stability and the ability of vegetation to capture sediment and other water quality contaminants (see Section 3.1.4 *Water*). The majority of the surface lands along major waterways in the CIAA (i.e., the Bighorn River, Wind River, Clarks Fork of the Yellowstone River, and their associated tributaries, including the Nowood, Greybull, and Shoshone river systems) are privately owned. Of the 139,052 acres of riparian/wetland areas in the Planning Area, only 23,957 acres (17 percent) occur on BLM-administered surface. The large percentage of riparian/wetland areas on private lands means that actions by private landowners can have substantial impacts on the health of these systems and their performance of critical water quality protection functions. Programs and projects, such as those by County Conservation Districts, the National Resource Conservation Service, and county weed and pest districts, have had success in the implementation of proactive measures to improve riparian habitat and other vegetation and water sources (South Big Horn Conservation District 2012; Lumley et al. 2010). To manage riparian/wetland areas that occur on BLM-administered lands, alternatives A, B, D, E, and F apply proactive management measures that prohibit surface-disturbing activities in these areas and require active management of these to meet, or make progress towards meeting, PFC, DFC, or DPC. Management actions under alternatives E, B, F, D, A, and C would result in fewer beneficial impacts, respectively, to BLM-administered riparian/wetland areas. Actions by other entities to protect and restore riparian areas in the CIAA, coupled with protective management under alternatives A, B, D, E, or F may reduce cumulative adverse impacts to water quality by restoring functioning conditions in riparian areas. Such improvement would continue the current trend for these areas (see Section 3.4.3 *Vegetation – Riparian/Wetland Resources*).

Groundwater

The quality and quantity of groundwater in the CIAA is of concern as this water source makes up the majority of the municipal and residential water supply (South Big Horn Conservation District 2006; Big Horn County 2009). Alternatives proposed as part of this RMP revision would have impacts on groundwater through actions that allow or prohibit mineral development. In addition, municipal, mining, agricultural, and industrial use of this resource on state and private lands in the CIAA would affect groundwater quantity. Contamination of this resource from wastewater treatment and septic systems (Big Horn County 2009), as well as improper oil and gas well construction, and improper reinjection of produced water from oil and gas development are the principle groundwater quality concerns in the CIAA.

To limit adverse impacts to groundwater quality from wastewater, counties within the Planning Area are attempting to implement zoning restrictions and county level planning, such as the protection of sensitive groundwater areas in the Big Horn County Land Use Plan (Big Horn County 2009) through requiring larger residential lot sizes to reduce the concentration of wastewater discharge. Additionally, wells used for the reinjection of produced water require a permit from the Wyoming DEQ for construction and operation to insure the reinjected water does not enter into water bearing strata or resurface elsewhere. Though oil and gas development on state and private lands in the Planning Area is

not anticipated to vary by alternative, Alternative C is projected to result in the greatest number of new federal oil and gas wells and, therefore, the greatest potential for cumulative adverse impacts to groundwater, followed by alternatives A, D, F, B, and E.

Cumulative Issue 3: The cumulative impact of management actions on habitat for wildlife and special status wildlife species.

Cumulative Impact Assessment Area

The Bighorn Basin.

Analysis of Cumulative Impacts

The condition of wildlife and special status wildlife species habitat is described in Chapter 3 – *Affected Environment*, and potential impacts to wildlife habitat from BLM actions are described in Section 4.4.6 *Fish and Wildlife Resources – Wildlife* and Section 4.4.9 *Special Status Species – Wildlife* sections in this chapter.

Cumulative impacts on wildlife habitat would result primarily from surface-disturbing and other disruptive activities such as mineral development, road construction, vegetation treatments, rangeland improvements, and urban and rural expansion. These activities would result in short- and long-term impacts to wildlife habitat that may degrade and fragment habitat. Management actions to address the challenges associated with wildlife habitat impacts are listed by alternative in Chapter 2. Regardless of the alternative, the general approaches these management actions take to reduce impacts to wildlife habitat are the prohibition or restriction of certain resource uses and activities on BLM-administered land to control surface-disturbing and disruptive activities. These restrictions are generally applied to the following types of activities: oil and gas development, geophysical exploration, mineral materials disposal, renewable energy and ROW authorizations, and motorized vehicle use. Generally, the more surface disturbance and habitat loss from BLM actions, the greater the contribution to cumulative adverse impacts to wildlife and special status wildlife species. Of all the alternatives, Alternative C places the fewest restrictions on resource uses and surface-disturbing activities and would, therefore, result in the greatest adverse impacts to wildlife and special status wildlife species habitat.

Primary challenges for wildlife habitat management within BLM-administered land include poor habitat conditions, fire management, drought, increased development and urbanization, habitat fragmentation, OHV misuse, disease, hunter access, and the impacts of livestock grazing management on the frequency, quality, and composition of key forage species (see Chapter 3 *Affected Environment* for more information). The challenges associated with impacts to wildlife habitat are anticipated to continue under all alternatives. Additionally, surface-disturbing activities, wildfires, spread of invasive species, and activities that remove vegetation are anticipated to impact wildlife habitat regardless of land ownership. Wildlife habitat impacts from non-BLM actions in the CIAA are primarily anticipated from urban and energy development and associated infrastructure (e.g., roads, pipelines, powerlines), although the intensity of development on private lands is not expected to vary by alternative.

As noted in Chapter 3, many wildlife populations spend considerable time on non BLM-administered lands and are therefore proportionately impacted by the management of these lands. Important wildlife habitat such as migration corridors and crucial winter ranges extend across the patchwork of land ownership in the CIAA. For example, the Planning Area contains 2,484,330 acres of big game crucial winter range, of which 47 percent is on non BLM-administered lands (BLM 2009a). Surface disturbance and other development (e.g., oil and gas) on these lands are not subject to the same

restrictions designed to protect wildlife habitat on BLM-administered land and may increase the cumulative impacts on wildlife habitat. Given the varied land ownership pattern, protecting large blocks of intact habitat is a management challenge in the CIAA. The WGFD has, as part of its *Strategic Habitat Plan*, developed strategies to implement partnerships/projects with private landowners and land management agencies to preserve and restore habitat at the watershed or landscape level across land ownership boundaries (WGFD 2009a). Within the Shoshone and Bighorn National Forests, wildlife specific management would protect habitat along the edges of the basin. For example, in the Bighorn National Forest Plan, the USFS applies seasonal restrictions on motorized travel routes to reduce disturbance in key big game areas such as birthing areas and winter ranges (USFS 2005a).

Increased residential development and an expanded network of roads in portions of the CIAA may contribute to a reduction in suitable wildlife habitat. While the majority of population growth would likely occur in population centers where most of the job opportunities exist, such as in Cody, Powell, and Worland, rural development may have a greater proportional impact if the development occurs near sensitive wildlife habitat. In Washakie County, for example, the rural population increased by approximately 17 percent during the 1990s, accompanied by an increase in the number of second homes in and against the mountains where much of the big game crucial winter range occurs (Washakie County 2012). The trend in second home development is not isolated to Washakie County, occurring along the mountains in other parts of the Bighorn Basin, and would result in an increase in cumulative impacts on wildlife and their habitat. Additionally, the practice of subdividing larger private parcels to support development of residential subdivisions and ranchettes (e.g., 35-acre parcels) is expected to continue and contribute to wildlife habitat impacts (Big Horn County 2009). As larger tracts of land adjacent to public lands are subdivided, the WUI and its associated effects (e.g., habitat degradation and fragmentation, fire suppression, and spread of invasive species) are expected to increase. Some tracts of BLM-administered land may become disconnected or isolated from other native habitats and ultimately adversely affect CIAA biological diversity. In addition, with multiple land owners in the WUI, management of resources and resource uses affecting wildlife habitat, including invasive species spread, fire, wildlife, livestock grazing, motorized vehicle use, and development are expected to be varied.

Oil and gas development would result in one of the greatest impacts to wildlife habitats. While reclamation and mitigation procedures would reduce the short-term impact from surface disturbance associated with oil and gas development, permanent facilities such as roads and well pads would result in long-term impacts. Cumulative impacts would be greater where mineral development is more intense, such as in Oil and Gas Management Areas designated under alternatives C, D, and F, and on state and private land where fewer protections for habitat exist. Impacts would also be greater where oil and gas activity occurs in and around sensitive wildlife habitat such as crucial winter range. For example, several producing oil and gas fields overlap big game crucial winter range on private and state land along the Absaroka Front on the western edge of the Bighorn Basin. Cooperative management among landowners and the BLM in accordance with the Absaroka Front HMP would help to reduce the impacts to wildlife associated with mineral development in this area (BLM 1986a).

In general, cumulative impacts to special status wildlife species habitat would be the same as those for wildlife habitat. Surface-disturbing activities would tend to degrade and fragment habitat, having a greater impact where sensitive habitat and development occur. For example, many raptor nests occur near riparian areas, such as the Bighorn River corridor, where recreation and private development are common. On federal land, special status wildlife species would be protected by site-specific mitigation under the ESA and Wyoming BLM sensitive species guidance. However, on private and state lands, protection of non-federally listed species may not occur.

Cumulative impacts to wildlife and special status wildlife species habitat are anticipated to be least under alternatives B and E, which provide the most measures to minimize wildlife habitat loss and fragmentation and close the most wildlife habitat to oil and gas development in the CIAA, followed by alternatives F, D, A, and C. The greatest adverse cumulative impacts to wildlife habitat are anticipated under Alternative C because this alternative allows the most development with the least restrictions to address wildlife habitat conservation on BLM-administered lands. For this analysis, habitat impacts from non-BLM actions are assumed not to vary across alternatives. In addition, habitat impacts from non-BLM actions on private lands may be greater than impacts on public lands based on the fact that privately held lands are subject to fewer restrictions and generally experience more development compared to public lands.

To ensure consistency across the greater sage-grouse's range, the BLM's National Operation Center has conducted management zone and range-wide cumulative effects analyses. See Chapter 7 for the Bighorn Basin greater sage-grouse cumulative effects analysis.

Cumulative Issue 4: The cumulative impact of management actions on global climate change.

Cumulative Impact Assessment Area

Global.

Analysis of Cumulative Impacts

The lack of scientific tools (models with sufficient spatial and temporal resolution) to forecast climate change even at regional scales limits the ability to quantify effects of current and future management on global climate change. Given this current state of climate change science, it is not yet possible to associate specific actions with specific impacts in a given local area. As a result, a discussion of incremental impacts on climate change resulting from BLM actions when added to other past, present, and reasonably foreseeable future actions is not possible.

However, when added to past, present, and reasonably foreseeable future actions, the alternatives would result in overall differences in GHG emissions and contributions to climate change. Due to the lack of information for GHG emissions from past, present, and reasonably foreseeable future actions, cumulative impacts are analyzed qualitatively among the alternatives comparing management that would likely affect global climate change. Alternative C would result in the greatest cumulative impacts to climate change resulting from the most oil and gas development, the most surface disturbance, and the highest amount of fossil fuel combustion from motor vehicles, compared to the other alternatives. Alternatives B and E would result in the least cumulative impacts to climate change due to the least amount of oil and gas development, the least projected surface disturbance, and the most conservation of biological resources that retain sequestered carbon and minimize emissions. Alternatives D and F would result in greater cumulative impacts to climate change than alternatives B and E, less than Alternative C, and similar impacts to Alternative A (see Tables 4-10 and 4-15).

Implementation of the alternatives and other reasonably foreseeable future actions in the Planning Area would produce GHG emissions resulting in a minor contribution to climate change. Any noticeable effects of climate change in any given area result from the cumulative aggregation of all worldwide GHG emissions, global climate patterns, and other forces. As a result, the cumulative impacts to climate change resulting from BLM management and other past, present, and reasonably foreseeable future actions in the Planning Area would likely have no measurable effect on global climate change.

Cumulative Issue 5: Cumulative impacts of management actions and constraints on recreation opportunities.

Cumulative Impact Assessment Area

The Bighorn Basin, plus the BLM Billings Field Office, Montana.

Analysis of Cumulative Impacts

Recreation (Section 4.6.5) and *Comprehensive Travel and Transportation Management* (Section 4.6.4) describe how management actions under each alternative affect recreation opportunities in the Planning Area. As with direct and indirect impacts, cumulative impacts would most likely occur from surface-disturbing activities (primarily related to minerals development), which change recreational settings, and from constraints, which limit access and recreational motorized vehicle use.

Resource development and surface-disturbing activities (e.g., oil and gas development, fire and fuels management) on BLM-administered lands and private and state lands can result in increased visual intrusions, noise, and visitor contacts that interfere with realizing desired beneficial outcomes and displace recreational users from their desired setting-specific areas. Recreationists seeking undisturbed landscapes are particularly affected by surface disturbance, especially in back country and primitive recreation settings. While much of this activity would be mitigated or avoided on BLM-administered lands regardless of the alternative, many of the restrictions discussed in this RMP do not apply to private and state lands in the CIAA. Cumulative impacts to recreation would therefore be greatest at the intersection of primitive or back country recreation areas and private lands, especially in areas where mineral potential or urban development potential is highest. Alternatives B and E would result in the least cumulative surface disturbance and protects the most area suitable for primitive recreation (via lands with wilderness characteristics, WSRs, and recreation management areas), followed by alternatives F, D, A, and C. As discussed under Cumulative Issue 3, cumulative impacts to wildlife can result from mineral and residential development (particularly in areas where such development overlaps important wildlife habitat). Development may displace big game populations, resulting in adverse impacts to opportunities for hunting, a major recreation activity in the Planning Area. Though management under the RMP cannot dictate management on private and state lands, protecting habitat on BLM-administered lands would benefit hunting across the CIAA by protecting important life-cycle habitat for game species and thus insuring their continued presence. Alternatives B and E would result in the smallest loss of wildlife habitat and the greatest benefits from proactive management actions in the CIAA (e.g., closing areas to oil and gas development), followed by alternatives F, D, A, and C respectively.

Potential long- and short-term cumulative impacts to recreation may also occur from land use restrictions established to protect sensitive resources. Development activities that improve legal access to public lands, establish new and improve existing roads, and increase opportunities for motorized travel may benefit recreational experiences for motorized vehicle (OHV) recreationists. Alternative C would be the most effective at increasing motorized recreation opportunities, followed by alternatives A, D, F, B, and E. Increasing resource use and development may increase traffic on some roads and trails and increase the potential for long-term conflicts between commercial and recreational use of these roads. Conflict may also occur if development on private lands adjacent to BLM-administered lands includes sensitive noise receptors (i.e., second home development or rural subdivisions); such development would likely occur regardless of the RMP alternative. Construction of pipelines, fences, and transmission lines would increase hazards to recreational motorized vehicle users and reduce public

safety in certain areas. Management that results in a decrease in the amount of area available to motorized vehicle use on BLM-administered lands would be greatest under alternatives B and E, followed by alternatives F, D, A, and C. The availability of motorized recreation opportunities on private and state land is not anticipated to vary by alternative; however, increased access on adjacent BLM-administered lands may lead to increased use of non-BLM lands or, conversely, closing areas of BLM-administered land to motorized vehicles may displace these users to private or state lands.

Cumulative Issue 6: The cumulative impact of management actions and projected development on the economic and social conditions of local communities.

Cumulative Impact Assessment Area

The assessment area for cumulative social and economic conditions consists of the four counties that overlap the Planning Area.

Analysis of Cumulative Impacts

Analysis in this section primarily focuses on cumulative impacts related to oil and gas activity, ranching and livestock grazing, and quality of life, including nonmarket values.

The impacts of oil and gas drilling and production described in Section 4.8.2 *Economic Conditions* relate to activities only on BLM-administered surface and federal mineral estate within the Planning Area. However, oil and gas activity on private and state land is estimated to constitute a substantial portion of projected oil and gas activity in all alternatives (see Table 4-44 below). Specifically, in Alternative A, oil and gas drilling and production on state and private land would comprise about 30 percent of total activity; in alternatives B and E, about 51 percent; in Alternative C, about 28 percent; in Alternative D, about 30 percent; and in Alternative F about 31 percent. Note that the percentage is greatest in alternatives B and E. This is another way of saying that the overall change in earnings, employment, and output would be proportionally smaller than the reduction in activity on federal lands would suggest. To see this, note that the analysis earlier in Chapter 4 – focused on federal lands only – showed $78 million in earnings and 1,177 jobs related to oil and gas drilling, completion, and production in Alternative A, and $31 million in earnings and 472 jobs for the same activities in Alternative B– a 50 percent reduction. The comparable figures incorporating state and private production are $111 million and 1,675 jobs for Alternative A, and $64 million and 970 jobs for Alternative B – a 42 percent reduction. While the reduction from Alternative A to Alternative B would still be substantial, the stability of state and private production would moderate the change in federal policy.

Table 4-44. Cumulative (including State and Private) Impacts of Oil and Gas Development over the Life of the Plan in the Planning Area for Economic Conditions

Impact[1]	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Annual Average Earnings	$110.6	$64.1	$118.0	$107.9	$63.9	$107.8
Annual Average Output	$865.1	$500.9	$922.5	$843.6	$500.1	$843.2
Net Present Value of Output	$9,932.0	$5,750.0	$10,590.9	$9,685.0	$5,741.2	$9,681.1
Annual Average Employment[2]	1,675	970	1,787	1,633	968	1,632
Change from Alternative A – Earnings	N/A	-$46.6	+$7.4	-$2.7	-$46.7	-$2.8
Change from Alternative A – Employment	N/A	-705	+112	-42	-707	-43
Percentage change from Alternative A (earnings, employment)	N/A	-42%	+7%	-2%	-42%	-3%
Percentage change from Alternative A (earnings, employment), for federal land only	N/A	-60%	+10%	-4%	-60%	-4%

Source: Calculated using the IMPLAN model, as described in the text. Includes oil and gas well drilling and completion, and production from new wells, as estimated in the BLM's Reasonable Foreseeable Development Scenario for federal, state, and private land.

[1]All dollar values are in millions of year 2011 dollars. Net present value of output is discounted at a 7 percent real discount rate, as recommended in OMB 2002.
[2]Employment is in annual job equivalents.

BLM Bureau of Land Management
IMPLAN Impact Analysis for Planning model
N/A not applicable

Similarly, the effect of oil and gas activities on state and private land moderates the changes in earnings and employment for alternatives C, D, and F. In Alternative C, oil and gas activity on federal lands would create 10 percent more jobs and earnings than Alternative A, but incorporating state and fee lands would reduce this effect to a 7 percent increase. In Alternative D, oil and gas activity on federal lands would create 4 percent fewer jobs and earnings than Alternative A, but incorporating state and fee lands would reduce this effect to a 2 percent decrease. Finally, in Alternative F, oil and gas activity on federal lands would create 4 percent fewer jobs and earnings than Alternative A, but incorporating state and fee lands would reduce this effect to a 3 percent decrease.

Under each alternative various management actions constrain mineral development on BLM-administered land for the protection of other resource values. These constraints can limit the mineral development activity on BLM-administered surface and mineral estate and constrict the minerals-based economy in the Planning Area. Table 4-45 summarizes the number of constrained federal wells and unconstrained non-federal wells for each alternative over the life of the plan.

Table 4-45. Reasonable Foreseeable Development Well Number Projections

Well Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Number of Projected New Federal Wells	1,184	457	1,304	1,141	454	1,141
Projected Number of Abandoned New Federal Wells	228	89	250	220	89	220
Projected Productive New Federal Wells	**956**	**368**	**1,054**	**921**	**365**	**921**
Number of Projected New Non-federal Wells	511	511	511	511	511	511
Projected Number of Abandoned New Non-federal Wells	98	98	98	98	98	98
Projected Productive New Non-federal Wells	**413**	**413**	**413**	**413**	**413**	**413**
Cumulative New Wells (Federal and Non-federal)	1,695	968	1,815	1,652	965	1,652
Cumulative Abandoned New Wells (Federal and Non-federal)	326	187	348	318	187	318
Cumulative Productive New Wells (Federal and Non-federal)	**1,369**	**781**	**1,467**	**1,334**	**778**	**1,334**

Sources: BLM 2009d; BLM 2013a

The projected number of cumulative productive new wells is greatest under Alternative C (1,467) and the least under Alternative B (781). The percent increase/decrease from the number of new wells under Alternative A follows.

- Alternatives B and E – 43 percent decrease
- Alternative C – 7 percent increase
- Alternatives D and F – 3 percent decrease

A change in energy development and mining, whether increase or decrease, is likely to have a substantial social and economic impact within the Planning Area. As noted in the *Economic Conditions* section of this chapter, Alternative C is anticipated to result in the most substantial increase of economic opportunities with the highest projected job growth for the Planning Area. Alternatives D, F, B, and E would result in progressively greater decreases. Regional employment under Alternative C is also anticipated to average the greatest number of full and part-time jobs per year related to the oil and gas, livestock grazing, and recreation industries, which may result in beneficial impacts on quality of life. However, Alternative C may also result in adverse impacts to air quality, wildlife, and other resources that improve quality of life related to natural characteristics as priorities would be placed on the use of resources such as oil and gas development over the conservation of resources such as air quality and wildlife.

Comparatively, alternatives B and E would provide the least economic and social benefits as measured by jobs and income; priorities under these alternatives are centered on conservation of land and existing environmental conditions. Alternative D and Alternative F, respectively, would result in more opportunities than Alternative B, but fewer economic and social opportunities than Alternative C and Alternative A; the latter essentially represents the continuation of current trends. However, Alternative D would continue BLM's current practice of allowing multiple uses, balancing the use of resources such as oil and gas reserves with the conservation of resources such as air quality, open space, and wildlife

range areas while providing an increase in job opportunities dispersed geographically across the Planning Area. Overall, Alternative D updates BLM's land and resource management guidelines in the Planning Area while preserving both job opportunities and nonmarket values associated with open space and the environment. Management under Alternative F is similar to Alternative D except in the Greater Sage-Grouse PHMAs ACEC, where additional restrictions on the amount and type of development would apply. In the ACEC under Alternative F, open space and environmental considerations would be prioritized, potentially limiting job opportunities in comparison to Alternative D.

Past, present, and reasonably foreseeable future actions in the Planning Area and surrounding geographic areas would also affect both traditional economic measures (earnings, jobs, output) and nonmarket values in the Planning Area. For example, the BLM Lander Field Office RMP, which is being updated concurrent with the CYFO and WFO RMPs, would update BLM's direction and management plans in the Lander Field Office, which includes some land in Hot Springs County as well as several neighboring counties. Thus, the choice of alternatives in the Lander RMP could directly affect social and economic conditions in the Planning Area for the Bighorn Basin RMP. However, based on past BLM actions and present policy of balanced management of land and resources, the combined effects within the Planning Area – either on traditional economic measures or nonmarket values – would not likely be different from those under the alternatives considered in this planning effort.

A combination of market conditions and state and federal policy related to ranching and livestock grazing in Wyoming, and across the Rocky Mountain West, has created adverse economic conditions for many farms and ranches in the Planning Area. BLM management actions have the potential to help mitigate the effects of past and present trends that make livestock grazing more challenging, or to exacerbate those trends and further reduce the opportunities for livestock grazing operators. For example, some ranch owners raise money for retirement or other purposes by subdividing portions of their land into ranchettes and selling them to individuals. The sale of these ranchettes provides financial liquidity to ranchers who frequently have most of their assets in land, but generally results in increased building of fences, houses, and sometimes other structures (e.g., barns), changing the character of the landscape. Under all alternatives, this trend is likely to continue, because it is fundamentally related to (1) the nature of the ranching business (principally, the fact that most ranchers' assets are in land, and the fact that profit margins are generally low and can turn negative in drought or other adverse conditions) and (2) state laws that govern property subdivision, under which county zoning laws cannot regulate subdivisions of 35 acres and larger. However, RMP alternatives that adversely affect the profitability of ranching could serve to increase this trend. Specifically, alternatives B and E would have an adverse impact on continued profitability of livestock operators, and under this alternative, the subdivision, sale, and development of ranchettes could accelerate. This would result in a substantial cumulative impact, and the contribution of the BLM action would be cumulatively considerable. Alternatives A, C, D, and F would not be expected to exacerbate this cumulative impact.

Under all alternatives, however, potential cumulative impacts on livestock grazing operations could also result from a combination of activities and land uses occurring within the Planning Area primarily from surface-disturbing activities, human disturbances, and the presence of wildlife that compete with livestock for rangeland resources. Additionally, any increases in human population relative to increased job growth could create additional demands for recreational use of the public lands and could result in livestock displacement, increases in noxious weed infestation, and costs to operators and public land management areas. (However, only Alternative C would result in increased job growth compared to the current trend, and the increase would be small.)

Despite the potential for cumulative impacts resulting from various operations in the Planning Area, overall cumulative impacts of BLM and non-BLM actions are not anticipated to have long-term adverse impacts on livestock grazing on public lands, since anticipated impacts to grazing lands would occur gradually over the life of the plan, except in alternatives B and E where the impacts of livestock grazing withdrawals would be substantial for the reasons noted above. Additionally, the implementation of BLM's mitigation guidelines, reclamation requirements, surface-use restrictions, rangeland guidelines, vegetation treatments, and monitoring efforts would provide protection to forage resources on federal lands, which would help reduce overall impacts on livestock grazing resources and operations.

Cumulative Issue 7: The cumulative impact of management actions on greater sage-grouse.

To ensure consistency across the greater sage-grouse's range, the BLM's National Operation Center has conducted management zone and range-wide cumulative effects analyses. See Chapter 7 for the Bighorn Basin greater sage-grouse cumulative effects analysis.

Table 4-46. Cumulative Annual Emissions Associated with Alternative A – Project Year 2018

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	36.32	17.19	53.51	8.06	3.83	11.89	121.41	59.02	180.44	0.94	0.41	1.35
Coalbed Natural Gas Development/Production	4.74	2.52	7.26	0.76	0.38	1.14	4.59	2.04	6.63	0.10	0.05	0.15
Oil Development/Production	147.97	66.03	214.00	26.57	11.60	38.17	252.42	107.33	359.75	5.21	2.22	7.43
Locatable Minerals Mining	2,191.91	754.21	2,946.12	322.44	110.95	433.39	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	678.92	233.61	912.53	72.81	25.05	97.87	7.14	2.46	9.60	0.26	0.09	0.35
Resource Road Maintenance	80.05	61.89	141.94	8.83	6.83	15.66	2.10	1.63	3.73	0.11	0.09	0.20
ROW Corridors – Renewable Energy	229.68	177.56	407.24	23.71	18.33	42.03	11.40	8.81	20.21	0.42	0.32	0.74
Livestock Grazing	33.82	26.15	59.97	1.90	1.47	3.37	1.60	1.23	2.83	0.03	0.02	0.05
Fire Management	265.74	205.43	471.16	166.21	128.49	294.70	51.07	39.48	90.56	13.80	10.67	24.46
Forest Products	321.85	248.80	570.65	32.22	24.91	57.13	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	33.67	26.03	59.70	3.43	2.65	6.08	0.59	0.45	1.04	0.02	0.01	0.03
OHVs	22.84	17.66	40.50	20.56	15.89	36.45	44.91	34.72	79.63	4.53	3.50	8.03
Project Year 2018 Total	**4,047.51**	**1,837.07**	**5,884.58**	**687.50**	**350.38**	**1,037.88**	**585.13**	**287.50**	**872.63**	**27.43**	**18.08**	**45.51**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	54.36	26.86	81.22	409.19	207.99	617.19	54.13	27.53	81.66
Coalbed Natural Gas Development/Production	2.04	0.73	2.77	3.99	2.11	6.10	0.40	0.21	0.61
Oil Development/Production	74.68	32.14	106.82	19.03	8.11	27.14	1.90	0.81	2.71
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	4.86	1.67	6.53	1.63	0.56	2.19	0.16	0.06	0.22
Resource Road Maintenance	0.93	0.72	1.65	0.50	0.38	0.88	0.05	0.04	0.09
ROW Corridors – Renewable Energy	10.45	8.08	18.52	3.79	2.93	6.72	0.38	0.29	0.67
Livestock Grazing	13.57	10.49	24.05	12.77	9.87	22.65	1.28	0.99	2.26
Fire Management	1,806.43	1,396.46	3,202.89	98.69	76.29	174.98	9.87	7.63	17.50
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.68	0.52	1.20	0.18	0.14	0.32	0.02	0.01	0.03
OHVs	2,298.35	1,776.74	4,075.09	726.86	561.90	1,288.76	0.00	0.00	0.00
Project Year 2018 Total	**4,288.00**	**3,262.23**	**7,550.23**	**1,284.07**	**872.94**	**2,157.01**	**68.93**	**37.83**	**106.77**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-47. Cumulative Annual Emissions Associated with Alternative A – Project Year 2027

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	36.70	17.33	54.03	8.15	3.86	12.01	123.29	59.79	183.08	0.93	0.43	1.35
Coalbed Natural Gas Development/Production	3.88	2.07	5.94	0.67	0.34	1.01	4.57	2.03	6.60	0.10	0.05	0.15
Oil Development/Production	146.08	68.12	214.20	26.39	11.79	38.18	252.58	106.81	359.40	5.22	2.20	7.42
Locatable Minerals Mining	2,107.70	725.23	2,832.93	309.81	106.60	416.42	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	677.88	233.25	911.13	72.56	24.97	97.53	4.09	1.41	5.50	0.24	0.08	0.32
Resource Road Maintenance	79.95	61.80	141.75	8.72	6.74	15.47	0.63	0.49	1.11	0.10	0.08	0.17
ROW Corridors – Renewable Energy	181.70	140.46	322.16	18.67	14.43	33.10	4.19	3.24	7.43	0.16	0.13	0.29
Livestock Grazing	33.81	26.14	59.95	1.89	1.46	3.35	1.40	1.08	2.48	0.03	0.02	0.05
Fire Management	266.08	205.70	471.78	166.54	128.74	295.28	52.08	40.26	92.34	13.85	10.71	24.55
Forest Products	321.85	248.80	570.65	32.22	24.91	57.13	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	33.67	26.03	59.70	3.43	2.65	6.08	0.59	0.45	1.04	0.02	0.01	0.03
OHVs	18.05	13.95	32.00	16.25	12.56	28.80	57.82	44.70	102.52	4.87	3.76	8.63
Project Year 2027 Total	**3,907.35**	**1,768.88**	**5,676.23**	**665.30**	**339.06**	**1,004.36**	**589.13**	**290.58**	**879.72**	**27.52**	**18.17**	**45.69**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	55.41	27.14	82.55	412.47	205.40	617.87	53.73	26.77	80.50
Coalbed Natural Gas Development/Production	2.01	0.71	2.73	7.60	4.03	11.63	0.76	0.40	1.16
Oil Development/Production	74.23	32.74	106.98	19.02	8.10	27.12	1.90	0.81	2.71
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	3.80	1.31	5.11	1.51	0.52	2.03	0.15	0.05	0.20
Resource Road Maintenance	0.31	0.24	0.55	0.50	0.38	0.88	0.05	0.04	0.09
ROW Corridors – Renewable Energy	7.07	5.47	12.54	3.15	2.43	5.58	0.31	0.24	0.56
Livestock Grazing	13.48	10.42	23.91	12.76	9.87	22.63	1.28	0.99	2.26
Fire Management	1,813.43	1,401.87	3,215.31	100.11	77.39	177.49	10.01	7.74	17.75
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.68	0.52	1.20	0.18	0.14	0.32	0.02	0.01	0.03
OHVs	2,180.47	1,685.61	3,866.08	576.11	445.36	1,021.47	0.00	0.00	0.00
Project Year 2027 Total	**4,172.57**	**3,173.85**	**7,346.43**	**1,140.85**	**756.27**	**1,897.12**	**68.96**	**37.32**	**106.28**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-48. Cumulative Annual Emissions Associated with Alternative B – Project Year 2018

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	20.93	22.17	43.10	4.65	4.96	9.61	73.25	80.06	153.31	0.46	0.44	0.90
Coalbed Natural Gas Development/Production	1.36	2.14	3.50	0.24	0.32	0.57	1.87	1.72	3.59	0.03	0.04	0.08
Oil Development/Production	75.02	74.82	149.83	12.64	12.08	24.72	110.39	98.97	209.36	2.28	2.05	4.33
Locatable Minerals Mining	2,191.91	754.21	2,946.12	322.44	110.95	433.39	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	652.15	224.39	876.54	69.96	24.07	94.03	6.97	2.40	9.37	0.25	0.09	0.34
Resource Road Maintenance	60.83	47.03	107.86	6.71	5.19	11.90	1.60	1.24	2.84	0.08	0.06	0.15
ROW Corridors – Renewable Energy	185.87	143.69	329.55	19.13	14.79	33.92	8.35	6.46	14.81	0.31	0.24	0.55
Livestock Grazing	16.87	13.04	29.91	0.95	0.73	1.68	0.80	0.62	1.41	0.01	0.01	0.02
Fire Management	152.11	117.59	269.70	85.17	65.84	151.00	25.96	20.07	46.04	6.91	5.34	12.26
Forest Products	215.97	166.96	382.93	21.63	16.72	38.35	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	16.84	13.02	29.85	1.71	1.33	3.04	0.29	0.23	0.52	0.01	0.01	0.02
OHVs	22.84	17.66	40.50	20.56	15.89	36.45	44.91	34.72	79.63	4.53	3.50	8.03
Project Year 2018 Total	**3,612.69**	**1,596.69**	**5,209.38**	**565.80**	**272.87**	**838.67**	**362.28**	**276.81**	**639.09**	**16.89**	**12.48**	**29.38**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	33.91	37.68	71.58	262.60	299.31	561.91	34.04	38.81	72.85
Coalbed Natural Gas Development/Production	1.07	0.62	1.68	1.15	1.79	2.94	0.11	0.18	0.29
Oil Development/Production	34.49	32.31	66.79	8.40	7.59	16.00	0.84	0.76	1.60
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	4.80	1.65	6.45	1.61	0.55	2.16	0.16	0.06	0.22
Resource Road Maintenance	0.71	0.55	1.25	0.38	0.29	0.67	0.04	0.03	0.07
ROW Corridors – Renewable Energy	7.64	5.91	13.55	2.75	2.13	4.88	0.28	0.21	0.49
Livestock Grazing	6.78	5.24	12.02	6.39	4.94	11.32	0.64	0.49	1.13
Fire Management	907.27	701.37	1,608.64	52.83	40.84	93.67	5.28	4.08	9.37
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.34	0.26	0.60	0.09	0.07	0.16	0.01	0.01	0.02
OHVs	2,298.35	1,776.74	4,075.09	726.86	561.90	1,288.76	0.00	0.00	0.00
Project Year 2018 Total	**3,317.02**	**2,570.13**	**5,887.15**	**1,070.50**	**922.07**	**1,992.56**	**42.14**	**44.90**	**87.04**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-49. Cumulative Annual Emissions Associated with Alternative B – Project Year 2027

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	25.25	16.50	41.75	5.64	3.68	9.32	91.04	57.28	148.32	0.50	0.39	0.88
Coalbed Natural Gas Development/Production	1.12	1.75	2.87	0.22	0.29	0.51	1.86	1.72	3.58	0.03	0.04	0.08
Oil Development/Production	83.80	62.32	146.11	13.52	10.81	24.33	110.56	98.31	208.87	2.29	2.03	4.32
Locatable Minerals Mining	2,107.70	725.23	2,832.93	309.81	106.60	416.42	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	651.11	224.04	875.15	69.71	23.99	93.69	4.04	1.39	5.43	0.23	0.08	0.30
Resource Road Maintenance	60.75	46.96	107.71	6.63	5.13	11.75	0.48	0.37	0.85	0.07	0.06	0.13
ROW Corridors – Renewable Energy	139.17	107.59	246.76	14.28	11.04	25.32	3.16	2.45	5.61	0.14	0.11	0.25
Livestock Grazing	16.86	13.03	29.90	0.94	0.73	1.67	0.70	0.54	1.24	0.01	0.01	0.02
Fire Management	153.58	118.73	272.31	86.54	66.90	153.43	29.93	23.13	53.06	7.09	5.48	12.57
Forest Products	215.97	166.96	382.93	21.63	16.72	38.36	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	16.84	13.02	29.85	1.71	1.33	3.04	0.29	0.23	0.52	0.01	0.01	0.02
OHVs	18.05	13.95	32.00	16.25	12.56	28.80	57.82	44.70	102.52	4.87	3.76	8.63
Project Year 2027 Total	**3,490.20**	**1,510.07**	**5,000.27**	**546.88**	**259.76**	**806.64**	**387.78**	**260.44**	**648.21**	**17.25**	**12.66**	**29.92**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	42.89	26.17	69.06	338.19	197.06	535.24	43.47	25.31	68.78
Coalbed Natural Gas Development/Production	1.06	0.60	1.66	2.16	3.43	5.59	0.22	0.34	0.56
Oil Development/Production	36.23	29.95	66.19	8.49	7.45	15.94	0.85	0.74	1.59
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	3.78	1.30	5.08	1.50	0.52	2.01	0.15	0.05	0.20
Resource Road Maintenance	0.24	0.18	0.42	0.38	0.29	0.67	0.04	0.03	0.07
ROW Corridors – Renewable Energy	5.21	4.03	9.24	2.31	1.79	4.10	0.23	0.18	0.41
Livestock Grazing	6.74	5.21	11.95	6.38	4.93	11.32	0.64	0.49	1.13
Fire Management	938.44	725.46	1,663.91	67.66	52.31	119.97	6.77	5.23	12.00
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.34	0.26	0.60	0.09	0.07	0.16	0.01	0.01	0.02
OHVs	2,180.47	1,685.61	3,866.08	576.11	445.36	1,021.47	0.00	0.00	0.00
Project Year 2027 Total	**3,237.08**	**2,486.60**	**5,723.68**	**1,010.71**	**715.84**	**1,726.55**	**53.11**	**32.66**	**85.76**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-50. Cumulative Annual Emissions Associated with Alternative C – Project Year 2018

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	32.38	22.77	55.15	7.16	5.09	12.25	103.09	81.62	184.71	0.96	0.47	1.42
Coalbed Natural Gas Development/Production	5.63	2.54	8.17	0.89	0.38	1.28	5.31	2.04	7.35	0.12	0.05	0.17
Oil Development/Production	145.60	78.51	224.11	27.44	12.86	40.29	275.82	107.63	383.45	5.70	2.23	7.92
Locatable Minerals Mining	2,191.91	754.21	2,946.12	322.44	110.95	433.39	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	812.81	279.68	1,092.49	87.10	29.97	117.07	8.01	2.76	10.76	0.31	0.11	0.42
Resource Road Maintenance	126.40	97.71	224.12	13.94	10.78	24.72	3.32	2.57	5.89	0.17	0.13	0.31
ROW Corridors – Renewable Energy	263.80	203.93	467.73	27.32	21.12	48.44	14.15	10.94	25.10	0.53	0.41	0.93
Livestock Grazing	41.17	31.82	72.99	3.06	2.37	5.43	1.99	1.54	3.52	0.05	0.04	0.09
Fire Management	492.99	381.10	874.09	328.30	253.79	582.10	101.29	78.30	179.60	27.57	21.31	48.87
Forest Products	431.57	333.63	765.20	43.19	33.39	76.58	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	67.34	52.06	119.40	6.86	5.30	12.16	1.17	0.91	2.08	0.03	0.03	0.06
OHVs	22.84	17.66	40.50	20.56	15.89	36.45	44.91	34.72	79.63	4.53	3.50	8.03
Project Year 2018 Total	**4,634.44**	**2,255.62**	**6,890.06**	**888.26**	**501.89**	**1,390.15**	**646.96**	**353.35**	**1,000.31**	**41.98**	**28.97**	**70.94**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	44.48	38.29	82.76	314.63	312.89	627.52	41.76	41.64	83.39
Coalbed Natural Gas Development/Production	2.30	0.73	3.03	4.73	2.16	6.89	0.47	0.22	0.69
Oil Development/Production	78.52	34.61	113.13	20.66	8.24	28.90	2.07	0.82	2.89
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	5.18	1.78	6.96	1.73	0.59	2.32	0.17	0.06	0.23
Resource Road Maintenance	1.47	1.13	2.60	0.79	0.61	1.39	0.08	0.06	0.14
ROW Corridors – Renewable Energy	12.10	9.35	21.45	4.35	3.36	7.72	0.44	0.34	0.77
Livestock Grazing	26.36	20.38	46.75	25.39	19.63	45.02	2.54	1.96	4.50
Fire Management	3,604.74	2,786.65	6,391.39	190.40	147.19	337.59	19.04	14.72	33.76
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	1.36	1.05	2.41	0.36	0.28	0.64	0.04	0.03	0.06
OHVs	2,298.35	1,776.74	4,075.09	726.86	561.90	1,288.76	0.00	0.00	0.00
Project Year 2018 Total	**6,096.52**	**4,678.53**	**10,775.05**	**1,297.34**	**1,059.49**	**2,356.83**	**67.34**	**60.11**	**127.45**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-51. Cumulative Annual Emissions Associated with Alternative C – Project Year 2027

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	38.75	17.21	55.96	8.60	3.83	12.43	129.28	59.27	188.55	1.01	0.41	1.43
Coalbed Natural Gas Development/Production	4.61	2.07	6.68	0.79	0.34	1.13	5.29	2.03	7.33	0.12	0.05	0.17
Oil Development/Production	158.69	66.23	224.92	28.75	11.61	40.36	276.14	106.98	383.12	5.70	2.21	7.91
Locatable Minerals Mining	2,107.70	725.23	2,832.93	309.81	106.60	416.42	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	811.72	279.30	1,091.03	86.82	29.87	116.70	4.34	1.49	5.84	0.28	0.10	0.38
Resource Road Maintenance	126.23	97.58	223.81	13.78	10.65	24.43	0.99	0.77	1.76	0.15	0.12	0.27
ROW Corridors – Renewable Energy	211.75	163.69	375.44	22.11	17.10	39.21	4.95	3.83	8.78	0.19	0.15	0.34
Livestock Grazing	41.15	31.81	72.96	3.04	2.35	5.39	1.59	1.23	2.82	0.05	0.04	0.08
Fire Management	493.95	381.85	875.80	329.20	254.49	583.69	103.79	80.24	184.03	27.67	21.39	49.05
Forest Products	431.57	333.63	765.20	43.19	33.39	76.59	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	67.34	52.06	119.40	6.86	5.30	12.16	1.17	0.91	2.08	0.03	0.03	0.06
OHVs	18.05	13.95	32.00	16.25	12.56	28.80	57.82	44.70	102.52	4.87	3.76	8.63
Project Year 2027 Total	**4,511.53**	**2,164.61**	**6,676.14**	**869.20**	**488.10**	**1,357.30**	**673.26**	**331.77**	**1,005.03**	**42.10**	**28.95**	**71.05**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	57.70	27.00	84.70	425.79	206.36	632.15	55.64	26.98	82.62
Coalbed Natural Gas Development/Production	2.26	0.71	2.98	9.01	4.13	13.14	0.90	0.41	1.31
Oil Development/Production	81.10	32.30	113.40	20.79	8.09	28.88	2.08	0.81	2.89
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	3.91	1.34	5.25	1.59	0.55	2.14	0.16	0.05	0.21
Resource Road Maintenance	0.49	0.38	0.87	0.79	0.61	1.39	0.08	0.06	0.14
ROW Corridors – Renewable Energy	7.92	6.12	14.05	3.54	2.74	6.28	0.35	0.27	0.63
Livestock Grazing	26.20	20.26	46.46	25.37	19.61	44.99	2.54	1.96	4.50
Fire Management	3,625.80	2,802.92	6,428.73	199.64	154.33	353.98	19.96	15.43	35.40
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	1.36	1.05	2.41	0.36	0.28	0.64	0.04	0.03	0.06
OHVs	2,180.47	1,685.61	3,866.08	576.11	445.36	1,021.47	0.00	0.00	0.00
Project Year 2027 Total	**6,008.89**	**4,585.52**	**10,594.41**	**1,270.44**	**844.71**	**2,115.15**	**82.49**	**46.28**	**128.77**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-52. Cumulative Annual Emissions Associated with Alternative D – Project Year 2018

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	30.15	12.93	43.09	6.67	2.94	9.61	97.29	55.98	153.27	0.86	0.04	0.90
Coalbed Natural Gas Development/Production	4.51	2.54	7.05	0.72	0.38	1.11	4.41	2.04	6.45	0.10	0.05	0.15
Oil Development/Production	131.89	78.31	210.20	24.56	12.81	37.38	243.69	107.18	350.87	5.03	2.22	7.25
Locatable Minerals Mining	2,191.91	754.21	2,946.12	322.44	110.95	433.39	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	611.98	210.57	822.56	65.67	22.60	88.27	6.71	2.31	9.02	0.23	0.08	0.32
Resource Road Maintenance	80.05	61.89	141.94	8.83	6.83	15.66	2.10	1.63	3.73	0.11	0.09	0.20
ROW Corridors – Renewable Energy	229.68	177.56	407.24	23.71	18.33	42.03	11.40	8.81	20.21	0.42	0.32	0.74
Livestock Grazing	33.82	26.15	59.97	1.90	1.47	3.37	1.60	1.23	2.83	0.03	0.02	0.05
Fire Management	265.74	205.43	471.16	166.21	128.49	294.70	51.07	39.48	90.56	13.80	10.67	24.46
Forest Products	321.85	248.80	570.65	32.22	24.91	57.13	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	33.67	26.03	59.70	3.43	2.65	6.08	0.59	0.45	1.04	0.02	0.01	0.03
OHVs	22.84	17.66	40.50	20.56	15.89	36.45	44.91	34.72	79.63	4.53	3.50	8.03
Project Year 2018 Total	**3,958.10**	**1,822.07**	**5,780.17**	**676.93**	**348.24**	**1,025.17**	**551.66**	**284.15**	**835.81**	**27.14**	**17.70**	**44.84**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	42.39	29.18	71.57	303.01	258.83	561.84	39.94	32.90	72.84
Coalbed Natural Gas Development/Production	1.97	0.73	2.70	3.78	2.16	5.94	0.38	0.22	0.59
Oil Development/Production	69.97	34.49	104.45	18.28	8.20	26.48	1.83	0.82	2.65
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	4.70	1.62	6.32	1.58	0.54	2.12	0.16	0.05	0.21
Resource Road Maintenance	0.93	0.72	1.65	0.50	0.38	0.88	0.05	0.04	0.09
ROW Corridors – Renewable Energy	10.45	8.08	18.52	3.79	2.93	6.72	0.38	0.29	0.67
Livestock Grazing	13.57	10.49	24.05	12.77	9.87	22.65	1.28	0.99	2.26
Fire Management	1,806.43	1,396.46	3,202.89	98.69	76.29	174.98	9.87	7.63	17.50
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.68	0.52	1.20	0.18	0.14	0.32	0.02	0.01	0.03
OHVs	2,298.35	1,776.74	4,075.09	726.86	561.90	1,288.76	0.00	0.00	0.00
Project Year 2018 Total	**4,271.10**	**3,266.83**	**7,537.93**	**1,176.88**	**923.90**	**2,100.78**	**54.64**	**43.22**	**97.86**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-53. Cumulative Annual Emissions Associated with Alternative D – Project Year 2027

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	36.13	17.17	53.30	8.02	3.83	11.85	121.84	59.16	181.00	0.91	0.41	1.33
Coalbed Natural Gas Development/Production	3.69	3.35	7.05	0.64	0.46	1.11	4.39	2.05	6.45	0.10	0.05	0.15
Oil Development/Production	74.92	135.24	210.16	12.62	24.74	37.36	110.16	240.34	350.50	2.28	4.96	7.24
Locatable Minerals Mining	2,107.70	725.23	2,832.93	309.81	106.60	416.42	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	659.46	226.91	886.37	70.50	24.26	94.76	4.06	1.40	5.46	0.23	0.08	0.31
Resource Road Maintenance	79.95	61.80	141.75	8.72	6.74	15.47	0.63	0.49	1.11	0.10	0.08	0.17
ROW Corridors – Renewable Energy	181.70	140.46	322.16	18.67	14.43	33.10	4.19	3.24	7.43	0.16	0.13	0.29
Livestock Grazing	33.81	26.14	59.95	1.89	1.46	3.35	1.40	1.08	2.48	0.03	0.02	0.05
Fire Management	265.84	205.51	471.35	166.31	128.57	294.88	51.45	39.77	91.23	13.82	10.69	24.51
Forest Products	321.85	248.80	570.65	32.22	24.91	57.13	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	33.67	26.03	59.70	3.43	2.65	6.08	0.59	0.45	1.04	0.02	0.01	0.03
OHVs	18.05	13.95	32.00	16.25	12.56	28.80	57.82	44.70	102.52	4.87	3.76	8.63
Project Year 2027 Total	**3,816.77**	**1,830.61**	**5,647.37**	**649.09**	**351.22**	**1,000.31**	**444.43**	**423.01**	**867.44**	**24.53**	**20.89**	**45.42**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	54.79	26.93	81.72	407.21	204.48	611.69	52.95	26.59	79.54
Coalbed Natural Gas Development/Production	1.95	0.76	2.70	7.20	-1.26	5.94	0.72	-0.13	0.59
Oil Development/Production	34.43	70.14	104.56	8.39	18.07	26.46	0.84	1.81	2.65
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	3.79	1.30	5.09	1.50	0.52	2.02	0.15	0.05	0.20
Resource Road Maintenance	0.31	0.24	0.55	0.50	0.38	0.88	0.05	0.04	0.09
ROW Corridors – Renewable Energy	7.07	5.47	12.54	3.15	2.43	5.58	0.31	0.24	0.56
Livestock Grazing	13.48	10.42	23.91	12.76	9.87	22.63	1.28	0.99	2.26
Fire Management	1,808.17	1,397.80	3,205.97	97.18	75.13	172.31	9.72	7.51	17.23
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.68	0.52	1.20	0.18	0.14	0.32	0.02	0.01	0.03
OHVs	2,180.47	1,685.61	3,866.08	576.11	445.36	1,021.47	0.00	0.00	0.00
Project Year 2027 Total	**4,126.80**	**3,207.01**	**7,333.82**	**1,121.62**	**757.77**	**1,879.39**	**66.78**	**37.39**	**104.16**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-54. Cumulative Annual Emissions Associated with Alternative E – Project Year 2018

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	20.91	31.98	52.89	4.65	7.10	11.75	73.21	105.61	178.82	0.46	0.87	1.32
Coalbed Natural Gas Development/Production	1.25	2.14	3.38	0.23	0.32	0.55	1.78	1.72	3.50	0.03	0.04	0.07
Oil Development/Production	74.92	74.82	149.74	12.62	12.08	24.70	110.16	98.97	209.13	2.28	2.05	4.32
Locatable Minerals Mining	2,022.21	695.81	2,718.02	276.52	95.15	371.67	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	660.08	227.12	887.20	70.69	24.32	95.02	7.06	2.43	9.48	0.25	0.09	0.34
Resource Road Maintenance	60.83	47.03	107.86	6.71	5.19	11.90	1.60	1.24	2.84	0.08	0.06	0.15
ROW Corridors – Renewable Energy	185.87	143.69	329.55	19.13	14.79	33.92	8.35	6.46	14.81	0.31	0.24	0.55
Livestock Grazing	16.87	13.04	29.91	0.95	0.73	1.68	0.80	0.62	1.41	0.01	0.01	0.02
Fire Management	142.23	109.95	252.18	77.28	59.74	137.03	23.45	18.13	41.58	6.23	4.81	11.04
Forest Products	215.62	166.69	382.31	21.60	16.70	38.29	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	16.84	13.02	29.85	1.71	1.33	3.04	0.29	0.23	0.52	0.01	0.01	0.02
OHVs	22.84	17.66	40.50	20.56	15.89	36.45	44.91	34.72	79.63	4.53	3.50	8.03
Project Year 2018 Total	**3,440.46**	**1,542.93**	**4,983.39**	**512.65**	**253.35**	**766.00**	**359.50**	**300.45**	**659.95**	**16.20**	**12.38**	**28.58**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	33.89	46.73	80.62	262.53	349.82	612.35	34.03	46.77	80.80
Coalbed Natural Gas Development/Production	1.03	0.62	1.65	1.05	1.79	2.84	0.10	0.18	0.28
Oil Development/Production	34.43	32.31	66.73	8.39	7.59	15.98	0.84	0.76	1.60
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	4.83	1.66	6.49	1.62	0.56	2.17	0.16	0.06	0.22
Resource Road Maintenance	0.71	0.55	1.25	0.38	0.29	0.67	0.04	0.03	0.07
ROW Corridors – Renewable Energy	7.64	5.91	13.55	2.75	2.13	4.88	0.28	0.21	0.49
Livestock Grazing	6.78	5.24	12.02	6.39	4.94	11.32	0.64	0.49	1.13
Fire Management	817.36	631.86	1,449.22	48.25	37.30	85.54	4.82	3.73	8.55
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.34	0.26	0.60	0.09	0.07	0.16	0.01	0.01	0.02
OHVs	2,298.35	1,776.74	4,075.09	726.86	561.90	1,288.76	0.00	0.00	0.00
Project Year 2018 Total	**3,227.03**	**2,509.68**	**5,736.71**	**1,065.73**	**969.03**	**2,034.76**	**41.67**	**52.50**	**94.17**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-55. Cumulative Annual Emissions Associated with Alternative E – Project Year 2027

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	25.23	16.50	41.73	5.63	3.68	9.31	90.98	57.28	148.26	0.50	0.39	0.88
Coalbed Natural Gas Development/Production	1.03	1.75	2.77	0.21	0.29	0.49	1.77	1.72	3.49	0.03	0.04	0.07
Oil Development/Production	147.97	-1.96	146.01	26.57	-2.26	24.31	252.42	-43.78	208.65	5.21	-0.90	4.31
Locatable Minerals Mining	1,980.11	681.33	2,661.43	270.21	92.97	363.18	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	610.96	210.22	821.18	65.43	22.51	87.94	3.96	1.36	5.33	0.21	0.07	0.29
Resource Road Maintenance	60.75	46.96	107.71	6.63	5.13	11.75	0.48	0.37	0.85	0.07	0.06	0.13
ROW Corridors – Renewable Energy	139.17	107.59	246.76	14.28	11.04	25.32	3.16	2.45	5.61	0.14	0.11	0.25
Livestock Grazing	16.86	13.03	29.90	0.94	0.73	1.67	0.70	0.54	1.24	0.01	0.01	0.02
Fire Management	143.70	111.09	254.79	78.65	60.80	139.46	27.41	21.19	48.61	6.40	4.95	11.35
Forest Products	215.62	166.69	382.31	21.60	16.70	38.30	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	16.84	13.02	29.85	1.71	1.33	3.04	0.29	0.23	0.52	0.01	0.01	0.02
OHVs	18.05	13.95	32.00	16.25	12.56	28.80	57.82	44.70	102.52	4.87	3.76	8.63
Project Year 2027 Total	**3,376.28**	**1,380.16**	**4,756.44**	**508.11**	**225.47**	**733.58**	**526.90**	**116.38**	**643.28**	**19.48**	**9.20**	**28.67**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	42.87	26.17	69.04	338.06	197.06	535.12	43.45	25.31	68.77
Coalbed Natural Gas Development/Production	1.03	0.60	1.63	1.96	3.43	5.39	0.20	0.34	0.54
Oil Development/Production	74.68	-8.55	66.13	19.03	-3.11	15.92	1.90	-0.31	1.59
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	3.75	1.29	5.04	1.47	0.51	1.98	0.15	0.05	0.20
Resource Road Maintenance	0.24	0.18	0.42	0.38	0.29	0.67	0.04	0.03	0.07
ROW Corridors – Renewable Energy	5.21	4.03	9.24	2.31	1.79	4.10	0.23	0.18	0.41
Livestock Grazing	6.74	5.21	11.95	6.38	4.93	11.32	0.64	0.49	1.13
Fire Management	848.53	655.95	1,504.48	63.08	48.76	111.84	6.31	4.88	11.18
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.34	0.26	0.60	0.09	0.07	0.16	0.01	0.01	0.02
OHVs	2,180.47	1,685.61	3,866.08	576.11	445.36	1,021.47	0.00	0.00	0.00
Project Year 2027 Total	**3,185.51**	**2,378.58**	**5,564.09**	**1,016.31**	**701.74**	**1,718.05**	**53.67**	**31.24**	**84.91**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-56. Cumulative Annual Emissions Associated with Alternative F – Project Year 2018

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	30.12	22.77	52.89	6.67	5.09	11.75	97.22	81.60	178.82	0.86	0.47	1.32
Coalbed Natural Gas Development/Production	4.51	2.54	7.05	0.72	0.38	1.11	4.41	2.04	6.45	0.10	0.05	0.15
Oil Development/Production	131.70	78.50	210.20	24.52	12.85	37.38	243.24	107.63	350.87	5.02	2.23	7.25
Locatable Minerals Mining	2,191.91	754.21	2,946.12	322.44	110.95	433.39	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	674.49	232.08	906.57	72.25	24.86	97.11	7.14	2.46	9.60	0.26	0.09	0.35
Resource Road Maintenance	80.05	61.89	141.94	8.83	6.83	15.66	2.10	1.63	3.73	0.11	0.09	0.20
ROW Corridors – Renewable Energy	170.24	131.61	301.85	17.73	13.71	31.44	10.88	8.41	19.29	0.40	0.31	0.71
Livestock Grazing	33.45	25.86	59.31	1.84	1.42	3.27	1.58	1.22	2.80	0.03	0.02	0.05
Fire Management	265.74	205.43	471.16	166.21	128.49	294.70	51.07	39.48	90.56	13.80	10.67	24.46
Forest Products	322.37	249.21	571.58	32.27	24.95	57.22	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	33.67	26.03	59.70	3.43	2.65	6.08	0.59	0.45	1.04	0.02	0.01	0.03
OHVs	22.84	17.66	40.50	20.56	15.89	36.45	44.91	34.72	79.63	4.53	3.50	8.03
Project Year 2018 Total	**3,961.10**	**1,807.77**	**5,768.87**	**677.48**	**348.08**	**1,025.56**	**551.03**	**309.97**	**861.00**	**27.14**	**18.13**	**45.26**

Project Scenario/Resource	CO			VOCs			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	42.36	38.26	80.62	302.94	309.41	612.35	39.93	40.87	80.80
Coalbed Natural Gas Development/Production	1.97	0.73	2.70	3.78	2.16	5.94	0.38	0.22	0.59
Oil Development/Production	69.85	34.61	104.45	18.25	8.24	26.48	1.82	0.82	2.65
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	4.86	1.67	6.53	1.63	0.56	2.19	0.16	0.06	0.22
Resource Road Maintenance	0.93	0.72	1.65	0.50	0.38	0.88	0.05	0.04	0.09
ROW Corridors – Renewable Energy	9.98	7.72	17.70	3.61	2.79	6.40	0.36	0.28	0.64
Livestock Grazing	12.90	9.97	22.87	12.12	9.37	21.49	1.21	0.94	2.15
Fire Management	1,806.43	1,396.46	3,202.89	98.69	76.29	174.98	9.87	7.63	17.50
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.68	0.52	1.20	0.18	0.14	0.32	0.02	0.01	0.03
OHVs	2,298.35	1,776.74	4,075.09	726.86	561.90	1,288.76	0.00	0.00	0.00
Project Year 2018 Total	**4,269.99**	**3,275.22**	**7,545.20**	**1,175.98**	**973.88**	**2,149.87**	**54.55**	**51.13**	**105.68**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

Table 4-57. Cumulative Annual Emissions Associated with Alternative F – Project Year 2027

Project Scenario/Resource	Emissions (Tons per Year)											
	PM_{10}			$PM_{2.5}$			NO_x			SO_x		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	36.10	0.00	36.10	8.01	0.00	8.01	121.76	0.00	121.76	0.91	0.00	0.91
Coalbed Natural Gas Development/Production	3.69	2.07	5.76	0.64	0.34	0.98	4.39	2.03	6.42	0.10	0.05	0.15
Oil Development/Production	143.95	66.22	210.16	25.75	11.61	37.36	243.53	106.98	350.50	5.03	2.21	7.24
Locatable Minerals Mining	2,107.70	725.23	2,832.93	309.81	106.60	416.42	87.70	30.17	117.87	2.01	0.69	2.70
Salable Minerals Mining	673.34	231.69	905.03	71.98	24.77	96.75	4.09	1.41	5.50	0.24	0.08	0.32
Resource Road Maintenance	79.95	61.80	141.75	8.72	6.74	15.47	0.63	0.49	1.11	0.10	0.08	0.17
ROW Corridors – Renewable Energy	122.28	94.53	216.82	12.73	9.84	22.57	3.98	3.08	7.06	0.16	0.12	0.28
Livestock Grazing	33.44	25.85	59.29	1.83	1.42	3.25	1.39	1.07	2.46	0.03	0.02	0.04
Fire Management	265.84	205.51	471.35	166.31	128.57	294.88	51.45	39.77	91.23	13.82	10.69	24.51
Forest Products	322.37	249.21	571.58	32.27	24.95	57.22	0.20	0.15	0.35	0.00	0.00	0.01
Invasive Species/Pest Management	33.67	26.03	59.70	3.43	2.65	6.08	0.59	0.45	1.04	0.02	0.01	0.03
OHVs	18.05	13.95	32.00	16.25	12.56	28.80	57.82	44.70	102.52	4.87	3.76	8.63
Project Year 2027 Total	**3,840.38**	**1,702.09**	**5,542.47**	**657.75**	**330.04**	**987.79**	**577.51**	**230.30**	**807.82**	**27.28**	**17.72**	**45.00**

Project Scenario/Resource	CO			VOC			HAP		
	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative	BLM	Non-BLM	Cumulative
Conventional Natural Gas Development/Production	54.75	0.00	54.75	407.08	0.00	407.08	52.93	0.00	52.93
Coalbed Natural Gas Development/Production	1.95	0.71	2.66	7.20	4.13	11.33	0.72	0.41	1.13
Oil Development/Production	72.27	32.30	104.56	18.37	8.09	26.46	1.84	0.81	2.65
Locatable Minerals Mining	20.84	7.17	28.00	7.24	2.49	9.73	0.72	0.25	0.97
Salable Minerals Mining	3.80	1.31	5.11	1.51	0.52	2.03	0.15	0.05	0.20
Resource Road Maintenance	0.31	0.24	0.55	0.50	0.38	0.88	0.05	0.04	0.09
ROW Corridors – Renewable Energy	6.72	5.20	11.92	2.99	2.31	5.30	0.30	0.23	0.53
Livestock Grazing	12.82	9.91	22.74	12.11	9.36	21.47	1.21	0.94	2.15
Fire Management	1,808.17	1,397.80	3,205.97	97.18	75.13	172.31	9.72	7.51	17.23
Forest Products	0.83	0.65	1.48	0.20	0.16	0.36	0.02	0.02	0.04
Invasive Species/Pest Management	0.68	0.52	1.20	0.18	0.14	0.32	0.02	0.01	0.03
OHVs	2,180.47	1,685.61	3,866.08	576.11	445.36	1,021.47	0.00	0.00	0.00
Project Year 2027 Total	**4,163.61**	**3,141.42**	**7,305.03**	**1,130.66**	**548.07**	**1,678.73**	**67.68**	**10.27**	**77.95**

Source: Appendix U

BLM	Bureau of Land Management	PM_{10}	particulate matter less than 10 microns in diameter
CO	carbon monoxide	$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
HAP	hazardous air pollutant	ROW	right-of-way
NO_x	nitrogen oxides	SO_x	sulfur oxides
OHV	off-highway vehicle	VOCs	volatile organic compounds

4.10 Irreversible and Irretrievable Commitment of Resources

Section 1502.16 of CEQ regulations requires that the discussion of environmental consequences include a description of "…any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented." An irreversible commitment of resources refers to decisions affecting the use of resources (generally nonrenewable resources) that limit the ability for future generations to use that resource. For example, extraction and processing of sand and gravel as part of an aggregate mining operation is considered an irreversible commitment of salable minerals. This action is irreversible because once the minerals are extracted and processed, they cannot be renewed in the ground within a reasonable timeframe, and are therefore unavailable for use by future generations. An irretrievable commitment of resources refers to decisions resulting in the loss of production or use of a resource. For example, a decision not to treat juniper encroachment into adjacent sagebrush habitat results in the irretrievable loss of forage production from the grassland community. This action is not irreversible, because a treatment applied to the encroaching juniper could restore the forage production of the sagebrush habitat.

Though the decision to select one of the six alternatives described in this Proposed RMP and Final EIS does not authorize implementation level (activity- or project-specific) activities, all of the alternatives contain decisions on the management of resources that may lead to future irreversible and irretrievable commitments of those resources. Decisions made in the selected plan serve to guide future actions and subsequent site-specific decisions. Following the signing of the RODs for the RMP revision, implementation plans will be developed and implemented by the BLM. Implementation decisions require appropriate project specific planning and NEPA analysis, and constitute BLM's final approval authorizing on-the-ground activities to proceed. Assuming the BLM selects one of the action alternatives, and that subsequent implementation decisions authorize activity- or project-specific plans, irreversible and irretrievable commitment of resources would occur. For most resources, the RMP will provide objectives for management and guidance for future implementation level decisions to minimize the potential for irreversible and irretrievable commitments of resources.

Table 4-58 identifies the irreversible and irretrievable impacts to resources and resource uses that may occur as a result of implementing one of the six alternatives. No irreversible or irretrievable commitment of resources are anticipated for air quality, visual resources, lands and realty, renewable energy, ROW and corridors, CTTM, recreation, special designations, and socioeconomic resources.

Table 4-58. Irreversible and Irretrievable Resource Commitments

Resource	Irreversible	Irretrievable	Explanation
Physical, Biological, and Heritage Resources			
Soil	X		Surface-disturbing activities, nonmechanized activities, and natural processes cause soil erosion in the Planning Area. Soil formation can take thousands of years and, therefore, eroded soil and, to a lesser extent, lost productivity are considered unrecoverable.
Water		X	Depletion of surface water from in the Planning Area watersheds may result in an irretrievable commitment of water that would otherwise have contributed to the Missouri River System. Produced water from oil and gas wells in the Planning Area may be an irretrievable commitment of groundwater, depending on its use, once it reaches the surface. Increases in sediment, salinity, and nonpoint source pollution that result from surface-disturbing activities could result in degradation of water quality and an irretrievable loss of water utility.
Vegetation		X	Allowing surface-disturbing activities consistent with the BLM's multiple-use mandate would result in both long- and short-term alteration and removal of vegetation cover that would not be available to meet other resource objectives. In some instances, disturbance may result in a long-term shift in plant communities.
Fish and Wildlife		X	Activities that result in the alteration of habitat by shifting vegetation communities can displace wildlife, reduce carrying capacity, and change wildlife communities, resulting in lower species diversity and, thus, irretrievable commitment of these resources. Potential impacts to wildlife include obstacles and barriers affecting traditional ranges and migration corridors of big game and resulting in concentrated herbivory that may cause damage to habitat.
Cultural and Paleontological Resources	X		Any surface-disturbing activities may damage, destroy, or otherwise affect cultural and paleontological resources. Once disturbed, these resources cannot be replaced and the potential for collecting or preserving meaningful data is compromised.
Resource Uses			
Locatable Minerals	X		Allowing the removal of locatable minerals from the ground is considered an irreversible commitment of these resources.
Leasable Minerals	X		Allowing the removal of oil and gas or any solid leasable mineral from the ground is considered an irreversible commitment of these resources.
Mineral Materials	X		Allowing the removal of mineral materials from the ground is considered an irreversible commitment of these resources.
Forest Products		X	Any decision to prohibit silviculture treatments is an irretrievable commitment of the wood fiber produced.
Livestock Grazing		X	Forage consumed by livestock is unavailable for wildlife. Conversely, any decision to prohibit livestock grazing is also an irretrievable commitment of the forage produced.

4.11 Unavoidable Adverse Impacts

Assuming that the BLM selects one of the action alternatives and that subsequent implementation decisions authorize activity- or project-specific plans, unavoidable adverse impacts would occur. Unavoidable adverse impacts are the residual impacts of implementing management actions or allowable uses after BMPs and mitigation measures are applied. As discussed in Section 4.10 *Irreversible and Irretrievable Commitments of Resources*, the decision to select one of the four alternatives described in this RMP and EIS would not result in unavoidable adverse impacts because the decision does not authorize on-the-ground activities.; however, subsequent implementation level decisions may. This section describes the potential unavoidable adverse impacts that may occur from these implementation level decisions.

Surface-disturbing activities (e.g., construction of well pads and roads, pits and reservoirs, pipelines and powerlines, mining, and vegetation treatments), OHV use, fire and fuels management, some recreational activities, concentrated herbivory, and operation and maintenance of existing facilities and infrastructure in the Planning Area would cause fugitive dust, exhaust emissions, and smoke, thereby adversely affecting air quality through the release of HAPs, VOCs, CO, SO_2, NO, and PM_{10} into the atmosphere. In addition, these activities would release CO_2, CH_4, and other GHGs into the atmosphere.

Surface-disturbing activities, motorized vehicle use and recreation, fire and fuels management, herbivory, and the operation and maintenance of existing facilities and infrastructure in the Planning Area would contribute to soil erosion and soil compaction, sediment loading of waterbodies, and the potential spread of invasive species. Invasive species will continue to spread via the wind, in water courses, and by attaching to livestock, wildlife, humans, and vehicles. The continued presence of invasive species in the Planning Area is considered an unavoidable impact.

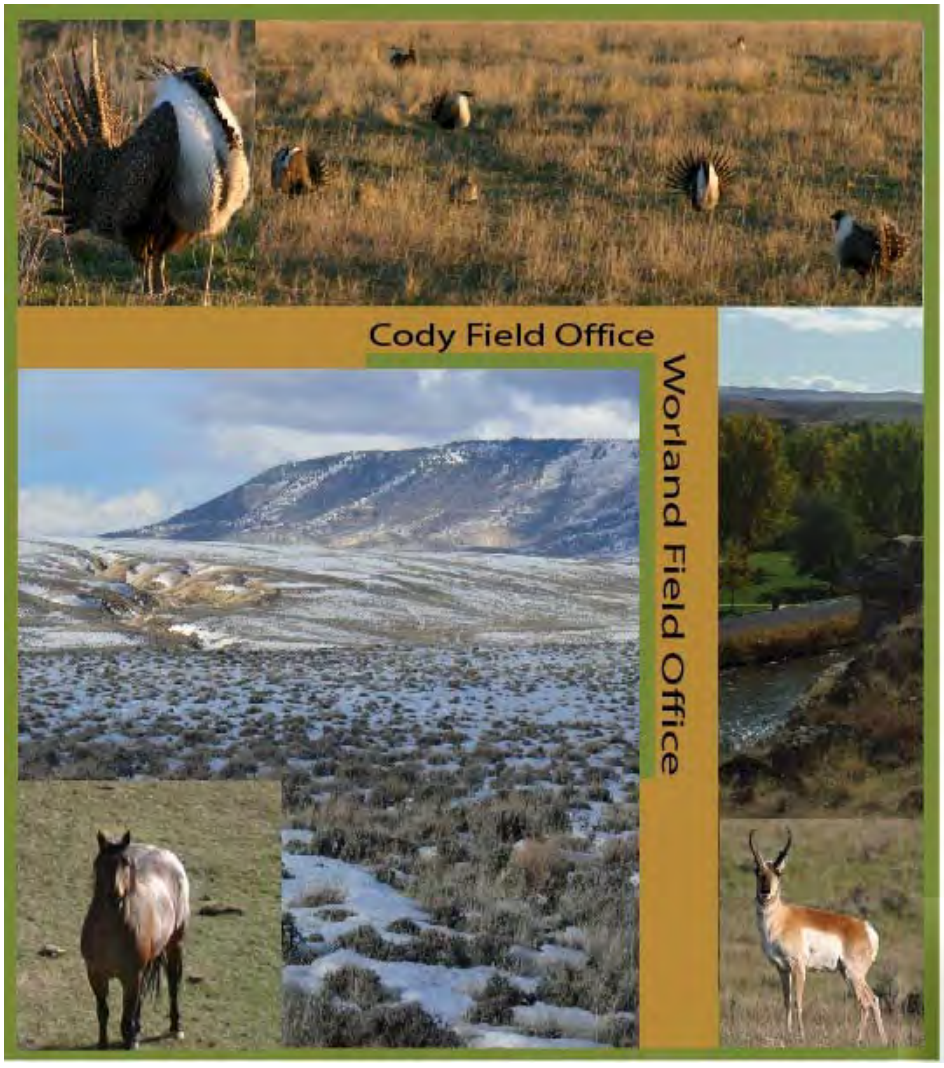
Surface-disturbing activities and the development of mineral, energy, and other facilities in the Planning Area are expected to cause the unavoidable degradation, loss, and fragmentation of habitats, and therefore will unavoidably affect wildlife that depends on these habitats. Motorized vehicle use and recreational activities, fire and fuels management, concentrated herbivory, and the operation and maintenance of existing facilities and infrastructure in the Planning Area would contribute to the unavoidable degradation, loss, and fragmentation of habitats.

Protection of some resource values (e.g., wildlife, special status species, cultural, cave and karst, and paleontological resources) would adversely affect the development of minerals and renewable energy. Conversely, the development of minerals and renewable energy would adversely affect the distribution of some wildlife, special status species, and vegetative communities.

Surface-disturbing activities and development for resource uses would change the landscape, scenic quality, and setting in the Planning Area. Surface-disturbing activities, motorized vehicle use, theft and vandalism, and natural processes (e.g., erosion) would adversely affect cultural and paleontological resources in the Planning Area.

Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement



Volume 3 of 4
Chapters 5 - 7, Glossary, and Maps

May 2015

BLM

Wyoming - Cody & Worland Field Offices

The BLM's multiple-use mission is to sustain the health and productivity of public lands for the use and enjoyment of present and future generations.

The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

BLM/WY/PL-15/013+1610
Volume 3 of 4

Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement

Volume 3 of 4
Chapters 5 – 7, Glossary, and Maps

U.S. Department of the Interior
Bureau of Land Management
Cody Field Office, Wyoming

and

U.S. Department of the Interior
Bureau of Land Management
Worland Field Office, Wyoming

May 2015

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CHAPTER 5 – PUBLIC INVOLVEMENT AND LIST OF PREPARERS

Public involvement, consultation, and coordination initiated prior to and occurred throughout preparation of the Bighorn Basin Resource Management Plan (RMP) revision and associated Environmental Impact Statement (EIS). The Bureau of Land Management (BLM) incorporated public involvement, consultation, and coordination through public meetings, informal meetings, individual contacts, news releases, newsletters, workshops, a planning website, and the *Federal Register*. This chapter describes the public involvement process, as well as other key consultation and coordination activities undertaken to prepare the EIS in support of the RMP revision. It also contains the List of Preparers in Table 5-3.

The BLM decision-making process is conducted in accordance with the requirements of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations implementing NEPA, and the United States Department of the Interior (DOI) and BLM policies and procedures implementing NEPA. NEPA and the associated regulatory and policy framework require that all federal agencies involve the interested public and potentially affected parties in their decision-making, consider reasonable alternatives to proposed actions, and prepare environmental documents that disclose the potential impacts of proposed actions and alternatives.

A Notice of Intent (NOI) published in the *Federal Register* on October 17, 2008, formally announced the BLM's intent to revise the existing plans and prepare the associated EIS. The NOI initiated the scoping process and invited participation of affected and interested agencies, organizations, and members of the public in determining the scope and issues to be addressed by alternatives and analyzed in the EIS. The BLM solicited additional public involvement, including cooperating agency meetings and workshops, to help identify issues to be addressed in developing a full range of land management alternatives. Subsequent to the release of the Draft RMP and Draft EIS on April 22, 2011, the BLM held six public meetings in June 2011 to discuss the commenting process, respond to questions, and solicit comments on the Draft RMP and Draft EIS. The BLM also held six public meetings in September of 2013 following the release of the Supplement to the Draft RMP and Draft EIS on July 12, 2013. Table 5-1 lists public involvement, coordination, and consultation events.

5.1 Public Involvement

In accordance with CEQ scoping guidance, the BLM provided opportunities for public involvement as an integral part of revising the RMP and preparing the EIS. CEQ scoping guidance defines scoping as the "process by which lead agencies solicit input from the public and interested agencies on the nature and extent of issues and impacts to be addressed and the methods by which they will be evaluated" (CEQ 1981). The scoping report, which summarizes public participation during scoping and issues identified during the scoping process, is available on the Bighorn Basin RMP website at: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html.

The intent of the scoping process is to provide an opportunity for the public, tribes, other government agencies, and interest groups to learn about the project and provide input on the planning issues, impacts, and potential alternatives that will be addressed in the EIS, and the extent to which those issues will be analyzed. In general, public involvement during scoping assists the agency through the following:

- Broadening the information base for decision-making
- Informing the public about the EIS and proposed RMP and the potential impacts associated with various management decisions

- Ensuring public needs and viewpoints are brought to the attention of the agency
- Determining the scope and the significant issues to be analyzed in depth in the EIS

Table 5-1. Public Involvement, Coordination, and Consultation Events

Date	Location	Event
November 5, 2008	Thermopolis, Wyoming	Public Scoping Meeting
November 6, 2008	Worland, Wyoming	Public Scoping Meeting
November 7, 2008	Greybull, Wyoming	Public Scoping Meeting
November 12, 2008	Cody, Wyoming	Public Scoping Meeting
November 13, 2008	Powell, Wyoming	Public Scoping Meeting
November 14, 2008	Lovell, Wyoming	Public Scoping Meeting
January 12, 2009	Greybull, Wyoming	Travel Management and Recreation Assessment Meeting
January 13, 2009	Lovell, Wyoming	Travel Management and Recreation Assessment Meeting
January 14, 2009	Cody, Wyoming	Travel Management and Recreation Assessment Meeting
January 15, 2009	Worland, Wyoming	Travel Management and Recreation Assessment Meeting
January 16, 2009	Thermopolis, Wyoming	Travel Management and Recreation Assessment Meeting
March 25 – 27, 2009	Cody, Wyoming	Cooperating Agency Workshop/Development of the Goals and Objectives
April 29 – May 1, 2009	Worland, Wyoming	Cooperating Agency Workshop/Development of the Range of Alternatives
May 27 – 29, 2009	Worland, Wyoming	Cooperating Agency Workshop/Development of the Range of Alternatives
June 24 – 26, 2009	Cody, Wyoming	Cooperating Agency Workshop/Development of the Range of Alternatives
July 29 – 31, 2009	Thermopolis, Wyoming	Cooperating Agency Workshop/Development of the Range of Alternatives
October 28, 2009	Cody, Wyoming	Open House
February 17 – 19, 2010	Cody, Wyoming	Cooperating Agency Workshop/Development of the Preferred Alternative
April 5, 2010	Worland, Wyoming	Open House
June 6, 2011	Thermopolis, Wyoming	Draft RMP Public Meeting
June 7, 2011	Worland, Wyoming	Draft RMP Public Meeting
June 8, 2011	Greybull, Wyoming	Draft RMP Public Meeting
June 13, 2011	Lovell, Wyoming	Draft RMP Public Meeting
June 14, 2011	Cody, Wyoming	Draft RMP Public Meeting
June 15, 2011	Powell, Wyoming	Draft RMP Public Meeting
January 31, 2013	Cody, Wyoming	Cooperating Agency Workshop/Supplement to the Bighorn Basin Draft RMP and Draft EIS
September 4, 2013	Powell, Wyoming	Supplemental EIS Public Meeting
September 5, 2013	Cody, Wyoming	Supplemental EIS Public Meeting
September 9, 2013	Lovell, Wyoming	Supplemental EIS Public Meeting
September 10, 2013	Greybull, Wyoming	Supplemental EIS Public Meeting
September 11, 2013	Thermopolis, Wyoming	Supplemental EIS Public Meeting
September 12, 2013	Worland, Wyoming	Supplemental EIS Public Meeting

EIS Environmental Impact Statement
RMP Resource Management Plan

5.1.1 Scoping Period

Publication of the NOI on October 17, 2008 announced the BLM's intention to revise existing plans and prepare an EIS. The scoping period provides an opportunity for the public to identify potential planning issues and concerns associated with the RMP and EIS. Information obtained by the BLM during scoping is combined with issues identified by the agencies to form the scope of the EIS.

5.1.2 Public Notification of Scoping

News Release

The BLM issued a news release to local media on October 14, 2008, describing the upcoming NOI and listing the time, date, and location of the public scoping meetings. Copies of the news release went out to numerous radio stations and newspapers within and outside the Planning Area. The news release was also posted on the Bighorn Basin RMP Revision Project website.

Postcard

Another means of outreach prior to the public scoping meetings included a postcard mailing announcing the scoping meetings. The BLM mailed the postcards to cooperating agencies, individuals and organizations on the project mailing list (see the following section, Scoping Meetings), as well as P.O. Box holders in the Planning Area. The BLM mailed 2,679 postcards on October 21, 2008, and more than 2,500 were successfully delivered.

Additional Sources of Public Information about the Scoping Process

In addition to news releases and other notifications from the BLM regarding the scoping process, some members of the public received notification from other sources. More than 15 articles and news bulletins regarding some aspect of the RMP process were published in newspapers, both within and outside the Planning Area. Many of the articles listed the dates for the scoping period and the dates, times, and locations of public scoping meetings. Most of the articles provided some background regarding the purpose of the RMP revision and information about the process. The County Commissioners for the counties within the Planning Area, all of whom are cooperating agencies, also contacted county residents and interest groups. The County Commissioners from Park County used an automated phone system, e-mails, and radio to contact thousands of county residents and invite them to attend the public meetings and participate in the scoping process. Big Horn, Washakie, and Hot Springs Counties performed similar outreach efforts including contacting county residents, posting flyers, and taking part in radio outreach.

Website

On October 17, 2008, the Bighorn Basin RMP Revision Project website came online. The website provides background information on the project, a description of the scoping process and meeting locations, instructions on how to submit comments, a map of the Planning Area, and copies of public information documents such as the NOI and the Preparation Plan. The website is one of the methods used to communicate project news and updates to the public. The website can be accessed at: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html.

5.1.3 Scoping Meetings

During the weeks of November 3, 2008 and November 10, 2008, the BLM hosted scoping meetings in six locations across the Planning Area. Table 5-1 lists the scoping meeting locations and dates. The six public scoping meetings provided the public with an opportunity to learn and ask questions about the project and the planning process and to submit their issues and concerns to the BLM. The BLM chose an open house format over a more formal public meeting format to encourage broader participation, to allow attendees to learn about the project at their own pace, and to enable attendees to ask questions of BLM representatives in an informal one-on-one setting.

In addition to members of the BLM Interdisciplinary Team, a total of 381 people attended the scoping meetings. The BLM provided four handouts and presented four display boards at each scoping meeting. BLM resource specialists also brought maps, photographs, pamphlets, and other visual aids to the meetings for use when speaking with the public.

The BLM encouraged meeting attendees to comment by submitting written comment forms (either at the meetings or via mail) or by sending an e-mail. Comment sheets were available to attendees at all meetings, as was a computer station where the public could type and submit their comments. Attendees to the November 14 public meeting received a notification of the extension of the scoping period until November 24, 2008. At the November 12 through November 14 meetings, attendees also received a survey from the County Commissioners.

5.1.4 Open Houses/Public Meetings

After the public scoping period closed, the BLM held two open house meetings in Cody and in Worland, Wyoming. Similar to the public scoping meetings, resource specialists and other representatives of the BLM were on hand to personally address questions and provide information to meeting participants. The BLM also hosted five public workshops to obtain information and input on travel management and recreational activities at locations throughout the Basin that were attended by 203 participants.

Mailing List

The BLM compiled a list of 158 individuals, agencies, and organizations that participated in past BLM projects or requested to be on the general mailing list. The BLM mailed the initial scoping postcard to each individual on this list. In addition to those on the general mailing list, the BLM purchased a mailing list covering the entire Bighorn Basin (over 16,000 addresses) and mailed postcards to P.O. Box addresses included in this basin-wide list (2,485 addresses). Visitors to the scoping meetings were asked to sign in and provide their mailing address so that they could also be added to the mailing list. Other additions to the mailing list include those individuals who have submitted requests to be added to the list. Duplicate entries, changes of address, and return-to-sender mailings were deleted from the official project mailing list as identified. Through this process, the general mailing list was revised to approximately 500 entries. Requests to be added to or to remain on the official mailing list will continue to be accepted throughout the planning process.

Newsletters

Periodic newsletters have been and are being developed and distributed to keep the public informed of the Bighorn Basin RMP Revision Project. The January 2009 newsletter summarized the public scoping period and invited the public to the recreation and travel management workshops. Eight newsletters have been mailed to individuals on the Bighorn Basin RMP mailing list.

Website

The Bighorn Basin RMP Revision Project website can be found at: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html. The site serves as a virtual repository for documents related to the development of the RMP, including announcements, newsletters, and documents. The documents are available in PDF format to ensure they are accessible to the widest range of interested parties. The website provides the public an opportunity to submit their comments for consideration as part of the planning process and to be added to the project mailing list.

Field Trips

Six field trips were held during the summer of 2010 to various locations within the Planning Area to provide on-site discussion of RMP topics and to describe opportunities for effective public comment in advance of the 90-day public comment period.

In addition, Field Managers and RMP project leader were available to discuss RMP issues at the invitation of external individuals and groups. Multiple outside groups requested information from BLM managers and staff during 2010.

5.1.5 Public Comment Period on the Draft RMP and Draft EIS

A notice of availability announcing the release of the Draft RMP and Draft EIS was published in the *Federal Register* on April 22, 2011 initiating a 90-day comment period. At the request of the public and cooperating agencies, the BLM extended the comment period by 45 days, for a total comment period of 135 days. The comment period ended on September 7, 2011. During the 135-day comment period, the BLM hosted six public meetings within the Planning Area to gather comments on the Draft RMP and Draft EIS and to answer questions from the public (see Table 5-1).

Notification

The BLM issued a news release April 22, 2011 announcing the release of the Draft RMP and Draft EIS, which provided the dates, times, and locations of the public meetings for the Draft RMP and Draft EIS. The BLM issued a subsequent news release on May 23, 2011 again providing the dates, times, and locations for the June public meetings. The news releases were also posted on the Bighorn Basin RMP Revision Project website.

Public Meetings

During the public comment period, the BLM held six public meetings in June of 2011 in towns and cities throughout the planning area (see Table 5-1). The meetings were held in an open-house format to encourage participation and allow for the public to have informal one-on-one discussions with BLM resource specialists. The public meetings provided additional opportunity for the public to ask questions and submit comments. BLM managers, resource specialists, and other representatives of the BLM were present during these meetings to discuss and answer questions.

Comment Analysis

Based on comments received during this period, the BLM revised the RMP where appropriate. Changes made to the Draft RMP and Draft EIS based on comments are reflected in the Proposed RMP and Final EIS. The Comment Analysis Report summarizes all substantive comments received during the 135-day public comment period and the BLM responses to those comments, including how the document was revised based on comments. The report is presented in Appendix A.

5.1.6 Public Comment Period on the Supplement to the Draft RMP and Draft EIS

A notice of availability announcing the release of the Supplement was published in the *Federal Register* on July 12, 2013 initiating a 90-day public comment period. The BLM initially scheduled 90 days for public comment, and the original date for the close of the comment period was October 12, 2013. However, due to the lapse in appropriations and the resulting federal government shutdown, the documents were not available on the BLM website from October 1 through October 16, 2013 and the comment period was extended 20 days, ending on November 1, 2013. During the 110-day comment period, the BLM hosted six public meetings within the Planning Area to gather comments on the Supplement and to answer questions from the public (see Table 5-1).

Notification

The BLM issued a new release to local media on July 12, 2013 announcing the release of the Supplement. The new release provided the dates, times, and locations of the six public meetings for the Supplement. The BLM issued a subsequent news release on August 21, 2013 again providing the dates, times, and locations for the September public meetings. The news releases were also posted on the Bighorn Basin RMP Revision Project website. On October 24, 2013, the BLM issued a third news release announcing the extension of the public comment period and new end date.

Public Meetings

During the comment period, the BLM held six public meetings in September of 2013 in towns and cities throughout the planning are (see Table 5-1). The meetings were held in an open-house format with presentations discussing the cause for the Supplement, outlining alternatives E and F, and providing guidance for making effective comments. Each presentation also included a question and answer session. The open house portions of the meetings were designed to allow attendees to learn about the project at their own pace and to enable them to ask BLM representatives questions in an informal one-on-one setting.

Comment Analysis

Based on comments received during the 110-day comment period, the BLM revised the RMP where appropriate. Changes made based on comments are reflected in the Proposed RMP and Final EIS, which integrates the content of the Draft RMP and Draft EIS and the Supplement. The Comment Analysis Report summarizes all substantive comments received during the 110-day comment period and the BLM responses to those comments. The report is presented in Appendix A.

5.1.7 Future Public Involvement

Public participation efforts will be ongoing throughout the remainder of the process of revising the RMP and developing the EIS. The Proposed RMP and Final EIS considered all substantive oral and written comments received during the comment periods for the Draft RMP and Draft EIS and the Supplement. Members of the public with standing will have the opportunity to protest the content of the Proposed RMP and Final EIS during the specified 30-day protest period. The Record of Decision will be issued by the BLM following the Governor's Consistency Review and protest resolution.

5.2 Consultation and Coordination

This section documents the consultation and coordination efforts undertaken by the BLM throughout the process of revising the RMP and developing the EIS. Title II, Section 202 of the Federal Land Policy and Management Act (FLPMA) directs the BLM to coordinate planning efforts with Native American Tribes, other federal departments, and agencies of the state and local governments as part of its land use planning process. The BLM is directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays (40 Code of Federal Regulations 1500.4-5). The BLM accomplished coordination with other agencies and consistency with other plans through ongoing communications, meetings, and collaborative efforts with the BLM Interdisciplinary Team, which includes BLM specialists, and federal, state, and local agencies.

The BLM is aware that there are specific state laws and local plans relevant to aspects of public land management that are discrete from, and independent of, federal law. However, BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with state and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where state and local plans conflict with the purposes, policies, and programs of federal law there will be an inconsistency that cannot be resolved. While county and federal planning processes, under FLPMA, are required to as integrated and consistent as practical, the federal agency planning process is not bound by or subject to county plans, planning processes, or planning stipulations.

5.2.1 Cooperating Agencies

The BLM invited local, state, federal, and tribal representatives to participate as cooperating agencies on the Bighorn Basin RMP Revision Project and EIS. The BLM invited the following entities to participate because they have jurisdiction by law or because they could offer special expertise:

Counties

- Big Horn County Commission
- Hot Springs County Commission
- Park County Commission
- Washakie County Commission

Conservation Districts

- Cody Conservation District
- Hot Springs Conservation District
- Powell-Clarks Fork Conservation District
- Meeteetse Conservation District
- Shoshone Conservation District
- South Big Horn Conservation District
- Washakie County Conservation District

Wyoming State Agencies

- Office of the Governor
- Department of Agriculture
- Department of Environmental Quality
- Game and Fish Department
- Office of Lands and Investments
- Oil and Gas Conservation Commission
- State Engineer's Office
- State Geological Survey
- State Historic Preservation Office

Federal Agencies

- U.S. Environmental Protection Agency (EPA), Region 8
- U.S. Forest Service – Shoshone National Forest/Wapati Ranger District
- U.S. Forest Service – Bighorn Ranger District

Tribes

- Northern Cheyenne Tribe Tribal Historic Preservation Office
- Crow
- Rosebud Sioux

The BLM formally invited the cooperating agencies to participate in developing the alternatives and RMP and EIS, and to provide data and other information relative to their agency responsibilities, goals, mandates, and expertise. Cooperating agencies provided input during the initial scoping process. The BLM held general meetings with cooperators to discuss procedures and processes. The BLM hosted teleconferences to obtain cooperator input on the Analysis of the Management Situation in February 2009. The BLM and cooperating agencies held several workshops to develop goals and objectives, a range of alternatives, and the Agency Preferred Alternative between March 2009 and February 2010. Cooperating agencies met with the Field Managers to relay concerns and propose options for the Preferred Alternative between October 2009 and February 2010. The BLM and cooperating agencies have routinely met to be orientated to process and procedures and to resolve process related issues. Though not in effect during meetings and consultation with cooperating agencies and the general public leading up the Draft RMP and Draft EIS, the BLM applied the guidance provided in Instruction Memorandum No. WY 2010-033 (BLM 2010d) in future public involvement activities for this revision project, including those with cooperating agencies.

Cooperating agencies were provided an opportunity to submit position statements for publication in the Draft RMP and Draft EIS. The intent of these position statements was to allow the cooperating agencies to express their agreement or disagreement on substantive elements of the alternatives or impacts and whether or not these disagreements were adequately resolved in the Agency Preferred Alternative. No position statements were provided opposing the Agency Preferred Alternative, and only the Wyoming Department of Agriculture and the Washakie County Conservation District provided positions statements for publication in the Draft RMP and Draft EIS, which are also included in this Proposed RMP and Final EIS (Appendix E).

The BLM held an additional cooperating agency workshop on January 31, 2013 to update the cooperators on the status of the RMP revision process and the need to prepare a Supplement to the Draft RMP and Draft EIS to incorporate additional considerations for the protection of greater sage-grouse. The meeting also presented an opportunity for cooperators to discuss and provide input on how impact analyses should be conducted for the new alternatives.

5.2.2 Section 7 Consultation

The Worland and Cody Field Offices contacted the U.S. Fish and Wildlife Service (USFWS) regarding Section 7 of the Endangered Species Act and the Bighorn Basin RMP revision. The BLM sent a scoping letter to the USFWS requesting comments concerning Section 7 consultation and the Bighorn Basin RMP revision project. On November 13 of 2008 the USFWS provided comments on (1) threatened and endangered species, (2) migratory birds, and (3) wetlands and riparian areas. Within these comments was also provided a list of threatened and endangered species likely to occur on BLM-administered land in the Worland and Cody Field Offices, for evaluating BLM Section 7 responsibilities. The USFWS was also provided opportunities to comment on chapters 2 and 4 of the Draft RMP and Draft EIS, and in November and December of 2009 comments were received on both chapters. The Worland and Cody Field Offices continued consultation with the USFWS regarding the RMP revision through completion of

the Final Biological Assessment and Proposed RMP and Final EIS. Consultation letters concerning the Bighorn Basin RMP revision project are located in Appendix E.

5.2.3 Consultation with the Wyoming Historic Preservation Officer

The Worland and Cody Field Offices initiated consultation with the Wyoming State Historic Preservation Office (SHPO) regarding the Bighorn Basin Resource Management Plan revision pursuant to the National Historic Preservation Act and the Wyoming State Protocol Agreement between BLM and the Wyoming SHPO. The BLM formally invited the Wyoming SHPO to be a cooperating agency; to participate in developing the alternatives and RMP and EIS; and to provide data and other information relative to their agency responsibilities, goals, mandates, and expertise concerning. The Wyoming SHPO participated in the development of the Preferred Alternative between March 2009 and February 2010. The BLM also provided the Wyoming SHPO with opportunities to comment on Chapters 2 and 4 of the Draft RMP and Draft EIS. On September 1, 2011 the Wyoming SHPO provided comments on the Draft RMP and Draft EIS regarding prehistoric and historic cultural resources within the Planning Area. The Worland and Cody Field Office continued consultation with the Wyoming SHPO regarding the RMP revision through completion of the Proposed RMP and Final EIS.

5.2.4 Native American Interests

Consultation with Native American tribes is part of the NEPA process and a requirement of FLPMA. The BLM invited Native American tribes to be cooperating agencies as part of the RMP revision and three tribes attended cooperator meetings. On October 10, 2008, the BLM sent letters to the following 11 tribes inviting them to be part of the planning process through consultation and public scoping meetings:

- Blackfeet
- Cheyenne River Sioux
- Crow
- Eastern Shoshone
- Nez Perce
- Northern Arapaho
- Northern Cheyenne
- Oglala Sioux
- Rosebud Sioux
- Salish & Kootenai
- Shoshone Bannock

The consultation letters invited Native American tribes to comment on interests or concerns related to management in the Planning Area and asked tribes to identify any places of traditional religious or cultural importance within the Planning Area. The chairman and cultural contacts for the 11 tribes invited to participate in the planning process are shown in Table 5-2. An example consultation letter between the Native American tribes and the BLM is included in Appendix E.

Following the scoping process, the BLM sent a letter to each of the above tribes requesting specific information to help identify areas of special concern for the tribes and presenting the opportunity for meetings or field trips with tribal representatives. BLM representatives followed these letters with

telephone calls to each tribe. In letters and during the follow-up calls, the BLM stressed its desire for the tribes to review and comment on the Draft RMP and EIS. On December 17, 2008 the BLM met with tribal representatives in Rapid City, South Dakota to discuss the RMP revision. Additional inquiries were made of interested tribes who might desire face-to-face opportunities to discuss RMP issues. In January 2010, Field Managers and staff met with the Northern Cheyenne Tribal Historic Preservation Officer to discuss the Tribe's interest in RMP topics. Government-to-government consultation with the tribes continued throughout the RMP process. In 2013, the BLM sent additional consultation letters to the tribes listed in Table 5-2 informing them of the need to prepare a Supplement to the Draft RMP and EIS, and welcoming continued feedback.

Comments have not been received from any tribe during the scoping period, or the public comment periods on the Draft RMP and Draft EIS, or Supplement, however, consultation is an on-going process.

Table 5-2. Tribal Consultation

State	Tribe	Chairman	Cultural Contact
Idaho	Nez Perce	Silas C. Whitman, Chairman Nez Perce Tribal Executive Committee	Keith "Pat" Baird Tribal Historic Preservation Officer Nez Perce Tribe
Idaho	Shoshone-Bannock	Nathan Small, Chairman Shoshone-Bannock Tribes of the Fort Hall Reservation	Carolyn Boyer Smith Cultural Resource Coordinator HETO/Cultural Resources Shoshone-Bannock Tribes of the Fort Hall Reservation Cleve Davis, Environmental Program Manager Shoshone-Bannock Tribes of the Fort Hall Reservation
Montana	Blackfeet	Harry Barnes, Chairman Blackfeet Tribal Business Council	John Murray Tribal Historic Preservation Officer Blackfeet Tribe
Montana	Crow	Darrin Old Coyote, Chairman Crow Tribal Council	Emerson Bull Chief Tribal Historic Preservation Officer George Reed Director, Cultural Resources Department
Montana	Northern Cheyenne	Llevando "Cowboy" Fisher, President Northern Cheyenne Tribal Council	James Walksalong, Interim Tribal Historic Preservation Officer Northern Cheyenne Tribe
Montana	Confederated Salish and Kootenai	Mr. E.T. "Bud" Moran, Chairman Confederated Salish and Kootenai Tribes of the Flathead Indian Nation	Ms. Marcia Pablo Tribal Historic Preservation Officer Confederated Salish and Kootenai Tribes of the Flathead Indian Nation
South Dakota	Cheyenne River Sioux	Harold Frazier Cheyenne River Sioux Tribal Council	Steve Vance Tribal Historic Preservation Officer
South Dakota	Oglala Sioux	Bryan Brewer, President Oglala Sioux Tribal Council	Michael Catches Enemy Tribal Historic Preservation Officer
South Dakota	Rosebud Sioux	Cyril "Whitey" Scott, President Rosebud Sioux Tribe	Russell Eagle Bear Tribal Historic Preservation Officer Rosebud Sioux Tribe

Table 5-2. Tribal Consultation (Continued)

State	Tribe	Chairman	Cultural Contact
Wyoming	Eastern Shoshone	Darwin St. Clair, Jr., Chairman Eastern Shoshone Tribe of the Wind River Reservation	Wilfred Ferris Tribal Historic Preservation Officer Eastern Shoshone Tribe of the Wind River Reservation
Wyoming	Northern Arapaho	Darrell O' Neal, Sr., Chairman Northern Arapaho Tribe	Yufna Soldier Wolf Tribal Historic Preservation Officer

5.3 Distribution List

The BLM sent postcards announcing the availability of the Bighorn Basin Proposed RMP and Final EIS to all mailing list entries including the public; media; educational institutions; federal, state, and local agencies; clubs, alliances, and societies; and other associations and councils. In addition, the BLM distributed electronic copies of the Proposed RMP and Final EIS to the following entities for their review and comment. Hardcopy documents were distributed to select libraries noted below.

Tribal Governments

- Blackfeet
- Cheyenne River Sioux
- Crow
- Eastern Shoshone
- Nez Perce
- Northern Arapaho
- Northern Cheyenne
- Oglala Sioux
- Rosebud Sioux
- Salish & Kootenai
- Shoshone-Bannock

Local Governments (Counties, Cities, Towns)

Big Horn County, Wyoming

- Big Horn County Commission
- South Big Horn Conservation District

Park County, Wyoming

- Park County Commission
- Cody Conservation District
- Meeteetse Conservation District
- Powell-Clarks Fork Conservation District

Washakie County, Wyoming

- Washakie County Commission
- Washakie County Conservation District

Hot Springs County, Wyoming

- Hot Springs County Commission
- Hot Springs Conservation District

State of Wyoming

- Senator Henry H.R. 'Hank' Coe
- Senator Gerald Geis
- Senator R. Ray Peterson
- Representative Mike Greear
- Representative Elaine Harvey
- Representative Samuel Krone
- Representative Dan Laursen
- Representative David Northrup
- Representative Nathan Winters

Wyoming State Agencies

- Office of the Governor, Environmental Policy Division
- Business Council
- Department of Environmental Quality
  - Air Quality Division
  - Land Quality Division
  - Water Quality Division
- Department of Agriculture
- Department of State Parks and Cultural Resources
  - State Museum
- Department of Transportation
- State Planning Office
- Game and Fish Department
- State Geologic Survey
- Office of State Lands and Investments
- State Engineer's Office
- State Historic Preservation Office
- Department of Administration and Information
- Department of Employment, Research, and Planning Division

Wyoming State Boards/Commissions

- Air Quality Advisory Board
- Board of Wildlife Commissioners
- Agriculture Board
- Environmental Quality Council
- Farm Bureau Federation
- Land Quality Advisory Board
- Livestock Board
- Oil and Gas Conservation Commission
- State Grazing Board
- Trails Council

Congressional Delegation

- U.S. Senator Michael Enzi
- U.S. Senator John Barrasso
- U.S. Representative Cynthia Lummis

U.S. Department of the Interior

- Bureau of Indian Affairs
- U.S. Bureau of Reclamation
- National Park Service
    - Bighorn Canyon National Recreation Area
    - Yellowstone National Park
- U.S. Fish and Wildlife Service
- Bureau of Land Management
    - Washington, D.C.
    - Wyoming State Office, Cheyenne
    - Wyoming Field Offices: Worland and Cody

Other Federal Agencies

- U.S. Environmental Protection Agency
- U.S. Department of Agriculture Forest Service
    - Big Horn National Forest
    - Shoshone National Forest

Libraries

- Park County Library
- Big Horn County Public Library
- Washakie County Library
- Hot Springs County Library

Educational Institutions

- University of Wyoming

Media

Newspapers

- Northern Wyoming Daily News, Worland, Wyoming
- The Independent Record, Thermopolis, Wyoming
- Greybull Standard Tribune, Greybull, Wyoming
- Basin Republican Rustler, Basin, Wyoming
- The Cody Enterprise, Cody, Wyoming
- Powell Tribune, Powell, Wyoming
- Lovell Chronicle, Lovell, Wyoming
- Billings Gazette, Billings, Montana
- Wyoming Livestock Roundup, Casper, Wyoming
- Associated Press, Billings, Montana
- Casper Star Tribune, Casper, Wyoming
- Riverton Ranger, Riverton, Wyoming

Radio

- Big Horn Radio Network: KODI/KZMQ/KTAG/KKLX/KWOR, Cody AM and FM
- KPOW/KLZY, Powell AM and FM
- KTHE, Thermopolis AM
- KWOR/KKLX, Worland AM and FM
- KVOW/KTAK, Riverton AM and FM
- Wyoming Public Radio

5.4 List of Preparers

Table 5-3. List of Preparers

Name	Education (degree, year, school)	Title	Project Role	Years of Experience
Bureau of Land Management				
Holly Elliott	B.S. Environmental Science & Natural Resource Management with emphasis in Environmental Law/Policy, 2001, University of Nevada, Reno	Planning and Environmental Coordinator	Project Manager/Inspector and Team Leader	18
Caleb Hiner	B.S. Geosciences, 2001, Idaho State University	Senior Resource Advisor	Senior Resource Advisor	14
Delissa Minnick	J.D., 2006, University of Wyoming	Field Manager	Cody Field Office Manager	8
Rebecca Good	B.S. Geological Engineering, 1994, South Dakota School of Mines (SDSM&T) B.S. Geology, 1995, SDSM&T	Field Manager	Worland Field Office Manager	21
Jessica Montag	B.S. Recreation Resource Management, 1998, University of Minnesota M.S. Resource Management, 2000, University of Montana; Ph.D. Wildlife Biology, 2004, University of Montana	Economist	Social Conditions/ Economic Conditions	11
Sarah Beckwith	B.A. Environmental Studies and Geography, 1993, University of California, Santa Barbara	Public Affairs Specialist	Public Affairs	17
JoDee Cole	B.A. Anthropology, 1978, Southern Illinois University	Resource Information Specialist	GIS Data Management	37
Kierson Crume	B.A. Anthropology, 1995, University of New Mexico	Archaeologist	Cultural, including National Historic Trails	20
Jared Dalebout	B.A. Geology, 2003, Weber State University	Hydrologist	Water, Riparian/Wetlands, Aquatic Resources, Vegetation (Riparian/Wetland, Grasslands/Shrublands)	8
John Elliott	B.S. Range Management, 1993, University of Wyoming	Rangeland Management Specialist	Livestock Grazing	22
Jim Gates	B.S. Forest Resources, 1996, University of Idaho	Forester	Forestry	21
Monica Goepferd	B.S. Mining Engineering, 2002, Montana Tech	Supervisory Civil Engineer	Transportation, Facilities, Maintenance	11
Destin Harrell	B.A. Biology, 2000, Western State College	Wildlife Biologist	Wildlife, Special Status Species	14

Table 5-3. List of Preparers (Continued)

Name	Education (degree, year, school)	Title	Project Role	Years of Experience
Patricia (Tricia) Hatle	B.S. Range Science, 1991, University of Wyoming	Rangeland Management Specialist	Wild Horses	25
Cam Henrichsen	B.S. Range Science, 1990, South Dakota State University	Range Management Specialist	Wild Horses	24
Karen Hepp	B.S. Range/Wildlife, 1983, University of Nebraska	Rangeland Management Specialist	Rangeland Vegetation, Special Status Species	29
Charis A. Tuers	B.S. Environmental Engineering, 1997, Montana Tech	Air Quality Specialist	Air Quality	13
Gretchen Hurley	B.S. Natural Science & Mathematics, 1981, University of Wyoming	Geologist	Geology, Paleontology, Minerals	33
Rance Neighbors	B.S. Forestry, 2002, Auburn University	Natural Resource Specialist	Invasive Species	11
Paul Rau	B.S. Geography, 2000, University of Wyoming	Outdoor Recreation Planner	Visual Resource Management, OHV, Travel Management, Recreation, and Special Designations	13
David Seward	B.S. Range Management, 1995, University of Wyoming	Natural Resource Specialist	Surface Compliance	20
Carol Sheaff	BLM-Lands Academy, 2003, Northwest Community College, Various courses University of Nebraska, Kearney, Education	Realty Specialist	Lands & Realty, including Transportation/Access and ROWs, Renewable Energy Utility/ Communication Corridors	31 – Retired
Tim Stephens	B.A. Greenville College, 1983 M.S. Environmental Biology, 1985, Emporia State University Teachers Certificate, 1988, Lawrence University, Appleton Wisconsin	Biologist	Fish & Wildlife, Special Status Species	25
Eve Warren	B.S. Wildlife Management, 1991, Utah State University M.S. Conservation Biology, 1993, Utah State University Ph.D. Range Science, 2001, Texas Tech University	Natural Resource Specialist	Rangeland Vegetation	23
Criss Whalley	B.S. Range Management, 1984, Humboldt State University M.S. Plant Science, 1987, University of Nevada, Reno	Rangeland Management Specialist	Livestock Grazing	28
Jim Wolf	B.S. Range Ecology, 1983, Colorado State University	Fire Management Specialist	Fire Ecology, Soil, Vegetation (Grasslands, Shrublands, Special Status Plants)	30

Table 5-3. List of Preparers (Continued)

Name	Education (degree, year, school)	Title	Project Role	Years of Experience
Consultants				
Laura Ziemke	B.A. Anthropology, Boise State University, 1993	Vice President	Project Manager	24
Alex Bartlett	B.G.S. Environmental Studies, emphasis in Environmental Policy, University of Kansas, 2006	Technical Specialist	Deputy Project Manager	8
Nathan Wagoner	M.S. Human Dimensions of Ecosystem Science and Management, Utah State University, Logan, Utah, 2006 B.S. Natural Resources Integrated Policy and Planning, The Ohio State University, Columbus, Ohio, 2003	Senior Project Manager	Deputy Project Manager	12
Kim Stevens	B.S. Geography, University of Utah, 1982	NEPA Specialist	Project Coordinator	12
Dan Nally	M.A. Urban and Environmental Policy and Planning, Tufts University, 2011 B.S. Biology, The College of William and Mary, 2007	NEPA Specialist	Technical Support	4
Karen DiPietro	Communications, Lewes Technical College, England, 1987	Publication Specialist	Editor	24
Jay Haney	M.S. Meteorology, Saint Louis University, 1980 B.S. Meteorology, Saint Louis University, 1978	Air Quality Specialist	Air Quality	33
Rob Fetter	M.S. Resource Economics, University of Massachusetts, 2002 B.S. Resource Economics, University of Massachusetts, 1999	Socioeconomics Specialist	Social Conditions/ Economic Conditions/ Environmental Justice	12
Alex Uriarte	Ph.D. Development Studies, University of Wisconsin, 2000 M.S. Economics, University of Wisconsin-Madison, 1996 M.S. Business Economics, Getúlio Vargas Foundation, São Paulo, Brazil, 1994 B.A. Economics, University of São Paulo, Brazil, 1989	Socioeconomics Specialist	Social Conditions/ Economic Conditions/ Environmental Justice	15
Lissa Johnson	B.A. Anthropology, University of Idaho, 1995	GIS Specialist	GIS	12

Table 5-3. List of Preparers (Continued)

Name	Education (degree, year, school)	Title	Project Role	Years of Experience
Joe Walsh	B.A. Physical Geography, University of California, Santa Barbara, 1993	GIS Specialist	GIS	18
Lucas Bare	MESM, Conservation Planning Specialization, Donald Bren School of Environmental Science & Management, University of California, Santa Barbara, California, 2009 BA, Biology, Bowdoin College, Brunswick, Maine, 2006	Manager	Technical Specialist	13
Randall Coleman	MURP, Urban and Regional Planning, University of Colorado, 2013 B.A. (cum laude), History and Spanish, Trinity University, 2005	Manager	Technical Specialist	8
ICF International	Interdisciplinary Team			
SAIC – now Laidos	Cultural Resources – Interdisciplinary Team			
EMPSi	Prepared: Executive Summary and Greater Sage-grouse Cumulative Effects (Chapter 7)			

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CHAPTER 6 – REFERENCES

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CHAPTER 7 – CUMULATIVE IMPACTS (GREATER SAGE-GROUSE)

7.1 Greater Sage-Grouse Cumulative Effects Analysis: Bighorn Basin

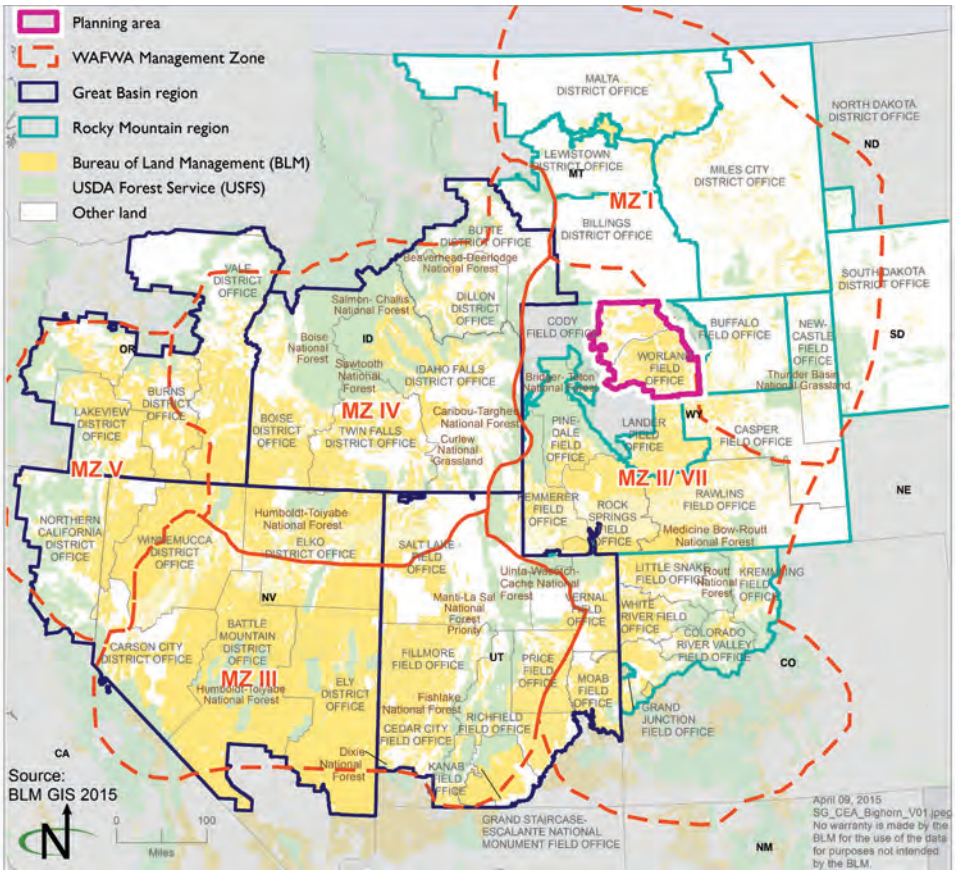
This cumulative effects analysis (CEA) discloses the long-term effects on Greater Sage-Grouse (GRSG) from implementing each RMP/EIS alternative in conjunction with other past, present, and reasonably foreseeable future actions. In accordance with Council on Environmental Quality guidance, cumulative effects need to be analyzed in terms of the specific resource and ecosystem being affected (Council on Environmental Quality 1997). As discussed in Chapter 1, the purpose for the proposed federal action is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. The Western Association of Fish and Wildlife Agencies (WAFWA) delineated seven sage-grouse management zones (MZ) based on populations within floristic provinces as depicted in Figure 7-1 (Stiver et al. 2006). The MZ is the appropriate geographic scope for this analysis because it encompasses areas with similar floristic conditions containing important GRSG habitat. Therefore, the cumulative effects analysis study area for the Greater Sage Grouse extends beyond the Bighorn Basin planning area boundary and incorporates WAFWA Management Zone (MZ) II/VII. MZ II and VII are combined for the purpose of characterizing GRSG habitat conditions and impacts, as was done in the Baseline Environmental Report (Manier et al. 2013). The planning area is almost entirely located within MZ II/VII, with the exception of a small portion on the eastern boundary located in MZ I. This portion of MZ I land contains 76,700 acres of GHMA and 0 acres of PHMA, which represents one tenth of one percent of all GHMA across MZ I; thus the relative influence of cumulative actions in the MZ I portion of the Bighorn Basin RMP planning area would be negligible.

The analysis of BLM actions in MZ II/VII is focused on the GRSG habitat within the MZs and is primarily based on MZ-wide datasets developed by the BLM National Operations Center (NOC). Where quantitative data are not available, analysis is qualitative. This analysis includes past, present and reasonably foreseeable future actions for all land ownerships in the MZ, and evaluates the impacts of the Bighorn Basin RMP, by alternative, when added to those actions. Non-federal actions considered in this analysis include, but are not limited to, the following:

- State plans
- Coordination with states and agencies during consistency reviews
- Additional data from non-BLM-administered lands

The following diagram shows the boundaries of the WAFWA MZs and BLM and Forest Service planning areas. The Bighorn Basin planning area has a relatively small influence in the context of MZ II/VII because it contains relatively few priority habitat management areas (PHMA) or general habitat management areas (GHMA): 1,786,200 acres of PHMA out of 14,105,000 total acres in MZ II/VII; and 3,780,500 acres of GHMA out of 17,771,500 total acres in MZ II/VII). As a result, actions in the Bighorn Basin RMP/EIS may have less cumulative impact on GRSG than those in larger planning areas in MZ II/VII.

Figure 7-1. Western Association of Fish and Wildlife Agencies Greater Sage-Grouse Management Zones



Section 7.1.1 describes the methods used in the analysis. Section 7.1.2 lists assumptions used in the analysis. Section 7.1.3 describes existing conditions in MZ II/VII and in the Bighorn Basin planning area. Section 7.1.4, Regional Efforts to Manage Threats to GRSG, provides a broad-scale description of past, present, and reasonably foreseeable future federal, state, local, and private actions influencing GRSG in MZ II/VII. Section 7.1.5 summarizes the relevant cumulative actions occurring in MZ II/VII. Section 7.1.6 analyzes threats to GRSG in MZ II/VII and discusses the potential cumulative effects resulting from each threat for each alternative. Section 7.1.7, Conclusions, determines the cumulative effects on GRSG as a result of implementing each alternative in the Bighorn Basin RMP, in combination with other private, local, regional, state, and federal past, present, and reasonably foreseeable future actions in MZ II/VII.

7.1.1 Methods

The CEA uses the following methodology:

- Data from the USGS publication "Summary of Science, Activities, Programs, and Policies That Influence the Rangewide Conservation of Greater Sage-Grouse" (Manier et al. 2013) establishes the baseline environmental condition against which the alternatives and other past, present, and reasonably foreseeable future actions are compared. Data from this publication are presented in terms of priority habitat and general habitat.
- The USFWS's 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (USFWS 2010) and the USFWS publication Conservation Objectives: Final Report (i.e., the COT report; USFWS 2013) were reviewed to identify the primary threats facing GRSG in each WAFWA MZ. Table 2 of the COT report lists threats to GRSG that are present and widespread in each population in the MZ.
- For MZ II/VII the list of threats that are directly or indirectly affected by BLM actions are energy development/mining, infrastructure, grazing/free roaming equids, conversion to agriculture/urbanization, fire, spread of weeds, recreation, and conifers (USFWS 2013). Two other threats listed in the COT report, sagebrush eradication and isolation/small population size, affect GRSG populations in MZ II/VII. While they are not addressed separately in this analysis, they are discussed as elements of other threats.
- Predation was not included as a threat in the final COT report and was not identified by USFWS as a significant threat to GRSG populations (USFWS 2010). Predation is a natural occurrence that may be enhanced by human habitat modifications such as construction of infrastructure that may increase opportunities for nesting and perching or increase exposure of GRSG nests. In such altered habitats, predators may exert an undue influence on GRSG populations. Predation is discussed in this CEA in the context of these other threats.
- Sagebrush eradication is a component of many threats. Isolation/small population size is not analyzed separately, because no management actions directly address this threat. These two threats are discussed as a component of other threats and in the conclusions. Not all the threats discussed in this section represent major threats to GRSG in each planning area in the MZ, but each poses a present and widespread threat to at least one population.
- Each threat is analyzed, and a brief conclusion for each threat is provided.
    - The BLM NOC compiled MZ-wide datasets for quantifiable actions in all proposed LUPs within MZ II/VII. These datasets provide a means by which to quantify cumulative impacts resulting from direct impacts of the threats identified in the COT report on BLM-administered lands.
    - The tables in this cumulative analysis display the number of acres across the entire MZ and the percentage of those acres that are located within the Bighorn Basin planning area. The total number of acres in the MZ includes the number of acres in the other BLM and Forest Service proposed plans plus the number of acres in the applicable Bighorn Basin RMP alternative. For example, the total number of acres for Alternative A includes all of the other proposed plans in MZ II/VII plus Bighorn Basin RMP Alternative A. Likewise, the Alternative B acreage includes all of the other proposed plans in MZ II/VII plus Bighorn Basin RMP Alternative B.
    - Data and information were gathered from other federal, state, and local agencies and tribal governments, where available, and were used to inform the analysis of cumulative impacts on GRSG from each of the threats in MZ II/VII.

- A discussion is provided for each alternative in Section 7.1.7. Each alternative considers the cumulative impacts on GRSG from each of the threats. It also considers whether those threats can be ameliorated via implementation of that particular alternative in conjunction with past, present, and reasonably foreseeable non-BLM/Forest Service and BLM actions in MZ II/VII.
- The list of reasonably foreseeable future actions was derived from each proposed BLM/Forest Service RMP in MZ II/VII to provide an MZ-wide overview of the ongoing and proposed land uses in both MZs.
- Baseline data that are consistent across planning areas and that analyze cumulative effects for each alternative, including the No Action Alternative and Proposed Plan, are used in this analysis.
- PHMA and GHMA were developed to protect the best habitat and highest population density of GRSG. Although PHMA and GHMA are not designated under Alternative A, spatial data was clipped to these boundaries by the BLM's NOC to provide a consistent lens for comparison across all alternatives.
- This analysis uses the most recent information available. For purposes of this analysis, the BLM has determined that the Proposed Plans for the other ongoing GRSG planning efforts in MZ II/VII are reasonable foreseeable future actions.

7.1.2 Assumptions

This cumulative analysis uses the same assumptions and indicators as those established for the analysis of direct and indirect effects on GRSG in Section 4.4.9. In addition, the following assumptions are have been made:

- The timeframe for this analysis is 20 years.
- The CEA area extends beyond the planning area and encompasses all of WAFWA MZ II/VII.
- The magnitude of each major threat would vary geographically and may have more or less impact on GRSG in some parts of the MZs, depending on factors such as climate, land use patterns and topography.
- A management action within an alternative would contribute a net conservation gain to GRSG if its effect is to reduce the level of a threat to GRSG from the level detailed in the 2010 USFWS listing decision for GRSG (USFWS 2010). A net conservation gain is equivalent to an actual benefit or gain above baseline conditions. Baseline conditions are defined as the pre-existing conditions of a defined area and/or resource that can be quantified by an appropriate metric(s).
- The CEA quantitatively analyzes GRSG and their habitat in the MZ. Impacts on habitat are likely to correspond to impacts on populations within MZ II/VII, since reductions or alterations in habitat could affect reproductive success through reductions in available forage or nest sites. Human activity could cause disturbance to the birds preventing them from mating or successfully rearing offspring. Human activities could also increase opportunities for predation, disease, or other stressors (Connelly et al. 2004; USFWS 2010; Manier et al 2013).
- In order to have consistency of analysis across the various planning areas within the MZ, the proposed Connectivity Areas have been classified as PHMA for cumulative analysis.

7.1.3 Existing Conditions in WAFWA MZ II/VII, and the Bighorn Basin Planning Area

This section summarizes existing conditions and past and present actions in the Bighorn Basin RMP planning area (provided in more detail in Chapter 3) and MZ II/VII as a whole. Reasonably foreseeable future actions are discussed in Section 7.1.5.

GRSG Habitat and Populations

MZ II/VII consists of nine populations: Eagle-South Routt, Middle Park, Laramie, Jackson Hole, Wyoming Basin, Rich-Morgan, Uintah, North Park, and Northwest Colorado. The bulk of the Bighorn Basin RMP planning area constitutes the Wyoming Basin population, which contains the largest regional extent and highest breeding density of GRSG in the western U.S. Leks in the northern portion of MZ II/VII are the most highly connected in the range (Knick and Hanser 2011), while populations in southern portions of MZ II/ VII (i.e., the Colorado Plateau) are less robust, with low lek connectivity and a 96 percent chance of populations declining below 200 males by 2037 (Garton et al. 2011; Knick and Hanser 2011).

In MZ II/VII, state and private lands account for approximately 43 percent of GRSG habitat, with BLM-administered and other federal land accounting for 57 percent (Manier et al. 2013, p. 118). The BLM also has some management authority over split-estate lands, with privately held surface land and federal subsurface mineral rights. The higher percentage of GRSG habitat on BLM-administered and other federal land means BLM management could play a key role in alleviating threats to GRSG across MZ II/VII; however, the Bighorn Basin planning area has a small footprint relative to other planning areas in MZ II/VII.

Table 7-1 provides a breakdown of landownership and acres of GRSG habitat in MZ II/VII. As the table shows, approximately 30 percent of priority habitats, and 30 percent of general habitats are on BLM-administered lands. In the Bighorn Basin planning area, there are approximately 5.6 million acres of GRSG habitat, including approximately 3.1 million acres (56 percent) on BLM-administered lands. The remaining 2.5 million acres (44 percent) of GRSG habitat comprise private, local state, and other federal and tribal lands.

Table 7-1. Management Jurisdiction in MZ II/VII by Acres of Priority and General Habitats

	Total Surface Area (Acres)	Priority (Acres)	General (Acres)	Non-habitat (Acres)
MZ II and VII	92,776,100 (100%)	17,476,000 (19%)	19,200,200 (21%)	56,099,900 (60%)
BLM	30,295,000 (33%)	9,021,200 (30%)	9,012,500 (30%)	12,261,300 (40%)
Forest Service	23,558,800 (25%)	162,000 (<1%)	452,500 (2%)	22,944,300 (97%)
Tribal and Other Federal	7,086,200 (8%)	784,000 (11.1%)	1,354,600 (19%)	4,947,600 (51%)
Private	27,405,400 (30%)	6,233,900 (22%)	7,394,800 (27%)	13,776,700 (50%)
State	4,053,900 (4%)	1,244,800 (31%)	979,800 (24%)	1,829,300 (45%)
Other	376,700 (<1%)	30,100 (8%)	6,000 (2%)	340,600 (90%)

Source: Manier et al. 2013, p. 118

BLM Bureau of Land Management
MZ Management Zone

Planning Area Habitat Conditions

Much of the Bighorn Basin RMP planning area is characterized by sagebrush shrub, foothill mountain sage and shrub, and desert salt shrub and greasewood. Livestock grazing, fire, fire suppression, and surface-disturbing activities have influenced many grassland/shrub vegetation types within the planning area. Leks within the planning area are generally located at mid-elevation sagebrush habitats. Nesting and brood-rearing habitat is sometimes associated with the lek and sometimes found at a distance from the lek in sagebrush habitat. No SFAs are located within the planning area.

Population Trends in Management Zone II/VII

The Wyoming Basin population within MZ II/VII is the largest population in the GRSG range with over 20,000 males attending leks annually. Although recent data suggests a population increase, long-term monitoring is trending downward and population modeling suggests this trend will continue (Garton et al. 2011).

Wyoming data suggest a cyclic pattern, with population lows in 1995, 2002 and 2013, and peaks in 2000 and 2006. Actual trends are difficult to discern due to the lower survey effort prior to 2007, meaning the number and proportion of active to inactive leks is unknown. Since 2007, the number of active leks in Wyoming has remained stable (approximately 1,100 active leks), but the number of males/active lek has declined by more than half (from 42 to 17 males/lek). (Christiansen 2013). Garton et al. (2015, p. 33) found that between 2007 and 2013, the Wyoming Basin population showed a 63 percent decline in the estimated minimum male population attending leks.

The isolation of many other populations on the fringes of MZ II/VII makes them particularly vulnerable to habitat loss and fragmentation. Subpopulation areas at greatest risk include the Laramie and Jackson Hole subpopulation areas, which are close to energy development and recreational areas and face fragmentation risk from infrastructure (USFWS 2013).

7.1.4 Regional Efforts to Manage Threats to GRSG

Across the Greater Sage-Grouse range, other BLM and Forest Service sub-regions are undergoing RMP revision or amendment processes similar to this one for the Bighorn Basin planning area. The Final EIS associated with each of these efforts has identified a Proposed Plan that meets the purpose and need of conserving, enhancing, and/or restoring GRSG habitat by reducing, eliminating, or minimizing threats. The management actions from the various Proposed Plans will cumulatively decrease the threat of GRSG habitat loss and will limit fragmentation throughout the range. Key actions present in many of the Proposed Plans include changes in land use allocations, mitigation framework, an adaptive management strategy, anthropogenic disturbance cap, and protective management actions in priority and general habitat areas.

The BLM has incorporated management of Sagebrush Focal Areas (SFAs) into its proposed plan management approach for GRSG. SFAs are a subset of PHMA and represent recognized “strongholds” for the species that have been noted and referenced by the conservation community as having the highest densities of the species and other criteria important for the persistence of the species. Portions of the SFAs that are located on BLM-administered and National Forest System lands would be petitioned for withdrawal from mineral entry, and are prioritized for management and conservation actions, including, but not limited to, review of livestock grazing permits/leases. Management of SFAs would enhance protection of GRSG in these areas, providing a net conservation gain to the species in light of other past, present, and reasonably foreseeable future actions considered in this CEA. Within MZ II/VII

there are two SFAs (Bear River Watershed Area, and Southwestern/South Central Wyoming), totaling approximately 3,895,500 acres.

The WAFWA Sage-Grouse Strategy (Stiver et al. 2006) outlines a plan for monitoring, research, outreach, and funding for conservation projects for GRSG. A basic premise of the WAFWA Sage-Grouse Strategy is that additional conservation capacity must be developed at all local, state, federal, and range-wide levels for both the short term (3 to 5 years) and for the long term (10 years or more) to ensure GRSG conservation.

Wyoming Statewide Efforts

Wyoming has established Core Population Areas to help delineate landscape planning units by distinguishing areas of high biological value. These areas are based on the locations of breeding areas and are intended to help balance GRSG habitat requirements with demand for energy development (Doherty et al. 2011).

In 2000, the Wyoming Sage-Grouse Working Group (WSGWG) was formed to develop a statewide strategy for GRSG conservation. This group prepared the Wyoming GRSG Conservation Plan (WSGWG 2003) to provide coordinated management and direction across the state. In 2004, local GRSG working groups were formed to develop and implement local conservation plans. Eight local working groups around Wyoming have completed conservation plans, many of which prioritize addressing past, present, and reasonably foreseeable threats at state and local levels, and prescribe management actions for private landowners to improve GRSG conservation at the local scale, consistent with the overall Wyoming Core Strategy. The Northeast Wyoming Sage-Grouse Conservation Plan was completed in 2006 and was updated in 2014 (Northeast Wyoming Sage-grouse Working Group 2014). The local and regional working group plans would assist in GRSG conservation through monitoring, public awareness, and voluntary conservation actions on private land.

Wyoming Executive Order

Wyoming Governor Matt Mead issued an executive order on June 2, 2011 that complemented and replaced several executive orders issued by his predecessor. The 2011 Wyoming executive order articulates the State's Core Population Area Strategy (Core Area Strategy) as an approach to balancing GRSG conservation and development. It also provides an approach to mitigating human disturbances to GRSG.

The Wyoming executive order applies to state trust lands starting in 2008. These trust lands cover almost 23 percent of GRSG habitat and benefit approximately 80 percent of the estimated breeding population in the state (USFWS 2010). All proposed activities are evaluated through a density/disturbance calculation tool to determine if the project would exceed recommended density/disturbance thresholds. Additionally, the order has stipulations to be included in such permits, with varying restrictions, depending on whether the proposed development activity occurs within or outside delineated Core Population Areas (Wyoming Executive Order, June 2, 2011).

In Core Areas, there is a 0.6-mile no surface occupancy (NSO) buffer around occupied leks and restrictions on activities in breeding and winter concentration habitat. Wyoming's Industrial Siting Council, which permits large development projects on all lands in the state, is subject to the terms of the executive order. This buffer provides protection for males during lekking season and acts in coordination with the density disturbance cap. The combination of protections could offer GRSG considerable regulatory protection when large wind energy and other development projects are being considered in Wyoming (USFWS 2010; Manier et al. 2013). Statewide modeling of trends under the

Core Area Strategy suggests that with effective enforcement statewide, the strategy could reduce population losses by 9 to 15 percent across Wyoming. Moreover, the number of Core Areas predicted to maintain 75 percent of their current populations could increase from 20 to 25 under long-term scenarios (Copeland et al. 2013). Combining the Core Area Strategy with $250 million in target conservation easements (provided willing landowners and funding are available) could reduce population declines by another 9 to 11 percent (Copeland et al. 2013).

Core Population Areas in Wyoming also incorporate connectivity corridors (Wyoming Executive Order 2011). These are areas GRSG use to maintain connectivity between habitat areas (Manier et al. 2013). Connectivity reduces isolation, thereby also reducing a population's vulnerability to disease, drought, or other events that may result in extirpation.

Umbrella Candidate Conservation Agreement with Assurances for Wyoming Ranch Management

Candidate Conservation Agreements with Assurances are voluntary conservation agreements between the USFWS and one or more federal or private partners (e.g., the ranchers). In return for managing lands to benefit GRSG, landowners receive assurances against additional regulatory requirements should GRSG be listed under the Endangered Species Act. Within Wyoming, the USFWS and Wyoming Governor's Office in conjunction with the BLM, Natural Resources Conservation Service, Forest Service, and other agencies, have developed an umbrella Candidate Conservation Agreement with Assurances for range management activities. Enrolled landowners are expected to comply with grazing specific conservation measures including but not limited to: avoid (or rotationally utilize) known nesting and brood-rearing habitat as a location for activities that concentrate livestock such as stock tank placement branding and roundup; place salt or mineral supplements in sites minimizing impacts to GRSG habitat; and within 24 months develop and implement a written grazing management plan to maintain or enhance the existing plant community as suitable GRSG habitat (USFWS et al. 2013).

Sweetwater River Conservancy Habitat Conservation Bank

The Sweetwater River Conservancy Habitat Conservation Bank is the first conservation bank established for GRSG. Located in central Wyoming, the bank manages habitat for GRSG allowing energy development and other activities to proceed on other lands within Wyoming. A conservation bank is a site or suite of sites established under an agreement with the USFWS, intended to protect, and improve habitat for species. Credits may be purchased which result in perpetual conservation easements and conservation projects on the land to offset impacts occurring elsewhere. The Sweetwater River Conservancy Habitat Conservation Bank launched with 55,000 deeded acres of GRSG habitat, and could expand up to 700,000 acres on other lands owned by the Sweetwater River Conservancy contingent upon demand (USFWS 2015).

Wyoming Landscape Conservation Initiative

The Wyoming Landscape Conservation Initiative is a long-term science based effort to assess and enhance aquatic and terrestrial habitats at a landscape scale in southwest Wyoming, while facilitating responsible development through local collaboration and partnership. Collaborative efforts address multiple concerns at a scale that considers all activities on the landscape, and can leverage resources that might not be available for single agency projects. GRSG initiatives from the Wyoming Landscape Conservation Initiative have included habitat enhancement efforts (e.g., invasive weed treatment, prescribed grazing strategies), and GRSG research studies (Wyoming Landscape Conservation Initiative 2013).

Montana Statewide Efforts

The Montana Department of Fish, Wildlife and Parks (MFWP) is tasked with implementing the range-wide WAFWA Sage-Grouse Strategy (Stiver et al. 2006) in Montana.

In addition, the MFWP's Montana Management Plan and Conservation Strategy for Sage-Grouse was initiated in 2005 to protect, maintain, and restore GRSG habitat. The plan ranks threats to the species across the state and provides an overall strategy for public and private cooperation in conservation actions. In 2013, the governor established the Greater Sage-Grouse Habitat Conservation Advisory Council to provide recommendations on policies and actions for GRSG conservation and provide regulatory authority for conservation actions. The council provided these recommendations in January 2014. The governor subsequently issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for future GRSG conservation in Montana.

Montana Executive Order

The Montana governor issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for GRSG conservation in Montana. Stipulations for development in the executive order and Montana Management Plan and Conservation Strategy for Sage-Grouse include but are not limited to:

- A 0.6-mile NSO buffer around the perimeter of active leks for new activities;
- Locating new overhead power lines and communication towers a minimum of 0.6 mile from the perimeter of active leks;
  A minimum 2.0-mile buffer from active lek perimeters for main roads and a minimum 0.6-mile buffer for facility site access roads;
- A 5 percent limit on anthropogenic surface disturbance within the Density and Disturbance Calculation Tool examination area (based upon suitable habitat); and
- As authorized by permitting agency or agencies, activities (production, maintenance and emergency activity exempted), will typically be prohibited from March 15 through July 15 outside of the NSO perimeter of an active lek and within 2 miles of that perimeter in Core Population Areas where breeding, nesting, and early brood-rearing habitat is present.

Specifically, the following measures which would be implemented under the Proposed Plan, or are considered reasonably foreseeable future actions, would help meet the COT report objectives:

- Managing ROW exclusion and avoidance areas would help meet the COT report objective for infrastructure by limiting ROW/SUA development within PHMA. These actions would also help to meet the COT objectives for non-native, invasive plant species by reducing disturbances that promote the spread of weeds.
- Designating major and moderate oil and gas stipulations would limit development in PHMA, except where pre-existing valid rights apply. In these areas Conditions of Approval would limit disturbance.
- Implementation of state conservation plans and/or state executive orders would help meet all COT report objectives, particularly on non-BLM and non-National Forest System lands. Applying a 5 percent disturbance limit (under the Wyoming and Montana GRSG plans/executive orders) would reduce impacts contributing to population declines and range erosion associated with multiple threats including energy, mining, and infrastructure.

- Prioritizing conifer treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or 2, would reduce the rate of pinyon-juniper incursion and help to maintain healthy native sagebrush plant communities.
- Continued implementation of the Natural Resource Conservation Service Sage-Grouse Initiative would help meet the COT objective for the threat of agriculture conversion, by securing conservation easements on private lands. Fence marking, implementing prescribed grazing systems, and vegetation seeding would help meet the COT objectives for range management structures, grazing, and non-native, invasive plant species.

The approach of the Montana executive order/Montana Management Plan and Conservation Strategy for GRSG is similar to the Wyoming executive order. Montana's plan will apply a disturbance cap in core habitat and will limit well density and apply timing limitations. The 0.6-mile buffer would protect males in the vicinity of leks during the breeding season; the density limits and disturbance cap would protect GRSG during nesting, brood-rearing, and winter concentration activities. The timing restrictions would reduce the potential for displacement or disruption during the breeding season.

Colorado Statewide Efforts

In 2008, the Colorado Division of Wildlife (now Colorado Parks and Wildlife [CPW]) developed a state conservation plan, which prioritized threats and identified key issues facing conservation. The plan included issues, objectives, and strategies in detail. The strategies for conservation discussed responsible parties, lead agency, timeline, and cost associated with implementation of the strategy.

In 2012, a state conservation plan revision process began, and in consultation with stakeholders, a matrix summarizing implementation and effectiveness of the strategies was developed (Colorado Package), along with a subsequent Synthesis Report. The Colorado Package identified a number of conservation efforts within Colorado which have resulted in positive impacts to GRSG including acquisition of conservation easements and habitat improvement projects (Colorado Department of Natural Resources 2013). The Synthesis Report provided additional information on the effectiveness of conservation efforts such as county zoning ordinances which support protection of GRSG habitat, and measures from the Colorado State Board of Land Commissioners (SLB) which will support adaptive management techniques to improve GRSG habitat (Colorado Department of Natural Resources 2014).

Utah Statewide Efforts

The Conservation Plan for Greater Sage-grouse in Utah (Utah Division of Wildlife Resources 2013) was designed to protect, enhance, and restore GRSG habitat, in an effort to reduce the threats to the species. The plan identifies 11 sage grouse management areas throughout the state (including lands within MZ II/VII), which represent areas of high habitat value. The plan calls for state and local efforts to obtain incentive-based negotiated covenants, easements, leases or other legal tools in order to protect habitat. Additionally, the plan identifies a five percent disturbance limitation of habitat on state or federally managed lands, intended to limit the effects of large scale disturbances.

Idaho Statewide Efforts

In 2006, Idaho developed a statewide plan for the conservation of GRSG (Idaho Sage-grouse Advisory Committee 2006). The plan includes a toolbox of conservation measures to address threats to the species, as well as research, monitoring, and evaluation guidelines and recommendations. The plan was designed to provide guidance, tools, and resources to the local working groups in Idaho, and to facilitate

development of their plans. Rural Fire Protection Districts have been established within the state to help suppress fires in GRSG habitat.

Similar to efforts in nearby states, the governor of Idaho is expected to issue an executive order providing direction for GRSG conservation in Idaho on state lands. This executive order is expected to be largely consistent with BLM and Forest Service direction, though exact details are not known and are speculative as of the time this FEIS is published.

Natural Resource Conservation Service Sage Grouse Initiative

The Natural Resource Conservation Service's (NRCS) Sage Grouse Initiative (SGI) is working with private landowners in 11 western states to improve habitat for GRSG (Manier et al. 2013). With approximately 31 percent of all sagebrush habitats across the range in private ownership (Stiver 2011, p. 39), including 37 percent of priority and general habitat in MZ II/VII (Manier et al. 2013, p. 118), a unique opportunity exists for the NRCS to benefit GRSG and ensure the persistence of large and intact rangelands by implementing long term contracts and conservation easements.

Participation in the SGI program is voluntary, but willing participants enter into binding contracts to ensure that conservation practices that enhance GRSG habitat are implemented. Participating landowners are bound by a contract (usually 3 to 5 years) to implement, in consultation with NRCS staff, conservation practices if they wish to receive the financial incentives offered by the SGI. These financial incentives generally take the form of payments to offset costs of implementing conservation practices and easements or rental payments for long-term conservation.

While potentially effective at conserving GRSG populations and habitat on private lands, incentive-based conservation programs that fund the SGI generally require reauthorization from Congress under subsequent farm bills, meaning future funding is not guaranteed.

As of 2015, SGI has secured conservation easements on 243,400 acres within MZ II/VII (NRCS 2015). On these and additional lands in the MZ, SGI has completed specific GRSG conservation actions, including implementation of grazing systems, conifer removal, vegetation seeding, and fence marking. These conservation actions are targeted at the critical threats in the MZ. Additionally, SGI clusters implementation to achieve landscape benefits (NRCS 2015).

Other Regional Efforts

A programmatic EIS by the Western Area Power Administration (WAPA) and the USFWS for the entire upper Great Plains will focus future wind energy developments in specific corridors outside of GRSG core habitat (WAPA 2013). In accordance with Section 7 of the ESA, preparation of the programmatic EIS has involved consultation between cooperating entities and the USFWS and preparation of a programmatic Biological Assessment to ensure that the action will not jeopardize the continued existence of any federally-listed species, including the federal candidate GRSG. At the time of this RMPA specific conservation measures for protecting GRSG and its habitat under the programmatic EIS are not developed.

Tribes, counties, and local working groups are playing a critical role in promoting GRSG conservation at the local level. Individual conservation plans have been prepared by most local working groups to develop and implement strategies to improve or maintain GRSG habitat and reduce or mitigate threats. The proposed conservation actions and recommendations in these plans are voluntary actions. The conservation plans located in Wyoming are used as instruments to inform the Wyoming executive order.

Local working group projects include monitoring, research, and mapping habitat areas, as well as public outreach efforts, such as landowner education and collaboration with federal, state, and other local entities. These efforts provide a net conservation gain to GRSG through increased monitoring and public awareness.

Local working group GRSG conservation plans in MZ II/VII include the following:

- Northwest Colorado (Northwest Colorado Greater Sage-Grouse Conservation Plan; 2008)
- Piceance/Parachute Roan Creek (Parachute-Piceance-Roan Greater Sage-Grouse Conservation Plan; 2008)
- Northern Eagle/Southern Routt (Northern Eagle County and Southern Routt County Greater Sage-Grouse Conservation Plan; 2004)
- North Park (North Park Greater Sage-Grouse Conservation Plan; 2001)
- Middle Park (Middle Park Sage Grouse Conservation Plan; 2001)
- Rich County (Rich County Sage-grouse Conservation Plan; 2006)
- Morgan-Summit (Morgan-Summit Greater Sage-Grouse Local Conservation Plan; 2006)
- Uintah Basin (Uinta Basin Greater Sage-Grouse Local Conservation Plan; 2007)
- Upper Green River Basin (Upper Green River Basin Sage-Grouse Grouse Conservation Plan; 2007)
- Upper Snake River Basin (Upper Snake River Basin Sage-Grouse Conservation Plan; 2008)
- Wind River/Sweetwater River Basin (Wind River/Sweetwater River Local Sage-Grouse Conservation Plan; 2007)
- Southwest Wyoming (Southwest Wyoming Sage-grouse Conservation Assessment and Plan; 2007)
- South Central Wyoming (South Central Sage-Grouse Conservation Plan; 2007)
- Bates Hole/Shirley Basin (Bates Hole/Shirley Basin Sage-grouse Conservation Plan; 2007)
- Bighorn Basin, Wyoming (Sage grouse Conservation Plan for the Bighorn Basin; Bighorn Basin Sage-grouse Local Working Group; 2007)

7.1.5 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Bighorn Basin RMP and alternatives in combination with other past, present, and reasonably foreseeable future federal and non-federal action on all lands in MZ II/VII. Where these occur within GRSG habitat, they would cumulatively add to the impacts of BLM- and Forest Service-authorized activities set forth in the Bighorn Basin Proposed Plan. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, private, or mixed landownership in MZ II/VII are described in the Proposed RMPAs/LUPAs for Northwest Colorado. The following list includes large-scale past, present, and reasonably foreseeable future actions in MZ II/VII that when added to the Proposed Plan and alternatives for the Bighorn Basin RMP, could cumulatively affect GRSG (see Table 7-12 for more detail):

- Hiawatha Regional Energy Development EIS
- LaBarge Platform Exploration & Development Project
- Continental Divide-Creston Natural Gas Project

- Moneta Divide Natural Gas and Oil Development Project
- Pinedale Anticline Project
- Black Fork Project (Formerly Moxa Arch Area Infill)
- Oil Shale and Tar Sands Programmatic EIS
- Atlantic Rim Natural Gas Field Development Project
- Chokecherry Sierra Madre Wind Farm
- Gateway South Transmission Line Project
- TransWest Express Transmission Line Project
- Gateway West Transmission Line Project
- Riley Ridge o Natrona Pipeline Project
- Invasive Plant Management EIS for the Medicine Bow – Routt National Forests, and Thunder Basin National Grassland
- Normal-Pressured Lance Natural Gas EIS
- Bird Canyon Field Infill EIS

These projects are incorporated into the following analysis as the relevant past, present, and reasonably foreseeable future projects associated with each threat to GRSG in MZ II/VII.

7.1.6 Threats to GRSG in MZ II/VII

The COT Report identifies the present and widespread threats facing GRSG in MZ II/VII as identifies energy development; infrastructure; grazing, including free-roaming equids; conversion to agriculture and urbanization; fire; spread of weeds; and recreation (USFWS 2013). These threats impact GRSG mainly by fragmenting and degrading their habitat. For example, the loss of sagebrush steppe across the West approaches or exceeds 50 percent in some areas. Habitat fragmentation and degradation is a primary factor in long-term declines in GRSG abundance across its historical range (USFWS 2010).

Habitat fragmentation reduces connectivity of populations and increases the likelihood of extirpation from random events such as drought or outbreak of West Nile virus. Furthermore, climate change is likely to affect habitat availability to some degree by decreasing summer flows and limiting growth of grasses and forbs, thereby limiting water and food supply (BLM 2012). Sensitive species such as GRSG, which are already stressed by declining habitat, increased development, and other factors, could experience additional pressures as a result of climate change.

Each COT report threat considered "present and widespread" in at least one population in MZ II/VII is discussed below. For more detail on the nature and type of effects and the direct and indirect impacts on GRSG in the planning area, see Chapter 4 of the Bighorn Basin PRMP/FEIS.

7.1.6.1 Energy Development

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing GRSG population trends. For mining, the COT objective is to maintain stable to increasing GRSG populations and no net loss of GRSG habitats in areas affected by mining (USFWS 2013).

There are approximately 1,144,800 acres of GRSG habitat in MZ II/VII where energy development, including oil and gas, coal leasing, mineral materials, and non-energy leasable minerals, is occurring. In

addition, there are over 30,000,000 acres indirectly influenced by energy development (Manier et al. 2013, pp. 55-71).

Oil and Gas

Nature and Type of Effects

As discussed in Chapter 4, oil and gas development impacts GRSG and sagebrush habitats through direct disturbance and habitat loss from well pads, construction activities, seismic surveys, roads, power lines, and pipeline corridors. Indirect disturbances result from noise, gaseous emissions, vehicle traffic, changes in water availability and quality, and human presence. These factors could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004; Holloran 2005).

Oil and gas development also directly impacts GRSG through the species' avoidance of infrastructure. This development can also impact GRSG survival or reproductive success. Indirect effects include habitat quality changes, predator communities, and disease dynamics (Naugle et al. 2011).

Several studies completed in the Great Plains and Wyoming Basin have shown that breeding GRSG populations are affected at oil and gas well densities commonly permitted in Montana and Wyoming (Naugle et al. 2011). Doherty et al. (2010) found that although impacts were indiscernible at densities of less than one well per square mile, lek losses were two to five times greater in areas with development above this threshold. They also found that the abundance (number) of males per lek at the remaining leks declined by approximately 30 to 80 percent. These and other studies demonstrate that both direct and indirect impacts result from the impacts of energy development and geophysical exploration in GRSG habitat.

Studies have researched the efficacy of NSO stipulations for leasing and development within certain distances of a lek (Holloran 2005; Walker et al. 2007). Walker et al. (2007) found that in the Powder River Basin, buffer sizes of 0.25, 0.5, 0.6, and 1.0 mile resulted in an estimated lek persistence (the ability of leks to remain on the landscape) of approximately 5, 10, 15, and 30 percent, respectively; conversely, lek persistence in areas without oil and gas development averaged approximately 85 percent. 0.25-mile NSO lease stipulations were found to be insufficient to conserve breeding GRSG populations in Wyoming and Montana, when nearly 100 percent of the area within approximately 2 miles of leks remained open to full-scale development (Walker et al. 2007).

Research has also studied the effects of energy development on GRSG at distances greater than one mile. Naugle et al. (2011) reported that impacts of energy development on leks had been documented at distances greater than 3.5 miles from the lek. Holloran (2005) found impacts on abundance at a distance between 3 and 4 miles in western Wyoming. However, Naugle et al. (2011) also stated that impacts on leks caused by energy development were most severe nearer the lek.

The impacts of well density have also been researched. Naugle et al. (2011) found that impacts from energy development often extirpate leks from gas fields. Doherty (2008) documented that lek losses increased and male abundance decreased as well density increased in the Powder River Basin. Lek extirpation in areas with 8 wells per section (40 to 100 wells total) within 2 miles of the lek was 5 times more likely to occur than in areas with no wells within 2 miles. Male attendance at the remaining leks in these areas declined approximately 20 to 60 percent (Doherty 2008).

The effects of noise on GRSG have been quantified in several studies. Lyon and Anderson (2003) reported that oil and gas development influenced the rate of nest initiation of GRSG in excess of approximately 2 miles of construction activities. GRSG numbers on leks within approximately 1 mile of natural gas compressor stations in Campbell County, Wyoming, were consistently lower than numbers

on leks unaffected by this noise disturbance (Braun et al. 2002). Holloran and Anderson (2005) reported that lek activity decreased downwind of drilling activities, suggesting that noise caused measurable impacts. In addition to activities directly associated with oil and gas development, road traffic also generates noise. Knick et al. (2003) indicated that there were no active GRSG leks within approximately 1 mile of Interstate 80 across southern Wyoming; only 9 leks were known to occur between approximately 1 and 2.5 miles of Interstate 80.

Conditions in MZ II/VII

The Greater Green River Basin, Uintah-Piceance Basin, and North Park Basin are all important oil and gas reserves in MZ II/VII.

Oil and natural gas development-related wells indirectly influence 78 to 84 percent of priority habitats and general habitats respectively across MZ II/VII. BLM-administered lands are host to 54 percent of wells in priority habitats and 50 percent in general habitats within MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the adverse impacts of oil and gas development on GRSG habitat than any other single land management entity.

Oil and gas conservation measures across MZ II/VII are more widespread than in the past. Much oil and gas development on private lands previously occurred with minimal mitigation efforts, but restrictions are now in place to protect GRSG habitat under the Wyoming and Montana executive orders. Additionally, in Colorado, operators may be subject to consultation requirements under the Colorado Oil and Gas Conservation Commission rules, to determine if conditions of approval are necessary to minimize adverse impacts from proposed oil and gas operations in sensitive wildlife habitat (such as GRSG PHMA).

Impact Analysis

Table 7-2, Acres Open and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ II/VII, and Table 7-3, Acres with NSO and CSU/TL Stipulation in GRSG Habitat in MZ II/VII, provide a quantitative summary of present fluid mineral leasing conditions on BLM-administered lands across MZ II/VII. An analysis of this summary along with other past, present, and reasonably foreseeable actions in MZ II/VII (Table 7-12) follows.

As stated under Methods and Assumptions, acreages in these tables are limited to BLM-administered lands and always assume implementation of Proposed Plans in other RMP planning areas across MZ II/VII. Tables displaying fluid mineral acreage include the federal mineral estate.

Table 7-2. Acres Open* and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open* to Fluid Mineral Leasing				
Alternative A	208,000	100%	2,522,000	43%
Alternative B	0	0%	1,875,000	20%
Alternative C	0	0%	3,949,000	62%
Alternative E	0	0%	1,854,000	19%
Alternative F	0	0%	2,370,000	37%
Proposed Plan	0	0%	2,378,000	37%
Closed to Fluid Mineral Leasing				
Alternative A	1,266,000	3%	1,142,000	18%
Alternative B	2,715,000	55%	1,825,000	49%
Alternative C	1,224,000	0%	1,083,000	13%
Alternative E	2,715,000	55%	1,825,000	49%
Alternative F	1,290,000	5%	1,133,000	17%
Proposed Plan	1,290,000	5%	1,165,000	19%

Source: BLM 2015

*Open with standard lease terms and conditions. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

Table 7-3. Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
NSO Stipulations				
Alternative A	4,102,000	14%	1,277,000	25%
Alternative B	3,546,000	0%	1,876,000	49%
Alternative C	3,546,000	0%	1,044,000	8%
Alternative E	3,546,000	0%	1,913,000	50%
Alternative F	4,442,000	20%	1,273,000	25%
Proposed Plan	4,442,000	20%	1,281,000	25%
CSU/TL Stipulations				
Alternative A	5,562,000	12%	6,679,000	14%
Alternative B	4,923,000	0%	6,074,000	5%
Alternative C	4,923,000	0%	7,058,000	19%
Alternative E	4,923,000	0%	6,059,000	5%
Alternative F	5,407,000	9%	6,913,000	17%
Proposed Plan	5,407,000	9%	6,957,000	17%

Source: BLM 2015

This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

CSU	Controlled surface use
GHMA	General Habitat Management Areas
GRSG	Greater sage-grouse
MZ	Management Zone
NSO	No surface occupancy
PHMA	Priority Habitat Management Areas
TL	Timing limitations

As shown in Table 7-2 and Table 7-3, fluid mineral closures and stipulations within the Bighorn Basin RMP planning area generally exert limited influence due to their small acreage compared to the broader MZ. However, actions such as closing PHMA and GHMA to leasing, establishing 0.6 mile-lek buffers in accordance with the Wyoming executive order, applying the disturbance cap, and implementing NSO and CSU/TL stipulations within the planning area would help to reduce the threat of oil and gas development within the MZ.

Under Alternative A, 208,000 acres of PHMA in MZ II/VII would be open to fluid mineral leasing under standard lease terms and conditions (all of which would be located in the Bighorn Basin planning area). Additionally, 2,522,000 acres of GHMA would be open to leasing in the MZ. The lack of protective restrictions in these areas would increase the potential for harm or disturbance associated with new leasing projects. GRSG would be most vulnerable to disturbances from oil and gas leasing and development in the Bighorn Basin planning area; implementing other BLM proposed plans throughout the remainder of the MZ would result in greater long-term protections on BLM-administered lands in those areas. Conservation actions at the state and local level (e.g., state GRSG plans, conservation easements, etc.) would complement other BLM proposed plans while oil and gas related past, present,

and reasonably foreseeable future actions that result in surface disturbance would result in a continued threat to GRSG specifically within the planning area.

Acres of PHMA and GHMA closed to fluid mineral leasing in MZ II/VII would be greatest under Alternative B and E. As such, there would not be oil and gas development in these areas, reducing the potential impact to GRSG populations. The risk of habitat fragmentation or disturbance due to new oil and gas development would be reduced. The incremental effect of implementing alternatives B or E in conjunction with BLM proposed plans elsewhere in the MZ and the past, present, and reasonably foreseeable future actions disclosed in Table 7-12 would result in a net conservation gain to GRSG in MZ II/VII because these two alternatives are the most restrictive for oil and gas development.

Alternative C provides the fewest restrictions on energy development in MZ II/VII. For example, approximately 3,949,000 acres of GHMA would be open to fluid mineral leasing under standard conditions. Reasonably foreseeable future leasing projects would be less restricted under this alternative, which could increase the risk of habitat fragmentation or disturbance, particularly within the Bighorn Basin planning area. Implementation of the BLM/Forest Service Proposed Plans in other planning areas would help ameliorate the threat of oil and gas development in those areas, but this alternative would result in a lower net conservation gain than alternatives B, E, or the Proposed Plan.

Under the Proposed Plan, no PHMA in MZ II/VII would be open to fluid mineral leasing with standard terms and conditions; approximately 2,378,000 acres of GHMA would be open with standard terms and conditions. Closing PHMA to fluid mineral leasing or applying major or moderate stipulations would benefit GRSG by limiting new development in PHMAs. While new oil and gas development is likely to occur on lands not administered by the BLM, such projects may be subject to the requirements of the Wyoming executive order and other state plans, which would limit disturbance. The incremental effect of implementing the Proposed Plan in conjunction with other GRSG conservation actions in MZ II/VII would be a net conservation gain for GRSG because of the additional restrictions in PHMAs.

Acres of GRSG habitat open, closed, or subject to NSO and CSU/TL stipulations under Alternative F are similar to those under the Proposed Plan, with slightly more acres of GHMA closed to fluid mineral leasing. Because the past, present, and reasonably foreseeable future actions would remain the same, the cumulative effects on GRSG in MZ II/VII would be similar to those discussed under the Proposed Plan.

All BLM/Forest Service Proposed Plans within MZ II/VII include BMPs and required design features to minimize impacts on GRSG from oil and gas development on federal lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas which are already leased, BMPs can be applied as conditions of approval for development of existing leases. Examples include: locating new compressor stations outside of PHMA to reduce noise disturbance; clustering operations and facilities as closely as possible; placing infrastructure in already disturbed locations where the habitat has not been fully restored; and restoring disturbed areas at final reclamation to the pre-disturbance landforms and desired plant communities. State plans contain similar measures to reduce impacts. Together, these measures would help protect unfragmented habitats, minimize habitat loss and fragmentation, and maintain conditions that meet GRSG life history needs. Recent research indicates that restored habitats lack many of the features sought by GRSG in their habitat areas, and may not support GRSG for long periods following restoration activities. In order to conserve GRSG populations on the landscape, protection of existing habitat through minimizing development, would provide the best hope for GRSG persistence (Arkle et al. 2014).

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Wyoming executive orders) could be synergistic, meaning that the effects of the actions together is

greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation benefit, especially in areas where little development has occurred to date.

Implementation of the Proposed Plan within the Bighorn Basin planning area, in combination with other BLM planning efforts and other GRSG conservation plans within MZ II/VII could affect proposed oil and gas development projects. Large-scale oil and gas projects which could potentially occur on GRSG habitat within MZ II/VII (such as the Hiawatha Regional Energy Development EIS, LaBarge Platform Exploration & Development Project, and Continental Divide-Creston Natural Gas Project as discussed in Table 7-12) would be subject to disturbance cap limitation requirements of the Wyoming executive order and/or BLM/Forest Service Proposed Plans. NSO and CSU/TL stipulations would also apply in GRSG habitat on BLM-administered lands. These restrictions would contribute to the greatest net conservation gain of any alternative because they would limit development in key habitat areas. Because leasing restrictions (e.g., closures in PHMA and NSO stipulations) under the Proposed LUPs in MZ II/VII would not preclude existing leases in PHMA and GHMA from being developed, reasonably foreseeable future projects for oil and gas development are likely to affect GRSG and sagebrush habitats. However, mitigation requirements in BLM/Forest Service LUPAs and state and other GRSG conservation plans would offset disturbances from future projects and result in a net conservation gain for GRSG.

Coal

Nature and Type of Effects

Coal extraction is a major mining activity in GRSG habitat (Braun 1998), and environmental effects include soil erosion, dust, noise, water pollution, acid-mine drainage, and air emissions. These environmental effects can result in GRSG behavioral disruptions and habitat removal or degradation. Although land disturbed by coal mining can be restored to a point that supports a diversity of vegetation, including big sagebrush, reclamation projects require long durations, and GRSG habitat may fail to be restored (Arkle et al. 2014).

Conditions in MZ II/VII

Coal surface leases indirectly influence 8 to 10 percent of priority habitats and general habitats respectively across MZ II/VII. Approximately 50 percent of coal leases in priority habitats (and 57 percent in general habitats) occur on private lands within MZ II/VII (Manier et al. 2013). Therefore, private actions are likely to have a greater potential to ameliorate the effects of coal development on GRSG than any other single land management entity.

Impact Analysis

Coal leasing and development is less extensive in the Bighorn Basin planning area than in other areas of MZ II/VII. As such, management actions in the Bighorn Basin RMP/EIS would have less influence in ameliorating the threat than other regional efforts. Because the Bighorn Basin RMP/EIS would have such a small impact on the broader MZ, there would be little variation in the effects on GRSG within MZ II/VII across the RMP/EIS alternatives.

Under all alternatives and the Proposed Plan, new coal lease applications on federal mineral estate would be subject to suitability determinations governed by 43 CFR, Part 3461.5. Under unsuitability criterion 15, the BLM may determine that portions of the MZ contain essential GRSG habitat and are

unsuitable for all or certain stipulated methods of coal mining. If the BLM made this determination, it would apply stipulations to restrict coal mining and protect GRSG, including possibly prohibiting surface coal mining. As such, the regulations under Criterion 15 of 43 CFR, Part 3461.5(o)(1) would reduce the potential for long-term impacts associated with new coal leasing projects on GRSG habitats and populations.

New coal leasing and development may also occur on non-federal lands in MZ II/VII, subject to state regulations (including reclamation requirements). Additionally, new coal leasing in Wyoming and Montana would be subject to the Surface disturbance limit as required by the Wyoming and Montana executive orders. These measures would help protect GRSG habitat on lands where 43 CFR, Part 3461.5(o)(1) do not apply.

The requirements of 43 CFR, Part 3461.5, Criterion 15, in combination with BLM planning efforts and state plans, would help reduce the threat from coal extraction and would provide a net conservation gain to GRSG in MZ II/VII.

Mineral Materials

Nature and Type of Effects

Development of surface mines (e.g., for sand, gravel and other common mineral materials found in MZ II/VII) may negatively impact GRSG numbers and disrupt the habitat and life-cycle of the species, similar to other types of mining activities (Braun 1998; Manier et al. 2013).

Conditions in MZ II/VII

Mineral material disposal sites indirectly influence 17 percent of priority habitats and 11 percent of general habitats across MZ II/VII. Approximately 65 percent of mineral material disposal sites in priority habitats and 60 percent of sites in general habitats occur on BLM-administered lands within MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of mineral material disposal on GRSG than any other single land management entity.

Impact Analysis

As shown in Table 7-4, Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ II/VII, acres of PHMA and GHMA closed to mineral material disposal within the planning area generally have a relatively smaller influence, when compared to the broader MZ.

Table 7-4. Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Mineral Material Disposal				
Alternative A	7,530,000	19%	10,417,000	23%
Alternative B	6,680,000	8%	8,971,000	11%
Alternative C	6,126,000	0%	11,705,000	32%
Alternative E	6,126,000	0%	8,971,000	11%
Alternative F	7,556,000	19%	10,436,000	24%
Proposed Plan	7,181,000	15%	9,762,000	18%
Closed to Mineral Material Disposal				
Alternative A	3,487,000	2%	1,285,000	13%
Alternative B	4,398,000	22%	2,675,000	58%
Alternative C	3,433,000	0%	1,454,000	23%
Alternative E	4,952,000	31%	2,675,000	58%
Alternative F	3,461,000	1%	1,265,000	12%
Proposed Plan	3,495,000	2%	1,390,000	20%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to mineral material disposal in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

Under Alternative A, 3,487,000 acres of PHMA are closed to mineral material disposal in MZ II/VII and 1,285,000 acres of GHMA are closed. 7,530,000 acres of PHMA would remain open, as would 10,417,000 acres of GHMA. Reasonably foreseeable future mineral material disposals in MZ II/VII could affect GRSG through habitat disturbance, fragmentation, or behavior disruptions, depending on the location and extent of the project; however, implementation of BLM/Forest Service Proposed Plans in other areas of MZ II/VII would restrict development, thereby reducing the risk of removing or fragmenting habitat elsewhere in MZ II/VII, particularly on federal lands. There would be a net conservation gain to GRSG in MZ II/VII, but it would be concentrated in areas outside the Bighorn Basin planning area and would have a less widespread beneficial impact on the Wyoming Basin population in the planning area.

Substantially more acres of PHMA and GHMA are closed under alternatives B and E. These closures would restrict the development of mineral materials on GRSG habitat on federal lands, thereby contributing to the protection of habitat. However, designating GRSG habitat as open or closed to mineral material disposal would not preclude existing facilities from continued operation. In areas where existing mineral material disposal sites affect GRSG (e.g., through noise disturbance or vehicle

collision risk), these impacts would likely continue. Impacts in other areas of MZ II/VII would be the same as under Alternative A.

Under Alternative C, 3,433,000 acres of PHMA would be closed to mineral material disposal in MZ II/VII and 1,454,000 acres of GHMA would be closed. While this Alternative closes the fewest acres of PHMA to mineral material disposal, implementation of state plans and BLM/Forest Service Proposed Plans in other areas of MZ II/VII are considered present and reasonably foreseeable future actions, respectively, which would contribute to the protection of habitat and a net conservation gain.

Under the Proposed Plan, 3,495,000 acres of PHMA would be closed to mineral material disposal in MZ II/VII; 1,390,000 acres would be closed in GHMA. On non-federal lands, the development limitations applied under the Wyoming executive order would reduce impacts to GRSG habitat across the state, and would encourage mineral material disposal in areas away from Core Areas. Together, the incremental effect would be a net conservation gain to GRSG.

Under Alternative F, slightly fewer acres of PHMA and GHMA in MZ II/VII would be closed to mineral material disposal in comparison to the Proposed Plan; the cumulative effects on GRSG are similar to those for the Proposed Plan, but less beneficial on BLM-administered lands within the planning area. This would impact the Wyoming Basin population's integrity more than populations elsewhere in the MZ.

Locatable Minerals

Nature and Type of Effects

Locatable minerals include gold, silver, uranium, and bentonite. Activities associated with locatable mineral development, such as stockpiling topsoil and extracting and transporting material, have direct impacts on GRSG through mortality and nest disruption. These actions also would reduce the functionality of the surrounding habitat via noise and light disturbance, resulting in lost and degraded PHMA and GHMA.

As with fluid mineral development, reclamation practices may help to reduce long-term impacts on GRSG and their habitat. Although disturbed areas have not been restored to near pre-disturbance conditions in the past, recent efforts have been directed toward restoring functional habitat. However, even with effective restoration, restored areas may not support GRSG populations at the same level as prior to disturbance.

Conditions in MZ II/VII

Within MZ II/VII, bentonite, gypsum, gold, and uranium are all commonly mined for commercial use.

Impact Analysis

As shown in Table 7-5, Acres Open and Recommended with Mineral Withdrawal, acres of GRSG habitat recommended for withdrawal generally represents a relatively small influence, when compared to the broader MZ.

Table 7-5. Acres Open and Recommended for Withdrawal from Mineral Entry in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Mineral Entry				
Alternative A	8,154,000	17%	8,910,000	27%
Alternative B	8,213,000	18%	8,830,000	27%
Alternative C	6,770,000	0%	10,413,000	38%
Alternative E	6,770,000	0%	8,825,000	27%
Alternative F	8,169,000	17%	8,993,000	28%
Proposed Plan	8,190,000	17%	8,940,000	28%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	890,000	0%	209,000	8%
Alternative B	941,000	6%	355,000	46%
Alternative C	887,729	0%	202,000	4%
Alternative E	2,383,000	63%	359,000	46%
Alternative F	894,000	1%	217,000	12%
Proposed Plan	893,000	1%	235,000	18%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open to mineral entry and recommended for withdrawal from locatable mineral entry in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

Under Alternative A, 890,000 acres of PHMA would be recommended for withdrawal from locatable mineral entry in MZ II/VII. Additional acres of PHMA would be recommended for withdrawal under alternatives B, E, F, and the Proposed Plan. Acres of PHMA and GHMA recommended with withdrawal in MZ II/VII would be greatest under Alternative E. Under all alternatives, withdrawing lands from locatable mineral development is unlikely to mitigate existing or approved projects in GRSG habitat. However, withdrawing GRSG habitat from mineral entry would reduce the risk of sagebrush habitat loss or fragmentation caused by new locatable mineral development projects.

Under all alternatives, required design features would help minimize the impacts on GRSG from locatable mineral development on federal land. All BLM/Forest Service Proposed Plans within MZ II/VII include required design features. Examples include: locating facilities outside of PHMA to reduce noise disturbance; clustering operations and facilities as closely as possible; placing infrastructure in already disturbed locations where the habitat has not been fully restored; and restoring disturbed areas at final reclamation to the pre-disturbance landforms and desired plant communities.

Under the Proposed Plan, portions of SFAs would be recommended for withdrawal. As such, if these areas are withdrawn the Proposed Plan would provide a greater net conservation gain to GRSG populations by reducing disturbance to birds from mining activities.

Nonenergy Leasable Minerals

Nature and Type of Effects

Nonenergy leasable minerals include materials such as sulfates, silicates, and trona (sodium carbonate). Impacts on GRSG are similar to those from other types of mining as described above.

Conditions in MZ II/VII

In MZ II/VII, existing federal mineral prospecting permits for nonenergy leasable resources have a direct footprint on 378,400 acres of priority habitats and 557,100 acres of general habitats (Manier et al. 2013, P. 79).

Impact Analysis

Table 7-6, Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ II/VII, shows acres of GRSG habitat open and closed to nonenergy leasing in the MZ.

Table 7-6. Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ II/VII

	PHMA		GHMA	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Nonenergy Leasing				
Alternative A	5,921,000	0%	7,939,000	0%
Alternative B	5,921,000	0%	7,939,000	0%
Alternative C	5,921,000	0%	7,939,000	0%
Alternative E	5,921,000	0%	7,939,000	0%
Alternative F	5,921,000	0%	7,939,000	0%
Proposed Plan	5,921,000	0%	7,939,000	0%
Closed to Nonenergy Leasing				
Alternative A	3,646,000	0%	1,114,000	0%
Alternative B	3,646,000	0%	1,114,000	0%
Alternative C	3,646,000	0%	1,114,000	0%
Alternative E	3,646,000	0%	1,114,000	0%
Alternative F	3,646,000	0%	1,114,000	0%
Proposed Plan	3,646,000	0%	1,114,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to nonenergy leasing in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA	General Habitat Management Areas
GRSG	Greater sage-grouse
MZ	Management Zone
PHMA	Priority Habitat Management Areas

No federal lands within the Bighorn Basin planning area were designated as open or closed under the RMP; therefore, cumulative impacts to GRSG within MZ II/VII would vary little across all alternatives because past, present, and reasonably foreseeable future actions would not vary across alternatives. New nonenergy leasable projects occurring in GRSG habitat could impact GRSG and their habitat, depending on the location and extent of the development. Precluding nonenergy leasable development in PHMA and GHMA would reduce habitat disturbance and fragmentation as well as direct disturbance to GRSG, improving the likelihood of successful breeding and reproduction. Implementing a 3 percent disturbance cap under alternatives E, F, and 5 percent disturbance cap under Alternative B and the Proposed Plan would limit nonenergy mineral development over the long term and may reduce development more than alternatives A, or C. As a result, in combination with the disturbance cap applied under state plans, BLM actions in other planning areas in MZ II/VII, and other past, present, and reasonably foreseeable future actions, alternatives B, E, F, and the Proposed Plan would provide a net conservation gain to GRSG. This gain would be greatest under alternatives E and F, as these alternatives implement the most restrictive disturbance caps.

7.1.6.2 Infrastructure

Rights of Way/Special Use Authorizations

Nature and Type of Effects

As discussed in Chapter 4, power lines can directly affect GRSG by posing a collision and electrocution hazard, and can indirectly decrease lek attendance and recruitment by providing perches and nesting habitat for potential avian predators, such as golden eagles and ravens (Connelly et al. 2004). In addition, power lines are linear and often extend for many miles. Thus, ground disturbance associated with construction, as well as vehicle and human presence during maintenance activities, may introduce or spread invasive weeds over large areas, thereby degrading habitat. Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also facilitate predator movements, spread invasive plants, and increase human disturbance from noise and traffic (Forman and Alexander 1998).

Numerous studies have researched the impact of infrastructure on GRSG. For example, GRSG avoided nesting and summering near major roads (for example, paved secondary highways) in south-central Wyoming (LeBeau 2012), and traffic disturbance (1 to 12 vehicles per day) within 1.9 miles of leks during the breeding season reduced nest-initiation rates and increased distances moved from leks during nest site selection of female sage-grouse in southwestern Wyoming (Lyon and Anderson 2003). Nesting propensity (i.e., nest initiation rates) was 24 percent lower for females breeding on road-disturbed leks compared with undisturbed females, 56 percent of females breeding on disturbed leks initiated nests in consecutive years compared to 82 percent of females breeding on undisturbed leks, and females moved twice as far from leks to nest locations if breeding on disturbed leks (Lyon and Anderson 2003). Increased length of road (correlated with use), increased traffic levels on roads, and traffic activity during the early morning on roads within approximately 1.9 miles of leks negatively influence male lek attendance (Manier et al. 2013).

An examination of leks within 62 miles of Interstate 80 in Wyoming and Utah found no leks within 1.25 miles of the interstate, reduced numbers of leks within 4.7 miles of the interstate, and a positive distance-effect with higher rates of decline in lek counts between 1970 and 2003 on leks within 4.5 miles compared to leks 4.7 to 9.3 miles from the interstate (Connelly et al. 2004). Rates of decline in GRSG male lek attendance increased as traffic volumes on roads near leks increased, and vehicle activity on roads during the daily strutting period (i.e., early morning) had a greater influence on male lek attendance compared with roads with no vehicle activity during early morning in southwestern Wyoming (Holloran 2005). In central Wyoming, peak male attendance (i.e., abundance) at leks experimentally treated with noise recorded at roads decreased 73 percent relative to paired controls (Blickley 2012; Manier et al. 2013).

Transmission lines are especially prevalent in MZ II/VII (Manier et al. 2013) and their impact on GRSG in the MZ has been studied. Negative effects of power lines on lek persistence were documented in northeastern Wyoming; the probability of lek persistence decreased with proximity to power lines and with increasing proportion of power lines within a four-mile window around leks (Walker et al. 2007). Braun reported that use of areas near transmission lines by sage-grouse, as measured by pellet counts, increased as distance from transmission line increased up to 600 m (1968 feet) (Braun 1998). Sage-grouse avoided brood-rearing habitats within 2.9 miles of transmission lines in south-central Wyoming (LeBeau 2012; Manier et al. 2013).

Power lines may also cause changes in lek dynamics, with lower growth rates observed on leks within 0.25 miles of new power lines in the Powder River Basin of Wyoming as compared with those further from the lines. This was attributed to increased raptor predation (Braun et al. 2002). Raptors and corvids forage on average 3.1 to 4.3 miles from perching sites, potentially impacting 32 to 40 percent of the sage-grouse conservation area (Connelly et al. 2004). Removing or reducing the number of perching structures and landfills in key nesting, brood rearing, and lekking habitats may reduce predation pressure on sage-grouse (Bui 2009; Leu and Hanser 2011; Manier et al. 2013).

Conditions in MZ II/VII

Infrastructure, such as ROWs and associated facilities and urbanization, is prevalent throughout MZ II/VII.

Although not representative of all infrastructure ROW, transmission lines (greater than 115 kilovolt) indirectly influence 60 to 63 percent of priority habitats and general habitats respectively across MZ II/VII. Approximately 50 percent of transmission lines in priority habitats (and 45 percent in general habitats) are located on BLM-administered lands across GRSG habitats in MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of transmission line ROW on GRSG than any other single land management entity.

Impact Analysis

Table 7-7, Acres of Rights-of-Way/Special Use Authorization Management within GRSG Habitat in MZ II/VII, lists the acres of ROW/SUA avoidance and exclusion within GRSG habitat by alternative.

Table 7-7. Acres of Rights-of-Way/Special Use Authorization Management within GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Rights-of-Way/Special Use Authorization				
Alternative A	822,000	91%	6,624,000	21%
Alternative B	78,000	0%	5,455,000	4%
Alternative C	77,000	0%	7,166,000	27%
Alternative E	77,000	0%	5,455,000	4%
Alternative F	77,000	0%	5,961,000	13%
Proposed Plan	77,000	0%	5,954,000	12%
Right-of-Way/Special Use Authorization Exclusion				
Alternative A	583,000	4%	678,000	6%
Alternative B	694,000	19%	727,000	12%
Alternative C	562,000	0%	646,000	1%
Alternative E	1,793,000	69%	727,000	12%
Alternative F	562,000	0%	677,000	6%
Proposed Plan	564,000	0%	674,000	5%
Right-of-Way/Special Use Authorization Avoidance				
Alternative A	7,570,000	5%	2,409,000	23%
Alternative B	8,319,000	13%	3,426,000	46%
Alternative C	7,220,000	0%	3,020,000	39%
Alternative E	7,220,000	0%	3,426,000	46%
Alternative F	8,335,000	13%	3,080,000	40%
Proposed Plan	8,336,000	13%	3,134,000	41%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within rights-of-way/special use authorization management areas in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

Past, present, and reasonably foreseeable projects within MZ II/VII identified in Table 7-12 indicate ROW/SUA applications are anticipated to continue to increase within MZ II/VII/. Major interstate transmission lines are currently proposed in MZ II/VII, and may contribute to the cumulative impacts on GRSG and their habitat. However, by implementing avoidance and exclusion management areas on BLM-administered lands, proposed transmission lines would be restricted in GRSG habitat. Exclusion areas would strictly prohibit ROW/SUA development, while avoidance areas may allow ROW/SUA development subject to restrictions and mitigation.

Exclusion and avoidance area management areas are intended to minimize disturbance to GRSG populations by limiting the siting of roads and other ROWs/SUAs which can increase bird mortality, habitat avoidance, habitat fragmentation. Additionally, the location of tall structures can increase predation (Connelly et al. 2004). These adverse impacts would be most prevalent under Alternative A and C, as these alternatives have the fewest acres of ROW/SUA avoidance and exclusion management areas within MZ II/VII.

Reasonably foreseeable future actions (as discussed in Table 7-12) include multi-state transmission lines which cross multiple land jurisdictions, including private, state, and federally owned lands. ROW exclusion and avoidance management under the Proposed Plan or any of the alternatives would not apply to non-federal lands. Therefore, the disturbance cap limitation under the Wyoming executive order, and other state plan incentives would have a greater impact towards ameliorating the threat.

Alternative A has the most acres of PHMA open to ROW/SUA development in MZ II/VII (822,000 acres), the majority of which are located within the Bighorn Basin planning area. All other action alternatives and the Proposed Plan reduce the number of PHMA acres open to ROW/SUA in MZ II/VII by 91%. Under Alternative A, 6,624,000 acres of GHMA would be open to ROW/SUA development in the MZ; this number is reduced for all other action alternatives and the Proposed Plan, except of Alternative C (7,166,000 acres). This would result in the smallest net conservation gain for GRSG because gains would be concentrated in other portions of MZ II/VII and would also be less pronounced on BLM-administered lands in the Bighorn Basin planning area.

Acres of GRSG habitat managed as ROW/SUA exclusion in MZ II/VII are highest under Alternative B and E and, because relevant cumulative actions do not vary across alternatives, these alternatives would provide the greatest net conservation gain in terms of acres that are closed or restricted for development. The Proposed Plan relies more on ROW avoidance management to protect GRSG habitat rather than ROW exclusion. While ROW avoidance areas do not afford the same level of protection as ROW exclusion areas, ROW developments in avoidance areas would be subject to restrictions and mitigation, which would limit impacts on GRSG habitats and populations. As a result, the incremental effect of implementing the Proposed Plan in conjunction with past, present, and reasonably foreseeable future actions would be a reduction in disturbance of GRSG leks, nests, and brood-rearing and wintering areas compared to other alternatives. The anthropogenic disturbance cap would also have a similar effect.

The cumulative impact of installing multi-state transmission lines and other ROWs/SUA would include adverse effects to some populations of GRSG within MZ II/VII. These effects may include lek abandonment; removal, degradation, and fragmentation of habitat; direct mortality through collisions with vehicles; impeding migration; increased risk of predation; and spread of noxious or invasive weeds. Construction of access roads and ancillary facilities in GRSG habitat would contribute to these negative effects. BMPs, design features, state or BLM field office-specific stipulations, and Forest Standards and Guidelines are incorporated into the NEPA documents for many of these proposed transmission line in MZ II/VII. However, the extent to which these measures are to be implemented during construction is uncertain. GRSG would be particularly vulnerable to the effects of new transmission lines in Colorado, where reasonably foreseeable future transmission line project routes are proposed in both GHMA and PHMA.

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Wyoming executive orders) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where

complementary protections can benefit leks, early brood rearing habitat, or other important areas that do not follow geopolitical boundaries.

Presidential Priority transmission projects which are proposed in MZ II/VII (i.e., TransWest Express and Gateway West), would not be subject to GRSG conservation requirements in BLM/Forest Service GRSG RMP Amendments, but would be subject to requirements in applicable state plans as well as other state and federal laws and regulations. They would also develop their own suite of protective measures analyzed in project-specific NEPA documents. Whether or not these project-specific measures would adequately protect GRSG is unknown at this point in time because the measures have not been finalized. Regardless, impacts would likely be greater in Colorado where the proposed route would impact approximately 26 miles in PACs (key habitats that are essential for GRSG conservation) and 57 miles in PHMA in the Little Snake and White River BLM Field Offices. This impact would be especially harmful to fringe GRSG populations in Colorado, as some are less robust than those in Wyoming and southern Montana. In Wyoming, the routes avoid Core Areas due to that state plan's requirements; this would reduce impacts in Wyoming.

Under all alternatives and the Proposed Plan, the cumulative effect of constructing multiple new transmission lines and other ROWs/SUAs is likely to result in negative effects to GRSG and their habitat. However, implementation of the BLM/Forest Service Proposed Plans in combination with other regional efforts would restrict the extent to which proposed ROWs/SUA could be located in or near GRSG habitat, providing more benefit to the species than current management.

Renewable Energy

Nature and Type of Effects

Impacts on GRSG from renewable energy development, such as that for wind and solar power, are similar to those from nonrenewable energy development. Additional concerns associated with wind energy developments are rotor blade noise, structure avoidance, and mortality caused by collisions with turbines (Connelly et al. 2004).

A study on specific effects of wind development on sage-grouse in south-central Wyoming showed that the relative probability of a GRSG nest failing (eggs not hatching) or brood failing (all chicks lost within 35 days post-hatch) increased with proximity to the nearest wind turbine. This study investigated short-term response of sage-grouse to a wind energy facility; additional impacts may be realized in the longer term following addition of wind turbines, due to the time lags associated with responses of breeding populations to infrastructure (Garton et al. 2011).

Conditions in MZ II/VII

While most federal lands are not currently leased or developed for wind or solar energy resources, areas of potential development coincide closely with GRSG habitats in MZ II (Manier et al. 2013). Within the Bighorn Basin planning area, renewable energy potential is present, but existing facilities are limited. Although not representative of all renewable energy development, wind turbines indirectly influence less than 1 to 2 percent of priority habitats and general habitats respectively across MZ II/VII. Private lands are host to 70 percent of wind turbines affecting GRSG in priority habitats (and 73 percent in general habitats) within MZ II/VII (Manier et al. 2013). If this trend continues into the future, conservation actions on private land are likely to have a greater potential to ameliorate the effects of wind energy development than any other single land management entity.

Impact Analysis

Table 7-8, Acres of Wind Energy Management Areas in GRSG Habitat in MZII/VII, lists acres of wind energy ROW/SUA by alternative.

Table 7-8. Acres of Wind Energy Management Areas in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Wind Rights-of-Way/Special Use Authorization				
Alternative A	0	0%	4,159,000	0%
Alternative B	0	0%	4,403,000	6%
Alternative C	0	0%	5,542,000	25%
Alternative E	0	0%	4,403,000	6%
Alternative F	0	0%	4,758,000	13%
Proposed Plan	0	0%	5,461,000	24%
Wind Right-of-Way/Special Use Authorization Exclusion				
Alternative A	3,684,000	0%	700,000	0%
Alternative B	4,214,000	13%	1,407,000	50%
Alternative C	3,684,000	0%	848,000	17%
Alternative E	4,915,000	25%	1,407,000	50%
Alternative F	3,761,000	2%	916,000	23%
Proposed Plan	3,796,000	3%	958,000	27%
Wind Right-of-Way/Special Use Authorization Avoidance				
Alternative A	4,179,000	0%	2,827,000	0%
Alternative B	4,880,000	14%	3,783,000	25%
Alternative C	4,179,000	0%	4,427,000	36%
Alternative E	4,179,000	0%	3,783,000	25%
Alternative F	5,217,000	20%	4,029,000	30%
Proposed Plan	5,184,000	19%	3,323,000	15%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within wind energy management areas in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

No PHMA would be managed as open to wind ROWs/SUAs in MZ II/VII under any of the alternatives or the Proposed Plan. All action alternatives and the Proposed Plan would manage GHMA as open to wind ROWs/SUAs in MZ II/VII to varying degrees with Alternative C (5,542,000 acres) and the Proposed Plan (5,461,000 acres) designating the most open acres within the MZ.

Alternative B and E would manage more acres of GRSG habitat in MZ II/VII as wind ROW/SUA exclusion compared to the other alternatives and the Proposed Plan. This would include 4,214,000 acres of PHMA and 1,407,000 acres of GHMA managed as ROW/SUA exclusion under Alternative B; 4,915,000 acres of PHMA and 1,407,000 acres of GHMA under Alternative E.

The Proposed Plan relies more on wind ROW avoidance management to protect GRSG habitat rather than wind ROW exclusion. Similar to other ROWs, this approach preserves management flexibility in situations where landownership is mixed. Without this flexibility, rerouting ROWs/SUAs across nonfederal land may result in a longer route, increasing disturbance of GRSG leks, nests, and brood-rearing and wintering areas more than direct routing across federal land.

Managing wind ROW/SUA avoidance and exclusion areas in GRSG habitat would reduce or minimize impacts from wind utility infrastructure on BLM-administered land by prohibiting or restricting new ROWs/SUAs. In addition, renewals or upgrades of existing facilities could incorporate additional conservation actions. Collocation or clustering of facilities would reduce impacts on GRSG habitat and would reduce disturbance in new areas.

Reasonably foreseeable future projects within MZ II/VII include renewable energy developments, such as the Chokecherry/Sierra Madre Wind Farm in southern Wyoming. Projects which require state agency review or approval would be subject to the Wyoming executive order permitting process for development in Core Areas, which would encourage ROW/SUA development outside of Core Areas and restrict surface occupancy within 0.6 miles of occupied leks.

Impacts would be minimized on BLM-administered land across all alternatives by adhering to the wildlife protection provisions of the Wind Energy Development Programmatic EIS (BLM 2005). Implementation of wind energy ROW/SUA avoidance in PHMA for all BLM/Forest Service Proposed Plans, in combination with the disturbance caps under the state plans, exclusion zones in other BLM planning areas and other past, present, and reasonably foreseeable future actions, would provide the greatest net conservation gain to GRSG in MZ II/VII.

7.1.6.3 Grazing/Free-Roaming Equids

Nature and Type of Effects

In general, livestock can influence habitat by modifying plant biomass, plant height and cover, and plant species composition. As a result, livestock grazing could cause changes in habitat that alter species abundances and composition in GRSG insect prey. Changes in plant composition could occur in varying degrees and could change vegetative structure, affecting cover for nesting birds. Grazing could also alter fire regimes (Davies et al. 2010).

If not managed properly, cattle and sheep grazing could compact soil, enrich soil with nutrients, trample vegetation and nests, directly disturb GRSG, and negatively affect GRSG recruitment. Cattle and sheep also can reduce invertebrate prey for GRSG or increase their exposure to predators (Beck and Mitchell 2000, Pp. 998-1,000; Knick 2011; Coates 2007, Pp. 28-33). Grazing in riparian areas can destabilize streams and riverbanks, cause the loss of riparian shade, and increase sediment and nutrient loads in the aquatic ecosystem (George et al. 2011). Stock watering tanks can contribute to stream and aquifer

dewatering and may concentrate livestock movement and congregation in sensitive areas (Vance and Stagliano 2007).

Grazing can be used to reduce fuel load and reduce the risk of wildfire (Connelly et al. 2004, Pp. 7, 28-30). Under certain conditions, grazing can reduce the spread of invasive grasses, if applied early in the season before the grasses have dried (Strand and Launchbaugh 2013). Light to moderate grazing does not appear to affect perennial grasses, which are important to nest cover (Strand and Launchbaugh 2013). However, excessive grazing can eliminate perennial grasses and lead to expansion of invasive species such as cheatgrass or Japanese brome (Reisner et al. 2013).

A well-developed understory of grass, forbs, and deciduous shrubs is critical for GRSG and other wildlife. Impacts on habitat vary with livestock densities and distribution; the more evenly livestock is distributed, the lower its impact on any given area (Gillen et al. 1984). However, cattle show a strong preference for certain areas, leading to high use in some areas and little to no use in others. Livestock grazing is generally limited by slopes of greater than 60 percent, dense forests and vegetation, poor or little upland forage, and lack of water (Holechek et al. 2010).

Although livestock grazing is the most widespread land use across the sagebrush biome, it exerts a more limited influence on soils and vegetation than land uses that remove or fragment habitat (e.g., mineral extraction or infrastructure development). GRSG are able to co-exist with grazing animals when properly managed. Thus, reducing AUMs or acres open to grazing would not necessarily restore high-quality GRSG habitat.

Reducing grass height caused by livestock grazing in GRSG nesting and brood-rearing areas has been shown to negatively impact nesting success. Livestock grazing could reduce the suitability of breeding and brood-rearing habitat, which would impact GRSG populations (USFWS 2010).

Since the passage of the 1934 Taylor Grazing Act, range conditions on BLM-administered lands have improved due to improved grazing management practices and decreased livestock numbers and annual duration of grazing. In addition, the BLM has applied Standards for Rangeland Health since 1997. The purpose of this practice is to enhance sustainable livestock grazing and wildlife habitat, while protecting watersheds and riparian ecosystems.

For BLM-administered lands, Standards for Rangeland Health require the BLM to ensure rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, or species of special concern sensitive species will be maintained or enhanced. The BLM Washington Office Instruction Memorandum 2009-018 serves as an aid to BLM field offices in determining priorities for focusing resources when processing permits and leases. The IM is based upon rangeland health, and considers critical habitat conditions, conflicts with GRSG, and whether projects have been proposed for implementing the Healthy Lands initiative. The authorized officer shall take appropriate action upon determining that existing management needs to be modified to ensure that standards are met or are making significant progress towards meeting standards. Modifying management could involve a variety of actions including, but not limited to, changing animal kind, changing season of use, adjusting AUMs, adjusting livestock numbers, implementing a grazing prescription or implementing range improvement projects.

On National Forest Systems lands, livestock grazing is administered in accordance to the Multiple Use and Sustained Yield Act of 1960. As with BLM-administered lands, the Forest Service issues livestock grazing permits for a period of up to 10 years that are generally renewable if it is determined that the terms and conditions of the permit are being met and the ecological condition of the rangelands are meeting the fundamentals of rangeland health.

Range improvements could result in livestock overusing important GRSG areas. For example, developing springs would generally change vegetative composition from a high diversity of grasses and forbs, important to broods, to one dominated by grasses.

Concentrated livestock use can remove standing vegetation and subsequently reduce associated insects and forbs, both of which are important to GRSG broods. Allowing spring developments along ephemeral streams and wetlands and allowing livestock watering tanks would decrease GRSG habitat. Springs, seeps, and wetland areas are vitally important to GRSG broods; therefore, allowing spring developments could reduce resources for GRSG.

Other direct and indirect effects may occur from range improvements. Water developments may also contribute to the increased occurrence of West Nile virus (Walker and Naugle 2011). Barbed wire fences contribute to direct mortality through fence collisions (Stevens et al. 2011).

Conditions in MZ II/VII

In general, the risks to GRSG and their habitat associated with improper grazing practices are less in the northerly, wetter parts of GRSG range (i.e., MZ I and northern portions of MZ II/VII) than across the arid semi-deserts of the rest of MZ II/VII. Nonetheless, livestock grazing is widespread across MZ II/VII, and may, if improperly conducted, pose a substantial threat to GRSG habitat (Stiver et al. 2006).

A large portion of the central regions of MZ II/VII (approximately 5 million acres) is federally managed wild horse and burro range, suggesting potential effects to GRSG from livestock grazing and the compounding effects of free-roaming equids (Manier et al. 2013). Within MZ II/VII, 19.9 percent of priority habitats are negatively influenced by free-roaming equids (Manier et al. 2013). Two designated herd management areas (HMAs) occur on BLM-administered lands in the planning area, both which contain GHMA and PHMA.

Impact Analysis

Table 7-9, Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ II/VII, lists the acres of PHMA and GHMA available and unavailable for grazing, by alternative.

Table 7-9. Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Available to Livestock Grazing				
Alternative A	8,901,000	13%	9,667,000	21%
Alternative B	7,786,000	0	8,829,000	13%
Alternative C	7,786,000	0%	10,782,000	29%
Alternative E	7,786,000	0	1,194,000	98%
Alternative F	8,901,000	13%	9,667,000	21%
Proposed Plan	8,901,000	13%	9,705,000	21%
Unavailable to Livestock Grazing				
Alternative A	28,000	0%	16,000	31%
Alternative B	1,231,000	100%	7,460,000	98%
Alternative C	28,000	0%	16,000	31%
Alternative E	1,259,000	98%	746,000	98%
Alternative F	28,000	0%	16,000	31%
Proposed Plan	28,000	0%	16,000	31%

Source: BLM 2015

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

Under Alternative A, 8,901,000 acres of PHMA would be available to livestock grazing in MZ II/VII; 9,667,000 acres of GHMA acres would be available. Under Alternative F and the Proposed Plan, a similar amount of GRSG habitat acres are available for livestock grazing on federal lands. Alternatives B and E place more restrictions on grazing by designating more acres of PHMA and GHMA within the MZ as unavailable to livestock grazing. These restrictions would help to protect GRSG habitat from the potential effects of improper livestock grazing on BLM-administered lands and National Forest System lands.

As literature suggests that moderate grazing is compatible with GRSG habitat (Strand and Launchbaugh 2013), closing acres to grazing may not itself benefit or harm GRSG. As described above under Nature and Type of Impacts, possibly equally or more beneficial is restricting range improvements in GRSG habitat, limiting fencing, and effectively implementing range health standards on grazing allotments in GRSG habitat.

The COT report objectives for livestock grazing are to manage grazing in a manner consistent with local ecological conditions. This type of management would maintain or restore healthy sagebrush shrub and native perennial grass and forb communities and conserve essential habitat components for GRSG. The

COT report also states that land managers should avoid or reduce the impact of range management structures on GRSG habitat.

Under the Proposed Plan, management actions specifically related to GRSG would help reduce the threat of grazing throughout the MZ to meet the COT report objectives. For example, allotments within PHMAs, (focusing on those containing riparian areas, including wet meadows), will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. Other alternatives do not include a similar action, therefore the Proposed Plan would afford greater protection to GRSG from improper grazing practices on BLM-administered lands by increased monitoring of PHMAs.

In addition, all BLM/Forest Service Proposed LUPs in MZ II/VII would prioritize SFAs for grazing permit renewals, to determine if modification is necessary prior to renewal. This would provide an opportunity to adjust forage levels to meet rangeland health standards, thereby reducing the risk of non-functioning rangelands impacting GRSG habitats. The BLM establishes an appropriate management level for each HMA, which represents the population objective for free-roaming equids. Under all alternatives and the Proposed Action, the BLM has the ability to adjust appropriate management levels of wild horses if resource damage occurs. Additionally, under all action alternatives and the Proposed Plan, HMA plans will be updated to include GRSG objectives. This will result in a net conservation gain for GRSG. Under alternatives B, E, F, and the Proposed Plan, the BLM would apply season restrictions from February 1 to July 31 within the two HMAs in the Bighorn Basin planning area. Therefore, the cumulative net conservation gain in MZ II/VII would be slightly greater compared to alternatives A and C, as seasonal surface disturbance restrictions for wild horse management would also benefit GRSG during nesting and early brood-rearing season.

BLM/Forest Service grazing and free-roaming equid management actions in MZ II/VII would not apply on non-federal lands. Conservation initiatives conducted through the NRCS's SGI would have a greater direct impact towards ameliorating the threat on these lands. Since 2010, SGI has enhanced rangeland health through rotational grazing systems, re-vegetating former rangeland with sagebrush and perennial grasses and control of invasive weeds. On privately-owned lands, SGI has developed a prescribed grazing approach that balances forage availability with livestock demand. This system allows for adjustments to timing, frequency, and duration of grazing, ensuring rangelands are managed sustainably to provide continued ecological function of sagebrush-steppe. A primary focus of the prescribed grazing approach is maintenance of key plant species, such as deep-rooted perennial grasses that have been shown to be essential for ecological resistance to invasive annual grasses (Reisner et al. 2013, pp. 1047-1048). These actions help to alleviate the adverse impacts associated with improper grazing practices outlined above under Nature and Type of Effects. Within MZ II/VII, SGI has implemented 552,600 acres of prescribed grazing systems. This program is likely the largest and most impactful program on private lands within MZ II/VII. Because of its focus on priority areas for conservation, which often overlap PHMA, the SGI's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on GRSG when considered alongside protective BLM management actions in PHMA.

Candidate Conservation Agreements with Assurances are another tool being implemented to protect private lands from the threat of improper grazing. Candidate Conservation Agreements with Assurances are voluntary conservation agreements between the USFWS and one or more federal or private partners (e.g., the BLM). In return for managing lands to benefit GRSG, landowners receive assurances against additional regulatory requirements should GRSG be listed under the Endangered Species Act. Within Wyoming, the USFWS and Wyoming Governor's Office in conjunction with the BLM, Natural Resources Conservation Service, Forest Service, and other agencies, have developed an umbrella Candidate

Conservation Agreement with Assurances for range management activities. Enrolled landowners are expected to comply with grazing specific conservation measures including but not limited to: avoid (or rotationally utilize) known nesting and brood-rearing habitat as a location for activities that concentrate livestock such as stock tank placement branding and roundup; place salt or mineral supplements in sites minimizing impacts to GRSG habitat; and within 24 months develop and implement a written grazing management plan to maintain or enhance the existing plant community as suitable GRSG habitat (USFWS et al. 2013). The incremental effects of the Natural Resources Conservation Service actions under the SGI, (including fence marking and conservation easements), Candidate Conservation Agreements with Assurances, and state efforts to maintain ranchland, BLM management actions (related to grazing and free-roaming equids) would provide a net conservation gain to GRSG in MZ II/VII.

7.1.6.4 Spread of Weeds

Nature and Type of Effects

As discussed in Chapter 4, invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology. Invasive weeds also may cause declines in native plant populations, including sagebrush habitat, through such factors as competitive exclusion and niche displacement. Invasive plants reduce and may eliminate vegetation that GRSG use for food and cover. Invasive weeds fragment existing GRSG habitat and reduce habitat quality by competitively excluding vegetation essential to GRSG. Invasive weeds can also create long-term changes in ecosystem processes, such as fire cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004).

Roads and recreation can promote the spread of invasive weeds through vehicular traffic. Weed infestations can further exacerbate the fragmentation effects of roadways. Irrigation water has also supported the conversion of native plant communities to hayfields, pasture, and cropland, thus fragmenting sagebrush habitats. Excessive grazing in these habitats can lead to the demise of the most common perennial grasses in this system and an abundance of invasive species such as cheatgrass or Japanese brome (Reisner et al. 2013).

Conditions in MZ II/VII

By means of seeds carried by wind, humans, machinery, and animals, invasive and noxious weeds have invaded and will continue to invade many locations in MZ II/VII, including the planning area. Cheatgrass (one of the primary invasive species threatening GRSG habitat) is found throughout MZ II/VII, and is generally more abundant in comparison to MZ I due to more favorable climate conditions.

The BLM currently manages weed infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods. It is guided by the 1991 and 2007 Records of Decisions (RODs) for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991) and by the 2007 Programmatic Environmental Report (BLM 2007). Weeds are managed in cooperation with county governments and represent a landscape-level approach across management jurisdictions.

Impact Analysis

Increased surface disturbance, motorized transportation, and animal and human activity would increase the chance for invasive plants to establish and spread.

The BLM and National Forest System manage weed infestations through integrated weed management practices, which include biological, chemical, mechanical, manual, and educational methods. This

general approach for combating infestations will continue under all alternatives and the Proposed Plan. Increased activity (e.g., surface disturbance, motorized transportation, and animal or human activity) would increase the likelihood for the spread and establishment of invasive plants, regardless or surface land ownership. Alternatives A and C would place the fewest constraints on resource uses, and would allow for the most acres of surface disturbing activities within GRSG habitat in MZ II/VII. Therefore, the potential for invasive weed spread and establishment would be greatest under this alternative, and effects to GRSG (e.g., reduction in quality of habitat) would be more pronounced. Reasonably foreseeable future projects which result in surface disturbance within or near GRSG habitat could increase the likelihood of invasive weed spread under these alternatives.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive weeds on federal and non-federal lands. Projects subject to the general stipulations outlined in the Wyoming and Montana executive orders are required to control noxious and invasive weed species and to use native seed mixes during reclamation processes. These stipulations would benefit GRSG Core Areas by limiting the spread or establishment of invasive species, particularly on lands that lack BLM protective regulatory mechanisms. Additionally, the Colorado Package has identified GRSG conservation strategies related to invasive weeds, such as interagency cooperation, mapping, monitoring, and integrated weed management treatments. However, complete weed eradication within MZ II/VII is not anticipated under any alternative or the Proposed Plan because of the scale and scope of efforts needed for complete eradication.

Alternatives B and E, would place the most restrictions on resource uses within GRSG habitat on BLM-administered land. Therefore, less disturbance associated with resource uses is likely to occur under these alternatives, which would reduce the potential for invasive weed spread and establishment on BLM-administered lands. Protective stipulations, in combination with state and county noxious weed regulations, continued integrated weed management practices, and other past, present and reasonably foreseeable future actions would provide a net conservation gain to GRSG habitats and populations in MZ II/VII under the Proposed Plan and the other RMP alternatives by restoring degraded sagebrush habitat and increasing native forbs, thus improving nest cover and food supply.

7.1.6.5 Conversion to Agriculture/Urbanization

Nature and Type of Effects

Converting sagebrush habitat to agricultural use, causes direct loss of habitat available for GRSG. Habitat loss also decreases the connectivity between seasonal habitats, increasing population isolation and fragmentation. Fragmentation then increases the probability for decline of the population, reduced genetic diversity, and extirpation from stochastic events (Knick and Hanser 2011).

In addition to reducing the land area available to support GRSG, habitat loss and fragmentation also results in other disturbances, such as human traffic, that increase the potential for wildfire and invasive plant spread.

Converting cropland has eliminated or fragmented sagebrush on private lands in areas with deep fertile soils or irrigation potential. Sagebrush remaining in these areas has been limited to the agricultural edge or to relatively unproductive environments that are ill-suited to sustaining leks, although these area may be beneficial for brood-rearing GRSG depending upon the particular crop.

Biofuel production and small grain prices have increased the conversion to cropland of native grasslands or lands formerly enrolled in the US Department of Agriculture's Conservation Reserve Program. This conversion of private lands further emphasizes the cumulative importance of BLM-administered lands

and associated private grazing lands in maintaining large blocks of native grassland and shrubland habitats suitable for GRSG.

Conditions in MZ II/VII

Less than 1 percent of priority habitats and 2 percent of general habitats in MZ II/VII are directly influenced by agricultural development (Manier at al 2013). Approximately 4 percent of habitat has been converted for agricultural use in the Wyoming Basin compared to 19 percent in the Great Plains (i.e., MZ I), (Knick et al. 2011).

Urban development also results in permanent loss of GRSG habitat. Human population centers continue to grow and expand across the range. The direct footprint of urban development is higher in priority habitats in MZ II/VII compared to other parts of the GRSG range, though it is still low (approximately 1 percent) compared to other threats (Manier et al. 2013). However, percentages and associated disturbance are higher in some areas. In some Colorado counties, fifty percent of sage-grouse habitat has been subdivided, while an estimated 3 to 5 percent of all historical habitat in Colorado has been converted into urban areas (Braun 1998; USFWS 2010).

Impact Analysis

The BLM does not convert public lands to agriculture. As such, the only direct authority it has over conversion to agriculture is by retaining or disposing of lands in the realty program. Disposing of lands could increase the likelihood they will be converted to agriculture, depending on their location and the policies of the new management authority. Lands retained under BLM management will not be converted to agriculture under any alternative.

As shown below in Table 7-10, Acres Identified for Retention and Disposal in GRSG Habitat in MZ II/VII, these acreages vary relatively little between alternatives.

Table 7-10. Acres Identified for Retention and Disposal in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Acres Identified for Retention				
Alternative A	7,278,000	15%	8,855,000	22%
Alternative B	7,414,000	17%	8,808,000	21%
Alternative C	6,185,000	0%	9,946,000	30%
Alternative E	7,414,000	17%	8,808,000	21%
Alternative F	7,290,000	15%	8,890,000	22%
Proposed Plan	7,301,000	15%	8,928,000	22%
Acres Identified for Disposal				
Alternative A	46,000	48%	189,000	44%
Alternative B	26,000	8%	127,000	17%
Alternative C	24,000	0%	213,000	51%
Alternative E	26,000	8%	127,000	17%
Alternative F	36,000	33%	156,000	32%
Proposed Plan	24,000	0%	156,000	33%

Source: BLM 2015

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

BLM land tenure adjustments require site-specific NEPA analysis, and land sales must meet specific disposal criteria. Lands identified for disposal in MZ II/VII are typically small isolated parcels that are difficult to manage and do not have high resource value. BLM land tenure adjustments are not anticipated to be a significant contributing element to the threat of agricultural conversion because of the small number of acres involved and the criteria in place that would reduce the likelihood of disposing of parcels containing significant wildlife value, (such as those lands containing leks, early brood rearing habitat, or winter habitat). As a result, cumulative impacts would vary relatively little across alternatives and BLM/Forest Service management would have little impact on alleviating this threat.

Studies of agricultural conversion risk on grasslands have shown a high probability of grassland plots being converted to cropland under current economic and climatic conditions (Rashford et al. 2013). The recent federal Farm Bill tried to discourage converting prairie to cropland by denying crop insurance for such conversions. Nevertheless, if corn and other crop prices remain high, the economic incentive to convert parcels to cropland in GRSG habitat areas will continue and will potentially increase.

The COT Report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and to prioritize restoration. In areas where taking agricultural lands out of production has benefited GRSG, the programs supporting

these actions should be targeted and continued (USFWS 2013). In accordance with this objective, the NRCS's SGI program focuses on maintaining ranchland that provides habitat for GRSG.

This voluntary program provides private landowners with monetary incentives to protect GRSG habitat, often through conservation easements. As a result, private land containing GRSG habitat is protected from conversion to agriculture or other development for the life of the conservation agreement. The conservation easements and other conservation incentives, such as restoration of water features and fence marking, can enhance the ability of private ranchlands to support GRSG. As of 2015, SGI has secured conservation easements on 243,400 acres within MZ II/VII, and marked or removed 23 miles of fence (NRCS 2015). This has preserved habitat and reduced the risk of direct mortality on these lands.

These efforts, in conjunction with BLM management, would provide a net conservation gain to GRSG in MZ II/VII, but its impact would be localized and not likely to ameliorate the threat because of limited management authority.

7.1.6.6 Fire

Nature and Type of Effects

Sagebrush killed by wildfire often requires many years to recover, especially after large fires. Contiguous old-growth sagebrush sites are at high fire risk, as are large blocks of contiguous dead sagebrush and sagebrush sites with a substantial cheatgrass understory. Before recovering, these sites are of limited use to GRSG, except along the edges and in unburned islands.

Because of its widespread impact on habitat, fire has been identified as a primary factor associated with GRSG population declines. Depending on the species of sagebrush and the size of a burn, a return to a full pre-burn community cover can take from 25 to 120 years (Baker 2011). In addition, fires can reduce invertebrate food sources and may facilitate the spread of invasive weeds.

While most sagebrush subspecies are killed by fire and slow to reestablish, cheatgrass recovers within one to two years of a fire from seed in the soil. This annual recovery leads to a reoccurring fire cycle that prevents sagebrush reestablishment (USFWS 2010, P. 13932).

BLM management to prevent or control wildfires can also affect GRSG and habitat. Increased human activity and noise associated with fire suppression, fuels treatments, and prescribed fire in areas occupied by GRSG could affect nesting, breeding, and foraging behavior. Important habitats could be altered because of the use of heavy equipment, hand tools, and noise.

In addition, suppression may initially result in higher rates of conifer encroachment in some areas. In the initial stages of encroachment, fuel loadings remain consistent with the sagebrush understory. As conifer encroachment advances, fire return intervals are altered by decreasing understory abundance. The depleted understory causes the stands to become resistant to low intensity wildfires; over years, the accumulating conifer loads contribute to larger-scale wildfires and confound control efforts due to extreme fire behavior.

Conditions in MZ II/VII

Fuels models predict fire risk as generally low across MZ II/VII with 10 percent of priority habitats and general habitats at high risk for fire (Manier et al. 2013). Within the Bighorn Basin planning area, wildfires and prescribed burns are more prevalent at lower elevations, except near river bottoms where vegetation density is higher. Upslope of the basin bottom, wildfires and prescribed burns are more common.

Impact Analysis

BLM/Forest Service management actions in MZ II/VII that emphasize wildfire suppression in GRSG habitat would benefit the species by limiting habitat loss in the event of a wildfire. BLM/Forest Service Proposed Plans would prioritize suppression immediately after life and property to conserve GRSG habitat. In GHMA, suppression would be prioritized where wildfires threaten priority sage-grouse habitat.

The Wyoming and Montana executive orders emphasize fire suppression in Core Population Areas, while recognizing other suppression priorities may take precedent. This would benefit GRSG habitat during wildfire planning and response, particularly on lands not administered by the BLM or Forest Service.

WAFWA's guidance on fire and fuels management for GRSG conservation (WAFWA 2014) promotes coordination among local fire response agencies similar to a "natural disaster" response; it emphasizes the importance of fuel breaks and the need to incorporate GRSG habitat objectives in fire management, as well as the use of grazing as a fuel reduction tool.

On the local level, the Bighorn Basin Sage-grouse Conservation Plan (Bighorn Basin Sage-grouse Local Working Group 2007) includes recommended management practices related to fire and fuels management such as evaluate all wildfires greater than 40 acres in occupied GRSG habitat to determine if rehabilitation of the burned area is needed; and protect and maintain areas of unburned sagebrush within perimeter of treated areas to allow for use in the untreated portion of a pasture or allotment.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit the GRSG in the event of an unplanned fire. The Interagency Standards for Fire and Fire Aviation Operations "Red Book" includes a BMP for GRSG habitat conservation for wildlife and fuels management (BLM 2013). This document serves as supplemental policy or guidance for the BLM, Forest Service, and USFWS. This BMP would benefit the GRSG (particularly during interagency wildland fire operations) by utilizing spatial habitat data and using predictive services to prioritize and preposition firefighting resources in critical habitat areas. The coordination of federal, state, and local fire prevention actions, changes in fire management, and other past, present, and reasonably foreseeable future actions would provide a net conservation gain to GRSG in MZ II/VII. The gain would be greatest under the Proposed Plan because of increased fire and fuels management flexibility (e.g., by designing fuels treatments in protect and improve GRSG habitat), interagency coordination, and emphasis on preserving and restoring GRSG habitat.

7.1.6.7 Recreation

Nature and Type of Effects

Recreation such as camping, bicycling, wildlife viewing, horseback riding, fishing, and hunting can be dispersed, concentrated (e.g., OHV use and developed campsites), or permitted (e.g., BLM Special Recreation Permit). The BLM also manages Special Recreation Management Areas (SRMAs), where recreation is a primary resource management consideration.

Recreation on federally administered lands that use the extensive network of double-track and single-track routes have an impact on sagebrush and GRSG. Ecological impacts of roads and motorized trails include mortality due to collisions; behavior modifications due to noise, activity, and habitat loss; alteration of physical environment; nutrient leaching; erosion; invasive plants spread; increased use; and alteration by humans due to accessibility (Knick et al. 2011). Recreation activities can degrade GRSG habitat through direct impacts on vegetation and soils, introduction or spread of invasive species, and

habitat fragmentation. This occurs in areas of concentrated use, trailheads, staging areas, and routes and trails.

Motorized activities, including OHV use, are expected to have a larger footprint on the landscape. They are anticipated to have the greatest level of impact due to noise levels, compared to nonmotorized uses such as hiking or equestrian use. Cross-country motorized travel, which is permitted in designated areas on BLM-administered lands but not on National Forest System lands, would increase the potential for soil compaction, loss of perennial grasses and forbs, and reduced sagebrush canopy cover. Losses in sagebrush canopy could be the result of repeated, high-frequency, cross-country OHV use over long periods. In addition, the chances of wildfire are increased during the summer, when fire dangers are high and recreation is at its highest.

Dispersed uses expand the human footprint. Closing areas to recreation and reclaiming unused, minimally used, or redundant roads in and around sagebrush habitats during seasonal use by GRSG may reduce the footprint and presumably impacts on wildlife. Restricting access to important habitat areas during seasonal use (lekking, nesting, brood-rearing, and wintering) may decrease the impacts associated with humans. However, access restriction will not eliminate other impacts, such as invasive plant spread, predator movements, cover loss, and erosion (Manier et al. 2013).

Conditions in MZ II/VII

BLM, Forest Service, and other agencies provide a variety of dispersed recreation opportunities within MZ II/VII governed by laws, policy, and guidance. Recreation also occurs on private land with fewer restrictions. Within the planning area, year-round dispersed recreational opportunities are available. Increased visitation to small towns and destination resorts contribute to the increased use of public lands within the planning area. The central and eastern portions of the planning area, as well as the western slopes of the Big Horn Mountains provide more accessible public access to BLM-administered lands, and therefore increased levels of recreation compared to the Absaroka Foothills region where public access is more limited.

Impact Analysis

Table 7-11, Acres of Travel Management Designations in GRSG Habitat in MZ II/VII, shows acres of GRSG habitat open, limited, or closed to travel in MZ II/VII.

Table 7-11. Acres of Travel Management Designations in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open				
Alternative A	5,000	0%	53,000	5%
Alternative B	5,000	0%	55,000	5%
Alternative C	5,000	0%	67,000	22%
Alternative E	5,000	0%	55,000	5%
Alternative F	5,000	0%	58,000	10%
Proposed Plan	5,000	0%	58,000	10%
Limited				
Alternative A	8,859,000	13%	9,293,000	21%
Alternative B	8,931,000	13%	9,125,000	20%
Alternative C	7,747,000	0%	10,449,000	30%
Alternative E	8,931,000	13%	9,125,000	20%
Alternative F	8,861,000	13%	9,294,000	21%
Proposed Plan	8,861,000	13%	9,331,000	21%
Closed				
Alternative A	113,000	4%	371,000	18%
Alternative B	158,000	31%	429,000	29%
Alternative C	109,000	0%	317,000	3%
Alternative E	158,000	31%	429,000	29%
Alternative F	112,000	3%	366,000	16%
Proposed Plan	112,000	3%	366,000	16%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within travel management designations of open, limited and closed in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
GRSG Greater sage-grouse
MZ Management Zone
PHMA Priority Habitat Management Areas

The COT Report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal GRSG behavior (USFWS 2013). Limits on road use under the action alternatives and the Proposed Plan, and limits on OHVs would help meet these objectives.

As shown in Table 7-11, acres of GRSG habitat closed to motorized vehicles would be greatest under Alternative B and E; and less under all other alternatives and the Proposed Plan. However, the vast majority of GRSG habitat on BLM/Forest Service lands in MZ II/VII would be designated as limited to existing routes. As such, OHVs would be prohibited from traveling off existing routes, which would

reduce the risk of direct and indirect effects from recreational motorized vehicles. Approximately 5,000 acres of PHMA in MZ II/VII would be open to OHV use under all alternatives and the Proposed Plan; between 53,000 and 67,000 acres of GHMA would be open under all alternatives and the Proposed Plan. In these areas, habitat degradation, behavior disruptions, and the potential for other direct and indirect effects caused by recreational use would be higher. However, these lands constitute a relatively small percentage of all PHMA and GHMA in MZ II/VII, therefore, the effects would be localized and no notable differences are anticipated in cumulative impacts across the alternatives.

On the local level, the Bighorn Basin Sage-grouse Conservation Plan (Bighorn Basin Sage-grouse Local Working Group 2007) includes recommended management practices related to recreation management such as includes recreation recommended management practices such as restricting organized recreational activities between March 15 and July 15 within two miles of a lek site, and discourage dispersed camping within important riparian habitats occupied by GRSG during late summer. Other local working groups within MZ II/VII include similar recommendations.

Implementation of the action alternatives and Proposed Plan described above, in concert with travel management planning on BLM-administered lands within MZ II/VII, the disturbance caps applied under the state plans, and other past, present, and reasonably foreseeable future actions would help reduce the threat of recreation and travel on GRSG populations and habitats and would provide a net conservation benefit to GRSG in MZ II/VI.

7.1.6.8 Conifers

Nature and Type of Effects

Conifer woodlands, especially juniper (*Juniperus* spp.) and in some regions pinyon pine (*Pinus edulis*), may expand into sagebrush habitat and reduce availability of habitat for GRSG. Conifer expansion may be encouraged by human activities, including fire suppression and grazing (Miller et al. 2011). If woodland development is sufficient to restrict shrub and herbaceous understory growth, habitat quality for GRSG will be reduced (Connelly et al. 2004). Mature trees offer perch sites for raptors; thus, woodland expansion may also increase the threat of predation, as with powerlines (Manier et al. 2013). Locations within approximately 1000 yards of current pinyon-juniper woodlands are at highest risk of expansion (Bradley 2010). The greatest risks from conifer encroachment are thought to be in the Great Basin, with smaller risks (6 to 7 percent of PH and GH) in the Wyoming Basin (Connelly et al. 2004; Manier et al. 2013). Studies have shown that GRSG incur population-level impacts at very low levels of conifer encroachment (Baruch-Mordo et al. 2013).

Conditions in MZ II/VII

Approximately 46 percent of conifer encroachment risk in priority habitats (and 43 percent in general habitats) occur on BLM-administered lands within MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of conifer encroachment on GRSG than any other single land management entity.

Impact Analysis

Specific required design features common to all BLM/Forest Service plans in MZ II/VII include removal of standing and encroaching trees within 100 meters of occupied leks and other habitats (e.g., nesting, wintering, and brood rearing). Additionally, reintroduction of appropriate fire regimes would limit conifer encroachment into the sagebrush plant communities. These actions would benefit GRSG by improving the quality of habitat throughout the MZ.

Additionally, under all action alternatives and the Proposed Plan, conifer removal treatments would be prioritized closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. This action would benefit GRSG by improving the quality of habitat and functionality. Alternative A, does not prioritize conifer removal treatments in areas closest to occupied GRSG habitats, therefore the risk of conifer encroachment would be greater under this alternative.

Recommendations within the Wyoming GRSG Conservation Plan (WSGWG 2003) call for removal of juniper and other conifers where they have invaded sagebrush sites important to GRSG, which could help ameliorate the threat on non-BLM lands. In Colorado, the Colorado Parks and Wildlife has conducted conifer treatments totaling 2,600 acres (Colorado Department of Natural Resources 2013).

SGI has helped reduce the threat of early succession conifer encroachment through mechanical removal on 10,500 acres of private lands within MZ II/VII. The majority of these efforts were located inside PACs (NRCS 2015), helping to preserve historic fire return intervals and important GRSG habitat. While the threat of conifer encroachment is likely to continue under all alternatives and the Proposed Plan, implementing mechanical treatments, reintroduction of appropriate fire regimes, and implementing BLM/Forest Service required design features and BMPs (e.g., removing standing and encroaching trees within 100 meters of occupied leks and other GRSG habitats) under all action alternatives and the Proposed Plan, would result in a net conservation gain for GRSG.

7.1.7 Conclusions

In addition to BLM management in RMP planning areas throughout MZ II/VII, GRSG will also be impacted by management and conservation at state, regional, and local levels. This analysis takes into account each alternative in the Bighorn Basin RMP in conjunction with state and private initiatives, and past, present, and reasonably foreseeable future actions. For purposes of this analysis, the BLM has determined that the Proposed Plans for the other ongoing GRSG and RMP planning efforts in MZ II/VII are reasonable foreseeable future actions.

Some of the most important past, present, and reasonably foreseeable future actions benefitting GRSG populations on private land in MZ II/VII are the conservation easements coordinated by the Natural Resources Conservation Service SGI, State of Wyoming, State of Colorado, BLM, Forest Service, and other agencies and organizations. As of 2015, SGI has secured conservation easements on 243,400 acres within MZ II/VII. Additionally, SGI has worked with landowners to increase fence marking, seeding of native vegetation, remove conifers, and implement prescribed grazing systems to help alleviate the adverse impacts associated with historic improper grazing practices. Future coordination of private landowners within SGI is expected to provide further benefits to GRSG habitat.

This coordination with private landowners enhances conservation in addition to what BLM management can accomplish on federal lands. Ranchers in MZ II/VII are also using Candidate Conservation Agreement with Assurances with the USFWS. Under these instruments, the ranchers voluntarily agree to manage lands to reduce threats to GRSG in exchange for a guarantee that they will not be subject to additional regulations should the species become listed. While ranchers have used these agreements across GRSG range, thus far the agreements have been applied to only a small number of ranches in Wyoming and Montana.

As discussed in Section 7.1.4, Wyoming, Montana, Utah, Colorado, and Idaho have adopted statewide plans to promote GRSG conservation throughout MZ II/VII. Wyoming's plan implements a Core Population Area Strategy with well density limitations, timing restrictions, and a uniform 5 percent disturbance cap across all landownership types. These measures would improve GRSG population levels

if effectively enforced (Copeland et al. 2013). Other state plans include similar, if sometimes less aggressive, measures to reduce impacts on state lands. In Montana, a 5 percent limit on anthropogenic disturbance is applied within the Density and Disturbance Calculation Tool examination area (based upon occupied leks within any given Core population area). Similarly in Utah, the Conservation Plan for Greater Sage-grouse in Utah (Utah Division of Wildlife Resources 2013), includes under certain circumstances, a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular Sage-grouse Management Area.

Alternative A: Current Management

Under Alternative A, current management would continue on BLM-administered lands within the Bighorn Basin planning area. The Bighorn Basin plan would not designate PHMA, GHMA, or SFAs, and would not manage any additional ROW avoidance or exclusion areas. Appropriate and allowable uses and restrictions with regard to such activities as mineral leasing and development, recreation, utility corridors, and livestock grazing would also remain unchanged.

Management prescriptions to protect GRSG currently in place include restricting surface disturbance and occupancy within a 0.25-mile radius of occupied GRSG leks and within 2 miles of occupied leks in GRSG nesting and early brood-rearing habitats. Additionally, the BLM prohibits surface-disturbing activities in GRSG winter concentration areas from November 15 to March 14. These management actions would continue to be implemented under Alternative A.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. As a result, the lack of protections under the Alternative A would be offset to an extent by more protective management elsewhere MZ II/VII. However, in the Bighorn Basin planning area, current management would do little to reduce the threats from energy development, mining, and infrastructure on GRSG wintering and breeding grounds. Although current management actions, including the temporary BLM GRSG IMs, provide a limited array of conservation measures that are intended to avoid continued degradation of GRSG habitat in MZ II/VII, they would not be subject to the same development restrictions in GRSG habitat under Alternative A as they would under the action alternatives or the Proposed Plan. Thus, Alternative A would not meet the goals and objectives in this plan to identify and incorporate conservation measures for GRSG and may meet the COT report objectives for present and widespread threats to GRSG, but only in localized areas and not on BLM-administered lands within the Bighorn Basin planning area.

Alternative B

Alternative B emphasizes conservation of biological resources, including habitat for fish and wildlife, maintenance of contiguous blocks of native plant communities, ecosystem management, protection of natural functions in riparian areas, and control of invasive species. Alternative B extends the protective buffers around GRSG habitat, prohibiting surface-disturbing activities within 0.6 mile of occupied GRSG leks and seasonally mitigating surface disturbing activities in GRSG nesting and early brood-rearing habitat. GRSG Key Habitat Areas are closed to mineral leasing and area closed to motorized vehicle use from March 15 to June 30. Alternative B would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by implementing management actions which specifically address these threats.

Implementing these protective measures on BLM-administered lands within the Bighorn Basin RMP planning area would help preserve GRSG habitat by limiting resource use activities in PHMA and GHMA. In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. The incremental effects of Alternative B combined with implementation of other regional efforts would result in a net conservation gain for GRSG in MZ II/VII.

Alternative C

Alternative C emphasizes resource uses with reduced constraints. Compared to the other alternatives, Alternative C conserves the least land for physical, biological, and heritage resources; and is the least restricted to motorized vehicle use and energy and mineral development. Under this alternative, the BLM would not manage to maintain contiguous blocks of native plant communities or minimize fragmentation.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. COT objectives for fire, invasive plants, range management, recreation, infrastructure, energy, and mining would likely be met in these areas. However, within the Bighorn Basin planning area, the limited protective measures would not meet the goals and objectives to identify and incorporate conservation measures for GRSG and would not meet the COT report objectives.

Alternative E

Impacts under Alternative E are the same as Alternative B outside of GRSG Key Habitat Areas. Within GRSG Key Habitat Areas, Alternative E includes additional management actions and an ACEC designation. Alternative E emphasizes conservation of biological resources with more constraints on resource uses than any other alternative. Alternative E would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by implementing management actions which specifically address these threats.

Implementing these protective measures on BLM-administered lands within the Bighorn Basin RMP planning area would help preserve GRSG habitat by limiting resource use activities in PHMA and GHMA. In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. The Proposed Plans include better management flexibility to reduce the potential for development spilling over onto adjacent lands in an unrestricted manner; however, this is less of an issue within the Bighorn Basin planning area, due to the fewer non-BLM administered lands. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. The incremental effects of other regional efforts combined with implementation of Alternative E would result in a net conservation gain for GRSG in MZ II/VII, but the strict protective measures on BLM-administered land in the Bighorn Basin planning area may have an unintended effect of reducing gains for GRSG in the planning area via the effects described above.

Alternative F

Impacts under Alternative F are the same as the Proposed Plan outside of GRSG PHMA. Within GRSG PHMA, Alternative F includes additional management actions and an ACEC designation. Alternative F generally emphasizes conservation of biological resources, while placing moderate constraints on resource uses and reclamation and mitigation requirements to reduce impacts to resource values. Alternative F would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by implementing management actions which specifically address these threats.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. The incremental effects of other regional efforts combined with implementation of the Alternative F would result in a net conservation gain for GRSG in MZ II/VII.

Proposed RMP (Alternative D)

The Proposed Plan generally increases conservation of biological resources compared to current management. The Proposed Plan also emphasizes moderate constraints on resource uses and reclamation and mitigation requirements. This would reduce the potential for development occurring solely on private land where less protections are afforded to GRSG. The Proposed Plan would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by targeting these threats in the RMP/EIS and implementing management actions which specifically address these threats.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. Reasonably foreseeable future actions in MZ II/VII such as proposed oil and gas developments, interstate transmission lines, and other land disturbance projects would be subject to the requirements set forth in the BLM/Forest Service Proposed Plans which encompass MZ II/VII, where those projects occur on federal decision area lands. For non-federal lands, reasonably foreseeable future projects may be subject to disturbance caps, buffer restrictions, and other requirements of GRSG state plans, as well as site specific mitigation measures.

Regional efforts combined with the incremental effect of implementing the Proposed Plan would result in a net conservation gain for GRSG in MZ II/VII.

Summary

The primary threats affecting GRSG populations throughout MZ II/VII are energy development, infrastructure, grazing/free-roaming equids, spread of weeds, conversion to agriculture, fire, recreation, and spread of conifers (USFWS 2013).

Infrastructure and energy development are of particular concern in MZ II/VII because they affect the greatest amount of land. Numerous multi-state transmission lines are proposed through GRSG habitat, as are large-scale oil and gas field developments in excess of 100,000 acres. Implementation of the BLM/Forest Service Proposed Plans in MZ II/VII is unlikely to preclude such projects from proceeding, especially Presidential Priority transmission line projects that are not subject to GRSG protective measures in the BLM/Forest Service planning efforts; however, GRSG protective measures are being

considered in the project specific analysis. The cumulative effect of the conservation measures in the Proposed Plan will result in protection of GRSG populations. In some localized areas, small populations may be at continued risk due to the cumulative effect of reasonably foreseeable future infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfires, drought, or West Nile virus outbreaks. However, the restrictions on land use, in combination with project-specific BMPs and RDFs and other regional efforts would achieve an overall net conservation gain for the regional population and would help mitigate the effects on small, at risk populations.

Implementation of alternatives B, E, F, and the Proposed Plan are anticipated to result in a net conservation gain for GRSG in MZ II/VII when compared to current management (Alternative A). Alternatives B and E emphasize conservation of biological resources, and contain more restrictions on resource uses than the other alternatives. While not as extensive as alternatives B or E, Alternative F and the Proposed Plan include GRSG conservation measures and resource use allocations which would improve baseline conditions.

Although small fringe populations may be at continued risk of decline in the next 20 years, implementing alternatives B, E, F, or the Proposed Plan in combination with other regional efforts (such as the Proposed Plans for other BLM planning areas; conservation strategies in the Montana, Wyoming, Idaho, Utah, and Colorado state plans; increased land protections via NRCS SGI, and local habitat restoration efforts) would effectively conserve the region-wide population of GRSG in MZ II/VII.

7.1.8 MZ-Wide Reasonably Foreseeable Future Actions Summary Table

Table 7-12 includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZ II/VII. The full tables can be found in each EIS within the MZ.

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
Energy and Mining						
II/ VII	Northwest Colorado, 9-Plan	Wyoming Basin, Northwest Colorado	Hiawatha Regional Energy Development EIS	Sweetwater County, Wyoming; Moffat County, Colorado	Proposed development of up to 4,208 new natural gas wells on approximately 157,361 acres of mixed federal, state, and private lands. The project area overlaps with lands identified as GRSG Core Areas. 91% of the project area is managed by the BLM.	Proposed
II/ VII	9-Plan	Wyoming Basin	LaBarge Platform Exploration & Development Project	Lincoln and Sublette County, Wyoming	Proposed development of up to 838 new oil and gas wells on 218,000 acres of private, state, and federal lands. Approximately 154,000 acres of surface lands are administered by the BLM.	Proposed

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat (Continued)

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
II/ VII	9-Plan	Wyoming Basin	Continental Divide-Creston Natural Gas Project	Carbon and Sweetwater Counties, Wyoming	Proposed development of up to 8,950 additional natural gas wells on 1.1 million acres of land, including GRSG Core Areas. The proposed facilities would add to the existing network of wells, pipelines, access routes and electrical distribution systems. Approximately 59 percent of the project area is on federally-owned lands.	Proposed
II/ VII	Lander, 9-Plan	Wyoming Basin	Moneta Divide Natural Gas and Oil Development Project	Fremont and Natrona Counties, Wyoming	Proposed development of approximately 4,250 natural gas and oil wells on 265,000 acres of land (including approximately 169,500 acres of land administered by the BLM). The project area includes GRSG Core Areas.	Proposed
II/ VII	9-Plan	Wyoming Basin	Pinedale Anticline Project	Sublette County, Wyoming	Proposed development of natural gas resources within nearly 200,000 acres of land, of which approximately 80 percent is federal surface ownership. The project area occurs within GRSG Core Areas.	Ongoing
II/ VII	9-Plan	Wyoming Basin	Blacks Fork Project (Formerly Moxa Arch Area Infill)	Sweetwater, Uinta, and Lincoln Counties, Wyoming	Proposed infill drilling project, on approximately 7,500 hydrocarbon wells within 633,532 acres of mixed federal, state, and private lands.	Proposed
II/ VII	9-Plan, Northwest Colorado, Utah	Wyoming Basin, Northwest Colorado	Oil Shale and Tar Sands Programmatic EIS	Colorado, Utah, and Wyoming	Amendment of 10 BLM RMPs to designate certain public lands as available for application for leasing and future exploration and development of oil shale and tar sands resources. A ROD was signed in 2013 which made approximately 678,000 acres available for potential development of soil shale, and approximately 132,000 acres available for development of tar sands.	Ongoing
II/ VII	9-Plan	Wyoming Basin	Atlantic Rim Natural Gas Field Development Project	Carbon County, Wyoming	Ongoing development of oil gas resources on 270,080 acres of land, of which 173,672 are federal surface estate. A ROD was signed in 2007. The project area includes GRSG Core Areas.	Ongoing
II/ VII	9-Plan	Wyoming Basin	Chokecherry/ Sierra Madre Wind Farm	Carbon County, Wyoming	Proposed development of approximately 1,000 wind turbines and associated ancillary facilities on 220,000 acres of land. The project area includes private, state, and federally managed lands, and overlaps with GRSG Core Areas.	Proposed

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat (Continued)

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
II/ VII	9-Plan	Wyoming Basin	Normally-Pressured Lance Natural Gas EIS	Sublette County, Wyoming	Proposed development of approximately 3,500 natural gas wells within 141,000 acres of state, private, and BLM-administered lands.	Proposed
II/ VII	9-Plan	Wyoming Basin	Bird Canyon Field Infill Project	Sublette and Lincoln Counties, Wyoming	Proposed drilling and production of 348 new natural gas wells within 17,612 acres of BLM-administered land.	Proposed
Rights-of-way						
II/ VII	9-Plan, Northwest Colorado, Utah	Wyoming Basin, Rich-Summit-Morgan, Uintah, North Park, NWCO, Strawberry Valley, Carbon	Gateway South Transmission Line Project	17 Counties in Wyoming, Colorado, and Utah	Proposed 500 kV transmission line which would begin near Medicine Bow, Wyoming, and would extend south and west to a proposed substation near Mona, Utah. The proposed transmission line would span over 400 miles, with a 250-foot right-of-way, and would cross multiple land jurisdictions including lands administered by the BLM.	Proposed
II/ VII	9-Plan, Northwest Colorado, Utah	Wyoming Basin, Northwest Colorado, Sheeprock, Strawberry Valley, Carbon, Bald Hills	TransWest Express Transmission Line Project	Wyoming, Colorado, Utah, and Nevada	Proposed 600 kV transmission line extending from south-central Wyoming to southern Nevada. The transmission line corridor would span over 700 miles and would cross private, state, and federally owned lands. The proposed route and alternative routes under consideration would cross priority and general habitats.	Proposed
II/ VII	9-Plan, Idaho and Southwest Montana	Wyoming Basin, East Central, Northern Great Basin, Box Elder	Gateway West Transmission Line Project	Wyoming and Idaho	Proposed 230 kV and 500 kV transmission line project between Glenrock, Wyoming, and Melba, Idaho. Approximately 1,000 miles of new high-voltage transmission lines would be constructed. The project would cross multiple land jurisdictions, including sage grouse Core Areas in Wyoming.	Proposed
II/ VII	9-Plan	Wyoming Basin	Riley Ridge to Natrona Pipeline Project	Sublette, Sweetwater, Fremont, and Natrona Counties, Wyoming	Proposed 243-mile pipeline from Riley Ridge to Big Piney, Wyoming. The pipeline would consist of a 50-foot right-of-way, and would cross GRSG Core Areas.	Proposed
II/ VII	9-Plan	Wyoming Basin	Zephyr Power Line Transmission Project	Wyoming, Colorado, Utah, and Nevada	Proposed 500 kV transmission line spanning between Chugwater, Wyoming to just south of Las Vegas, Nevada.	Proposed

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat (Continued)

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
Weeds						
II/ VII	9-Plan, Northwest Colorado	Wyoming Basin, Northwest Colorado, Powder River Basin, North Park	Invasive Plant Management EIS for the Medicine Bow - Routt National Forests, and Thunder Basin National Grassland	Wyoming and Colorado	Proposed treatment of invasive plant species using adaptive and integrated invasive plant treatment methods. These include manual, mechanical, biological, aerial, and ground herbicide applications. Potential treatment areas include GRSG Core Areas.	Proposed

Notes:

1. Hiawatha Regional Energy Development Project Update: http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/rsfodocs/hiawatha/newsltrs.Par.79506.File.dat/Hiawatha03-2013.pdf
2. LaBarge Platform Exploration & Development Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/labarge_platform.html
3. Continental Divide-Creston Natural Gas Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/cd_creston.html
4. Moneta Divide Natural Gas and Oil Development Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/lfo/moneta-divide.html
5. Pinedale Anticline Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/anticline/seis.html
6. Black Forks Project (Formally Moxa Arch Area Infill Project): http://www.blm.gov/wy/st/en/info/NEPA/documents/kfo/moxa_arch.html
7. Oil Shale and Tar Sands Programmatic EIS: http://ostseis.anl.gov/
8. Atlantic Rim Natural Gas Field Development Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/atlantic_rim.html
9. Chokecherry/Sierra Madre Wind Farm: http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/Chokecherry.html
10. Gateway South Transmission Line Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/gateway_south.html
11. TransWest Express Transmission Line Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/transwest.html
12. Gateway West Transmission Line Project: http://www.gatewaywestproject.com/
13. Riley Ridge to Natrona Pipeline Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/rsfo/RRNP.html
14. Normally Pressured Lance Natural Gas Development Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/npl.html
15. Bird Canyon Natural Gas Infill Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/rsfo/birdcanyon.html
16. Invasive Plant Management EIS for the Medicine Bow – Routt National Forests and Thunder Basin National Grasslands: http://www.fs.usda.gov/wps/portal/fsinternet/!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gDfxMDT8MwRydLA1cj72BTMwMTAwjQL8h2VAQArb-_RA!!/?ss=110206&navtype=BROWSEBYSUBJECT&navid=130110000000000&pnavid=130000000000000&accessDB=true&position=Project*&groupid=19692&ttype=projectdetail&pname=Medicine%20Bow-Routt%20National%20Forests%20&%20Thunder%20Basin%20National%20Grassland-%20Projects

BLM	Bureau of Land Management
EIS	Environmental Impact Statement
GRSG	Greater sage-grouse
kV	Kilovolt
MZ	Management Zone
RMP	Resource Management Plan
ROD	Record of Decision

7.1.9 References

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Glossary

GLOSSARY

Abandoned Mine: An abandoned hardrock mine on or affecting public lands administered by the Bureau of Land Management (BLM), at which exploration, development, mining, reclamation, maintenance, and inspection of facilities and equipment, and other operations ceased as of January 1, 1981 (the effective date of BLM's Surface Management regulations codified at 43 Code of Federal Regulations (CFR) Subpart 3809) with no evidence demonstrating that the miner intends to resume mining. For many abandoned mines, no current claimant of record or viable potentially responsible party exists. Abandoned mines generally include a range of mining impacts, or features that may pose a threat to water quality, public safety, and/or the environment (BLM no date).

Abandoned Mine Land (AML) Program: BLM program that focuses on reclaiming hardrock abandoned mine lands on or affecting public lands administered by BLM. The primary goal of the program is to remediate and reduce actual or potential threats that pose physical safety risks and environmental degradation. BLM applies risk-based criteria and uses the watershed approach to establish project priorities. The program also works to return mine-impacted lands to productive use(s) (BLM No Date).

Active Preference: see *Active Use.*

Active Use: The current authorized livestock grazing use. Active use may constitute a portion, or all, or permitted use. Active use does not include a temporary non-use or suspended use of forage within all or a portion of an allotment.

Additionality: The conservation benefits of compensatory mitigation are demonstrably new and would not have resulted without the compensatory mitigation project. (BLM Manual Section 1794).

Aeolian: Pertaining to the wind, especially said of such deposits as loess and dune sand, of sedimentary structures such as wind-formed ripple marks, or of erosion and deposition accomplished by the wind; also the erosive action of the wind and deposits that are transported by the wind (American Geological Institute 2005).

Alfisols: Moderately leached soils with a subsurface zone of clay accumulation and a low base status.

Allotment: An area of land where one or more livestock operators graze their livestock. Allotments are BLM lands, but may also include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotment Categorization: Grazing allotments and rangeland areas used for livestock grazing are assigned to an allotment category during resource management planning. Allotment categorization is used to establish priorities for distributing available funds and personnel during plan implementation to achieve cost-effective improvement of rangeland resources. Categorization is also used to organize allotments into similar groups for purposes of developing multiple use prescriptions, analyzing site-specific and cumulative impacts, and determining trade-offs.

> **Category "I" (Improvement):** The category for allotments where (1) present range condition is unsatisfactory and where range condition is expected to decline further; (2) present grazing management is not adequate; (3) the allotment has potential for medium to high vegetative production but production is low to moderate; (4) resource conflicts/controversy with livestock grazing are evident; (5) there is potential for positive economic return on public investment (BLM 1990). Additionally, allotments are categorized as Improvement where current livestock grazing management or level of use on public land is, or is expected to be, a significant causal factor in the

non-achievement of land health standards, or where a change in mandatory terms and conditions in the grazing authorization is or may be necessary. When identifying Category I allotments, review condition of critical habitat, conflicts with sage-grouse, and whether projects have been proposed specifically for implementing the Healthy Lands Initiative (BLM 2008a).

Category "M" (Maintain): The category for allotments where (1) the present range condition an management are satisfactory with good to excellent condition and will be maintained under present management, or fair condition and improving with improvement expected to continue under present management or opportunities for BLM management are limited because percentage of public land is low or acreage of public lands is small; (2) the allotment has a potential for moderate or high vegetative production is producing at or near this potential; (3) there are no significant land-use resource conflicts with livestock grazing; (4) land ownership status may or may not limit management opportunities; (5) opportunities for positive economic return from public investment may exist (BLM 1990). Additionally, allotments are categorized as Maintain where land health standards are met or where livestock grazing on public land is not a significant causal factor for not meeting the standards and current livestock management is in conformance with guidelines developed by the State Directors in consultation with Resource Advisory Councils. Allotments where an evaluation of land health standards has not been completed, but existing monitoring data indicates that resource conditions are satisfactory (BLM 2008a).

Category "C" (Custodial): The category for allotments where (1) present range condition is not in a downward trend; (2) the allotment has a low vegetative production potential and is producing near this level; (3) there may or may not be limited conflicts between livestock grazing and other resources; (4) present management is satisfactory or is the only logical management under existing conditions; and (5) opportunities for a positive economic return on public investments do not exist (BLM 1990). Additionally, allotments are categorized as Custodial where public lands produce less than 10 percent of the forage in the allotment or are less than 10 percent of the land area. An allotment should generally not be designated Category C if the public land in the allotment contains: (1) critical habitat for a threatened or endangered species, (2) wetlands negatively affected by livestock grazing (BLM 2008a).

Allotment Management Plan: A written program of livestock grazing management, including supportive measures if required, designed to attain specific management goals in a grazing allotment.

Alluvial: Composed of alluvium or deposited by a stream or running water.

Alluvium: A general term for all deposits resulting from the operations of modern rivers and creeks, including the sediments laid down in riverbeds, floodplains, and fans at the foot of mountain slopes.

Analysis Area: Any lands, regardless of jurisdiction, for which the BLM synthesizes, analyzes, and interprets data for information that relates to planning for BLM-administered lands.

Animal Unit Month (AUM): A standardized measurement of the amount of forage necessary for the sustenance of one cow unit or its equivalent for 1 month (approximately 800 pounds of forage).

Animal-unit: Considered to be one mature cow of approximately 1,000 pounds, either dry or with calf up to 6 months of age, or their equivalent, based on a standard amount of forage consumed.

Anticline or Anticlinal: A fold, generally convex upward, whose core contains the stratigraphically older rocks; also configuration of folded, stratified rocks in which the rocks dip or incline in two directions away from the crest, like the two halves of a pitched roof (BLM 2006; American Geological Institute 2005).

Appropriate Management Level: The number of adult horses or burros (expressed as a range with an upper and lower limit) to be managed within an HMA. The appropriate management level range is the number of adult wild horses and burros within which herd size will be allowed to fluctuate. The upper limit of the range is the maximum number of wild horses and burros that results in a thriving natural ecological balance and avoids a deterioration of the range; the lower limit of the range is the number that allows the population to grow to the appropriate management level upper limit over 4 to 5 years, without the need for gathers to remove excess wild horse and burros in the interim.

Archaeology: A method of the discovery, study and reconstruction of past human cultures from material remains such as artifacts and sites.

Archaeological Site: A place which holds evidence of past human activity.

Archeological Landscape District: A significant concentration, linkage, or continuity of cultural resource sites important in history or prehistory (BLM 2002b).

Archaic: Ancient, old, or surviving from an earlier people. Archaic can also mean relating to an earlier time.

Area of Critical Environmental Concern (ACEC): An area within the public lands designated for special management attention to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. According to 43 CFR 1601.0-5a, "The identification of...[an] ACEC shall not, of itself, change or prevent change of the management or use of public lands."

Areas Administratively Unavailable to Leasing: BLM H-1601-1 – Land Use Planning, Appendix C.4 uses the term “areas closed to oil and gas leasing.” Areas administratively unavailable or closed to oil and gas leasing are areas where it has been determined that other land uses or resource values cannot be adequately protected with even the most restrictive oil and gas leasing stipulations; appropriate protection can be ensured only by making the areas administratively unavailable to oil and gas leasing for the life of the plan. Lands currently under lease would remain leased for the life of the leases. After expiration of these leases, no lands would be available for lease.

Aridisols: Soils developed in arid environments with subsurface development that contains calcium carbonate ($CaCO_3$).

Arroyo: A deep gully from the Spanish word riachuelo meaning stream, brook, small river or the dry bed of a waterway in the southwestern part of the United States.

Arroyo Traps: A dead end arroyo that was deep and broad enough to trap bison. Hunters drove a group of bison into one. When the stampeding bison reached the dead end, hunters armed with spears slaughtered the struggling animals.

Artifact: Any object made, modified, or used by humans usually, but not necessarily portable.

Assessment Unit: A mapable volume of rock within a total petroleum system that encompasses accumulations (discovered and undiscovered) that share similar geologic traits and socio-economic factors. Accumulations within an assessment unit should constitute a sufficiently homogeneous population such that the chosen methodology of resource assessment is applicable. A total petroleum system might equate to a single assessment unit. If necessary, a total petroleum system can be subdivided into two or more assessment units in order that each unit is sufficiently homogeneous to assess individually. An assessment unit may be identified as conventional, if it contains conventional accumulations, or as continuous, if it contains continuous accumulations.

Associated Settings: The geographic extent of the resources, qualities, and values or landscape elements within the surrounding environment that influence the trail experience and contribute to resource protection. Settings associated with a National Scenic or Historic Trail include scenic, historic, cultural, recreation, natural (including biological, geological, and scientific), and other landscape elements (see resources, qualities, and values).

Atlatl: A spear thrower that extended the range of a thrown spear. Using it caused the spear to go faster and farther than when it was thrown without an atlatl.

Avoid: A term used to address mitigation of some activity (i.e., resource use). Paraphrasing the Council on Environmental Quality Regulations (40 CFR 1508.20), avoidance means to circumvent, or bypass, an impact altogether by not taking a certain action, or parts of an action. Therefore, the term "avoid" does not necessarily prohibit a proposed activity, but it may require the relocation of an action, or the total redesign of an action to eliminate any potential impacts resulting from it.

Avoidance Areas: Areas where negative routing factors exist. ROWs either will not be granted in these areas, or—if granted—will be subject to stringent terms and conditions. In other words, ROWs would be *restricted* (but not necessarily prohibited) in these avoidance areas.

Avoidance Mitigation: Avoiding the impact altogether by not taking a certain action or parts of an action. (40 CFR 1508.20(a)) (e.g., may also include avoiding the impact by moving the proposed action to a different time or location).

Back Country Byway:

> **Back Country Byway Type I:** Byways that are either paved or have an all-weather surface. Normal passenger cars can easily negotiate the roads. They are usually narrow, slow-speed, secondary roads. None of the byways follow the main highways.
>
> **Back Country Byway Type II:** Roads that require high-clearance trucks or four-wheel-drive vehicles, although passenger cars may be able to negotiate them under good conditions. These roads are not paved but often have an improved gravel surface. They often cross dry, rocky arroyos, have rough rutted sections, and have occasional steep grades and sharp curves.
>
> **Back Country Byway Type III:** Byways requiring four-wheel-drive vehicles and others such as dirt bikes and all-terrain vehicles (ATVs). These roads are often unimproved dirt tracks. Expect steep grades, rocky and muddy sections, and possible route-finding. Do not attempt these byways in a two-wheel-drive vehicle, the consequences could be serious for operator/passenger and car.
>
> **Back Country Byway Type IV:** Trails that are managed for snowmobile, dirt bike, mountain bike, or ATV use.

Basal Area: An area of land that is occupied by the cross-section of tree trunks and stems at their base.

Baseline: The pre-existing condition of a defined area and/or resource that can be quantified by an appropriate metric. During environmental reviews, the baseline is considered the affected environment that exists at the time of the review's initiation, and is used to compare predictions of the effects of the proposed action or a reasonable range of alternatives.

Basement Rock: A complex of undifferentiated rocks that underlies the oldest sedimentary rocks (SOP and WLA no date).

Basin: An extent of land where water from rain or snow melt drains downhill into a body of water, such as a river, lake, reservoir, estuary, wetland, sea or ocean. The basin includes both the streams and rivers that

convey the water as well as the land surfaces from which water drains into those channels, and is separated from adjacent basins by a drainage divide.

Best Management Practices (BMP): A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes. Best management practices are often developed in conjunction with land use plans, but they are not considered a land use plan decision unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory.

Benefits-Based Management: Method for prescribing wildland recreation management from analysis in identifying and applying psychological motivators of participants in leisure activities. Benefits-based management is used in prescribing management, administration, monitoring, and marketing actions based on identified on-site desired experiences and lasting desired beneficial outcomes from activities influenced from the local recreational setting character conditions.

Big Game Crucial Winter Range: Winter habitat on which a wildlife species depends for survival. Because of severe weather conditions or other limiting factors, no alternative habitat would be available.

Biodiversity: The range of biological resources present in a particular region. It can be measured by the numbers and types of different ecosystems, species, or the genetic variation within species.

Biologically Significant Unit: In Wyoming, the Biologically Significant Unit for greater sage-grouse is Priority Habitat Management Areas (PHMAs), regardless of whether PHMAs cross multiple planning boundaries.

Borrow Material: A term used in conjunction with construction. The term refers to unprocessed material excavated from a borrow pit for use as fill at another location.

Bow and Arrow: A bow is a weapon for shooting arrows. It is made of a flexible material, often wood, that is bent by a string that is fastened to each end. An arrow is a straight slender stick that has a projectile point at one end and feathers on the other.

C Category (Custodial): see *Allotment Categorization*.

Carbon Dioxide Flood: A carbon dioxide flood (CO_2) is an enhanced oil recovery technique that injects fluid into the reservoir. When carbon dioxide is injected, it mixes with the oil and the two compounds dissolve into one another. The injected CO_2 acts as a solvent to overcome forces that trap oil in tiny rock pores and helps sweep the immobile oil left behind after the effectiveness of water injection decreases, resulting in increased oil production (EnCana 2005).

Carbon Isotope Excursion: A marked deviation in the atmospheric C^{13}/C^{12} ratio due to a change in the global primary productivity level.

Carrying Capacity: The maximum stocking rate possible which is consistent with maintaining or improving vegetation or related resources. It may vary from year to year on the same area due to fluctuating forage production.

Casual Collecting: The collecting of a reasonable amount of common invertebrate and plant paleontological resources for non-commercial personal use, either by surface collection or the use of non-powered hand tools resulting in only negligible disturbance to the Earth's surface and other resources.

Category (see *Allotment Categorization*): The criteria used for the placement of the allotments into categories based on resource potential, resource use conflicts or controversy, opportunity of positive economic return on public investments, and the present management situation (BLM 1990).

Cattleguard: A device or structure, at points where roads or railroads cross a fence line, that is so designed that vehicular travel is uninterrupted, but crossing by all kinds of livestock is restricted.

Causal: Relating to a cause or causes; relating to a cause of effect.

Cheatgrass: Cheatgrass (*Bromus tectorum*) is an annual grass that forms tufts up to 2 feet tall. The leaves and sheaths are covered in short, soft hairs. The flowers occur as drooping, open, terminal clusters that can have a greenish, red, or purple hue. Flowering occurs in the early summer. These annual plants will germinate in fall or spring (fall is more common), and senescence usually occurs in summer. Cheatgrass invades rangelands, pastures, prairies, and other open areas. Cheatgrass has the potential to completely alter the ecosystems it invades. It can completely replace native vegetation and change fire regimes and is most problematic in areas of the western United States with lower precipitation levels.

Class I Wells: Injection wells that are:

(1) Used by generators of hazardous waste or owners or operators of hazardous waste management facilities to inject hazardous waste beneath the lowermost formation containing, within ¼ mile of the well bore, an underground source of drinking water.

(2) Other industrial and municipal disposal wells that inject fluid beneath the lowermost formation containing, within ¼ mile of the well bore, an underground source of drinking water.

(3) Radioactive waste disposal wells that inject fluid below the lowermost formation containing an underground source of drinking water within ¼ mile of the well bore.

Class II Wells: Injection wells that are:

(1) Brought to the surface in connection with natural gas storage operations, or conventional oil or natural gas production, and may be commingled with wastewaters from gas plants, which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection.

(2) For enhanced recovery of oil or natural gas.

(3) For storage of hydrocarbons that are liquid at standard temperature and pressure.

Closed: Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs.

Clovis Point: Spear point made by early Paleo-Indians; characterized by a short, shallow channel on one or both faces; larger than a Folsom point.

Colluvium: Rock fragments, sand, or soil material that accumulates at the base of slopes; slope wash (BLM 2008b).

Commercial Forestland: Capable of producing 20 cubic feet of wood fiber from commercial species per acre per year and has not been withdrawn from forest product harvest by law or statute.

Commodity: An economic good, such as a product of agriculture or mining.

Communal Hunt: A hunt in which all the group's able people joined. It may involve a number of groups and employ a technique that could kill many animals, such as bison (or buffalo) jump.

Communication Site Management Plan: A plan that provides for effective administration of a communications site. The site plan defines the principles and technical standards adopted in the site designation. The site plan provides direction for the day-to-day operations of the site in connection with

the lease. The site plan shall delineate the types of uses that are appropriate at this site and the technical and administrative requirements for management of the site. The site plan should reflect the complexity of the current situation and the anticipated demand for the site.

Community: (1) An assemblage of populations of plants and/or animals in a common spatial arrangement. (2) As assemblage of plants occurring together at any point in time, while denoting no particular ecological status. (3) A unit of vegetation.

Community Phase: A unique assemblage of plants and associated dynamic soil property levels that can occur within a state (Caudle et al. 2013).

Community Recreation-tourism Market: A community or communities dependent on public lands recreation or related tourism use, growth, or development. Major investments in facilities and visitor assistance are authorized within SRMAs where the BLM's strategy is to target demonstrated community recreation-tourism market demand. Here, recreation management actions are geared toward meeting primary recreation-tourism market demand for specific activity, experience, and benefit opportunities. These opportunities are produced through maintenance of prescribed natural resource or community setting character and by structuring and implementing management, marketing, monitoring, and administrative actions accordingly.

Compensatory Mitigation: Compensating for the (residual) impact by replacing or providing substitute resources or environments. (40 CFR 1508.20)

Compensatory Mitigation Projects: Specific, on-the-ground actions to improve and/or protect habitats (e.g., chemical vegetation treatments, land acquisitions, conservation easements).

Compensatory Mitigation Sites: The durable areas where compensatory mitigation projects will occur.

Comprehensive Weed Management Plan: A plan for controlling invasive plant species that incorporates integrated weed management techniques and accounts for pertinent considerations, such as management actions and allocations affecting weeds.

Context and Intensity (NEPA): Determining the significance of an impact under NEPA requires consideration of the context and intensity. Context is the significance of an action that must be analyzed in its current and proposed short- and long-term effects on the whole of a given resource (e.g., the affected region). Intensity refers to the severity of the effect, expressed qualitatively (relative comparable terms) or quantitatively (empirically measurable units).

Continuous Grazing: The grazing of a specific unit by livestock throughout a year or that part of the year during which grazing is feasible. The term is not necessarily synonymous with yearlong grazing, since seasonal grazing may be involved.

Cool-Season Plant: A plant which generally makes the major portion of its growth during the late fall, winter, and early spring. Cool-season species generally exhibit the C3 photosynthetic pathway.

Nonconsumptive Use: This is a use that does not reduce supply. For example, wildlife viewing does not reduce the supply of wildlife as opposed to big game hunting, which reduces the supply of big game.

Contrast: Opposition or unlikeness of different forms, lines, colors, or texture in a landscape.

Controlled Surface Use (CSU): Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts. Identified resource values require special operational constraints that may modify the lease rights. CSU is used for operating guidance, not as a substitute for the no surface occupancy (NSO) or timing limitations.

Cordage: Plant fibers twisted into cord, rope, or yarn.

Core Areas: An area of habitat of an appropriate size, configuration, and plant community type as to be capable of supplying all elements for the long-term security of a population of a given species (County of Riverside No Date).

Cover: (1) The plants or plant parts living or dead, on the surface of the ground. Vegetative cover or herbage cover is composed of living plants and litter cover of dead parts of plants. (2) The area of ground cover by plants of one or more species.

Critical Growing Season (Growth Period): A specified period of time in which plants need to develop sufficient carbohydrate reservoir and produce seed. This period of time varies by growth form. For example: Cool season bunchgrasses: May 1 – July 15; Warm season perennial grasses: June 1 – July 30; Riparian vegetation: July 1 through August 30.

Cryic Soils: Soil temperature regime that has mean annual soil temperatures between 0°C and 8°C (32°F and 47°F) (University of Wyoming 1999).

Cultural Resource Inventory Levels: A three-tiered process for discovering, recording, and evaluating cultural resources.

> **Class I** - A review of existing literature and oral informant data combined with an analysis of a specific geographic region (e.g., an area of potential effect, drainage basin, resource area, etc.).
>
> **Class II -** A sampling survey usually aimed at developing and testing a predictive model of cultural resource distribution.
>
> **Class III -** An on-the-ground survey to discover, record, and evaluate cultural resources within a specific geographic area (e.g., usually an area of potential effect for a proposed undertaking).

Cultural Resources Setting Consideration Zones (SCZ): Zones of view shed management of "X" distance or the visual horizon, whichever is closer, from the external site boundaries, created to reduce visual and acoustic impacts to cultural resources for which the elements of setting and association are important. Where the vegetation, rock formations, open space, and bodies of water that made up the environmental setting during the periods of prehistoric or historic occupation or use are intact, management actions will be modified to maintain the long term integrity of those features. The current integrity of environmental features or factors related to the location, use, formation, or preservation of the site will be the important factors for determining appropriate management actions.

Culture: The customs, beliefs, and ways of life of a group of people.

Cultivate: To raise crops; to water, loosen the soil, and weed around growing plants.

Cultivation: The process of preparing the land and caring for growing crops.

Dark Zone Cave: An environmental zone found in deep and extensive caves. This cave zone is typified by complete darkness, almost constant temperature and humidity, and a unique array of cave-adapted organisms.

dB (decibel): A unit of measurement of the loudness or strength of a signal. One decibel is considered the smallest difference in sound level that the human ear can discern. Decibels are a relative measurement derived from two signal levels: a reference input level and an observed output level. A decibel is the logarithm of the ratio of the two levels. One Bel is when the output signal is 10 times that of the input and one decibel is 1/10 of a Bel.

Declared Pest: Any animal or insect which the board and the Wyoming weed and pest council have found, either by virtue of its direct effect, or as a carrier of disease or parasites, to be detrimental to the general welfare of persons residing within a district.

Declared Weed: Any plant which the board and the Wyoming weed and pest council have found, either by virtue of its direct effect, or as a carrier of disease or parasites, to be detrimental to the general welfare of persons residing within a district (State of Wyoming 1973).

Deferment: Delay of livestock grazing on an area for an adequate period of time to provide for plant reproduction, establishment of new plants, or restoration of vigor of existing plants. Rest is not defined as deferment in the Cody Field Office.

Deferred Grazing: The use of deferment in grazing management of a management unit, but not in a systematic rotation including other units. In the Cody Field Office, this is usually used to identify grazing use after the growing season, generally after August 15.

Deferred-rotation: Any grazing system which provides for a systematic rotation of the deferment among pastures.

Dendrochronology: The study of tree-ring dating. The science of dating events and weather patterns in former times by studying growth rings in trees. One can determine the age of a tree by counting its rings.

Designated Noxious Weeds: Weeds, seeds, or other plant parts that are considered detrimental, destructive, injurious, or poisonous, either by virtue of their direct effect or as carriers of diseases or parasites that exist within this state, and are on the designated list.

Designated Pests: Animals or insects which are on the designated list considered detrimental to the general welfare of the state (State of Wyoming 1973).

Designated Roads and Trails: A network of roads and trails specifically identified as the official travel and transportation network for a given area on which some type of motorized vehicle use is allowed either seasonally or year-long. Designated roads and trails are identified on maps, identified by signs in the field, and may be assigned road numbers for inventory and identification purposes. This may include routes on the official BLM transportation plan that are routinely maintained as well as routes that were user-created and which receive no regular maintenance. Vehicle travel is permitted only on roads and vehicle routes designated by the BLM. In areas where no formal travel management plan has been implemented, motorized use is limited to existing roads and trails on an interim basis.

Desired Future Condition (DFC): A portrayal of the land or resource conditions which are expected to result if goals and objectives are fully achieved (BLM and USFS 2001).

Desired Future Condition (DFC) for Riparian and Wetlands (after 20-40 years of management):

- Proper functioning conditions on all riparian and wetland habitats.
- Riparian and wetland vegetation supports proper functioning condition of biologic, hydrologic, and physical components of streams and wetlands.
- Systems are vertically stable (no downcutting).
- Floodplain connectivity.
- Herbaceous plant communities are composed of functional and structural plant groups that are dominated by deep-rooted native species that support streambank and shoreline stability, floodplain development, water quality, and nutrient cycling. Also includes woody species and cottonwoods within the site's potential.
- Management of invasive, noxious, and undesirable species.
- Provide 'Yellow, Red and Blue Ribbon' streams on those systems with fish habitat potential.

Desired Plant Community (DPC): Of the several plant communities that may occupy a site, the DPC is the community that has been identified through a management plan to best meet the plan's objectives for the site. At a minimum, it must protect the site.

Destination Recreation-Tourism Market: National or regional recreation-tourism visitors and other constituents who value public lands as recreation-tourism destinations. Major investments in facilities and visitor assistance are authorized within special recreation management areas (SRMAs) where the BLM's strategy is to target demonstrated destination recreation-tourism market demand. Here, recreation management actions are geared toward meeting primary recreation-tourism market demand for specific activity, experience, and benefit opportunities. These opportunities are produced through maintenance of prescribed natural resource setting character and by structuring and implementing management, marketing, monitoring, and administrative actions accordingly.

Determination (Standards and Guidelines [S&G]): Document recording the authorized officer's finding that existing grazing management practices or levels of grazing use on public lands grazing either are or are not significant factors in failing to achieve the standards and conform with the guidelines within a specified geographic area (preferably watershed or a group of contiguous watersheds) (BLM 2001).

Diet: What people and living organisms eat is their diet. A diet is a combination of foods and liquids that provide the necessary nutrients for the body.

Digging Stick: A pointed, wooden stick used to dig and pry edible roots from the ground.

Disruptive Activity: Those activities that disrupt or alter wildlife actions at key times, during important activities, or in important areas (feeding, breeding, nesting, herd movement, winter habitat). Disruptive activities are those which can result in reductions of energy reserves, health, reproductive success, or population. Some examples of disruptive activities include geophysical (seismic), well plugging or work-over operations that last 24 to 48 hours or longer, road reclamation, and wild horse grazing and management. Emergency activities, rangeland monitoring, recreational activities, livestock grazing and management, and other field activities are not considered disruptive activities (BLM 2008f).

Domestication: The process of taming or making usable for humans.

Drive Line: Alignments of stone, brush, logs or other materials designed to control the movement of animals during hunts.

Driveway: A strip of land specifically designated for the controlled movement of livestock.

Drought: (1) A prolonged chronic shortage of water, as compared to the norm, often associated with high temperatures and winds during spring, summer, and fall. (2) A period without precipitation during which the soil water content is reduced to such an extent that plants suffer from lack of water.

Dung: Animal manure. Solid waste material passed from the bowels of animals. Scientists study dung to learn what animals and humans ate in the past.

Durability (protective and ecological): The maintenance of the effectiveness of a mitigation project for the duration of the associated impacts, which includes resource, administrative/legal, and financial considerations (adopted and modified from BLM Manual Section 1794).

Ecological Site: A distinctive kind of land with specific soil and other physical characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond to management actions and natural disturbances.

Ecological Site Description (ESD): The official documentation of an ecological site describing the distinctive properties and characteristics, the abiotic and biotic relationships, and the ecological dynamics

of the site. In addition an ESD also provides interpretations about land uses and ecosystem services that a particular ecological site can support and management alternatives for achieving land management objectives.

Ecological Status: Ecological status is the present state of vegetation of a range site in relation to the potential natural community for that site. It is an expression of the relative degree to which the kinds, proportions and amounts of plants in a plant community resemble that of the potential natural plant community for the site. Four classes are used to express the degree to which the production or composition of the present plant community reflects that of the potential natural community (climax).

Ecosystem: A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

Eligible River: An eligible river segment found through administrative study to meet the criteria for designation as a component of the National System, as specified in Section 4(a) of the Wild and Scenic Rivers Act.

Endangered Species: A plant or animal species whose prospects for survival and reproduction are in immediate jeopardy, as designated by the Secretary of the Interior, and as is further defined by the Endangered Species Act.

Enhanced Recovery: The use of artificial means to increase the amount of hydrocarbons that can be recovered from a reservoir. A reservoir depleted by normal extraction usually can be restored by secondary or tertiary methods of enhanced recovery.

Enhancement: A management action designed to improve visual quality.

Entisols: Soils with little or no development.

Environment: The conditions around an area that affect it. These include geography, soil, climate, plants, and animals.

Ephemeral Stream: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table. Confusion over the distinction between intermittent and ephemeral streams may be minimized by applying Meinzer's suggestion that the term "ephemeral" be arbitrarily restricted to streams that do not flow continuously for at least 30 days (Prichard et al. 1998). Ephemeral streams support riparian areas when streamside vegetation reflects the presence of permanent subsurface water.

Epicontinental Seaway: Shallow sea extending far into a continent.

Epidemic: An outbreak of a pest or disease in a high proportion of the individuals of a population in a geographic area. For example, outbreaks of bark beetles causing mortality in a large portion of pine trees in a forest.

Evaluation (S&G): An evaluation is conducted to arrive at 2 outcomes. Firstly, an evaluation conducts an analysis and interpretation of the findings resulting from the assessment, relative to land health standards, to evaluate the degree of achievement of land health standards. Secondly, an evaluation conducts an analysis and interpretation of information--be it observations or data from inventories and monitoring--on the causal factors for not achieving a land health standard. An evaluation of the causal factors provides the foundation for a determination (see *Determination*) (BLM 2001).

Evidence: Data which are used to prove a point, or which clearly indicate a situation.

Excavation (Archaeological): Carefully removing layers of dirt or sediment to find objects or features made by people from long ago.

Exceedance: An event in which measurements of ambient air quality are above the national ambient air quality standard (NAAQS) or Wyoming Department of Environmental Quality (DEQ) standard set for a particular pollutant. For example, an annual average nitrogen dioxide value of 110 µg/m^3 is an exceedance of both the NAAQS and Wyoming DEQ annual average standard for nitrogen dioxide of 100 µg/m^3.

Exclusion Areas: Areas with sensitive resource values where rights-of-way (ROWs) and 302 permits, leases, and easements would not be authorized.

Existing Roads and Trails (interim existing roads and trails): Defined as routes existing prior to the date the OHV designation is announced in the *Federal Register*. These routes may have been constructed and maintained or may be two-track routes created and maintained by the passage of motor vehicles and which receive regular use. Roads and trails may be added, modified, or deleted by the Bureau from the inventory through authorizations as needs arise. Recent CTTM guidance (BLM Handbook 8342-1) directed the BLM to manage all BLM-administered public lands under "Designated Roads and Trails". Existing roads and trails is to be used on an interim basis until a Travel Management Plan designates each individual route as open or closed for motorized use. The term "interim existing roads and trails", or "existing roads and trails" are used to identify areas of low priority for travel management planning.

Extensive Recreation Management Areas (ERMA): *See Recreation Management Areas*.

Extinct: No longer existing or active; died out.

Extinction: Bring to an end, wiping out, or destruction.

Fault: A fracture in bedrock along which there has been vertical and/or horizontal movement caused by differential forces in the earth's crust (BLM 2008f).

Fire Management Plan: Identifies appropriate strategies to achieve resource objectives. Identifies fire policy, objectives, and prescribed actions; may include maps, charts, tables, and statistical data.

Fire Regime Condition Class: A classification of the amount of departure from the natural fire regime. The departure results in changes to one or more of the following ecological components: vegetation characteristics (e.g., species composition, structural stages, stand age, canopy closure, and mosaic pattern), fuel composition, fire frequency, severity, and pattern, and other associated disturbance (e.g., insect and disease mortality, grazing, and drought). The three condition classes are listed below:

Condition Class 1:

- The historic disturbance regime is largely intact and functioning (e.g., has not missed a fire return interval)
- Potential intensity and severity of fire within historic range
- Effects of disease and insects within historic range
- Hydrologic functions within normal historic range
- Vegetation composition and structure resilient to disturbances
- Nonnative species currently not present or to a limited extent
- Low risk of loss for key ecosystem components.

Condition Class 2:

- Moderate alterations to historic disturbance regime evident (e.g., missed one or more fire return intervals)
- Effects of disease and insects pose an increased risk of loss of key community components

- Riparian areas and associated hydrologic function show measurable signs of adverse departure from historic conditions
- Vegetation composition and structure shifted toward conditions less resilient to disturbances
- Populations of nonnative species may have increased, increasing the risk of further increases following disturbance.

Condition Class 3:

- Historic disturbance regime significantly altered; historic disturbance processes and impacts may be precluded (e.g., missed several fire return intervals)
- Effects of disturbance (fire, insects, and disease) may cause significant or complete loss of key community components
- Hydrologic functions may be adversely altered; high potential for increased sedimentation and reduced streamflows
- Invasive, nonnative species may be common and in some cases the dominant species on the landscape; disturbance will likely increase both the dominance and geographic extent of these invasive species
- Highly altered vegetation composition and structure predisposes community to disturbance events outside the range of historic availability; disturbance may have effects not observed or measured before.

Fire Return Interval: The number of years between two successive fire events at a specific site or area.

Flaring/Venting: The controlled burning (flare) or release (vent) of natural gas that cannot be processed for sale or use because of technical or economic reasons.

Floodplain Connectivity: Maintenance of lateral, longitudinal, and vertical pathways for biological and hydrological processes in the floodplain. Examples of failures to maintain connectivity could include culverts or levees that restrict flow in the floodplain and that focus overbank flow into the channel.

Floristic Province: Areas of ecological and biological issues similarity (Stiver et al. 2006).

Flushing Livestock: Flushing livestock is the holding of livestock in an invasive, nonnative plant species (INPS) seed-free area where they are fed an INPS seed-free ration for 72 hours, thus flushing INPS seed from the animals' digestive systems.

Fluvial: Pertaining to rivers, streams, and floodplains (BLM 2006).

Folsom Point: A spear or atlatl dart point made by later Paleo-Indians. Characterized by a long, shallow channel on one or both faces; smaller than a Clovis point.

Foothill: A low hill near the base of a mountain or range of mountains.

Forage: Browse and herbage that are available and may provide food for grazing animals or be harvested for feeding. To search for or consume forage.

Forage Production: The weight of forage that is produced within a designated period of time on a given area (e.g., pounds per acre). The weight may be expressed as either green, air-dry, or oven-dry. The term may also be modified as to time of production such as annual, current years, or seasonal forage production.

Foreground-Middle Ground Zone: An area that can be seen from a travel route for a distance of 3 miles (foreground) to 5 miles (middle ground) where management activities might be viewed. A distance from 5 to 15 miles is called the *Background Zone* and the area beyond 15 miles is called the *Seldom-Seen Zone.*

Foreland Basin: A linear sedimentary basin in a foreland which subsides in response to flexural loading of the lithosphere by adjacent thrust sheets; also a depression that develops adjacent and parallel to a mountain belt (American Geological Institute 2005).

Forestland: Capable of producing 20 cubic feet of wood fiber from commercial species per acre per year.

Fossil: Fossils are any naturally occurring evidence of life older than 10,000 years.

Frigid (soils): The frigid soil temperature regime has mean annual soil temperatures below 8°C (47°F) but above 0°C (32°C). Frigid soils are described as cool (University of Wyoming 1999).

Functional/Structural Groups: A suite of species that are grouped together, on an ecological site basis, because of similar shoot (height or column) or root (fibrous vs. tap) structure, photosynthetic pathways, nitrogen fixing ability, or life cycle (University of Wyoming 1999).

Fundamentals of Rangeland Health: Overarching principles of rangeland health, listed at 43 CFR § 4180.1, which establish BLM policy of managing for healthy rangelands (60 Federal Register (FR) at 9954). State or regional standards and guidelines must provide for conformance with the Fundamentals of Rangeland Health (43 CFR § 4180.2(b)) (BLM 2001).

Geographic Information System (GIS): A computer system capable of storing, analyzing, and displaying data and describing places on the earth's surface.

Geologic Province: A spatial entity with common geologic or geomorphic attributes. A province may include a single dominant structural element such as a basin or a fold belt, or a number of contiguous related elements.

Geologic Resources: Resources associated with the scientific study of the Earth, including its composition, structure, physical properties, and history. Geologic resources commonly include the study of minerals (mineralogy) and rocks (petrology); the structure of the Earth (structural geology) and volcanic phenomena (volcanology); and landforms and the processes that produce them (geomorphology and glaciology).

Glacier: A large mass of ice that moves slowly down a slope or valley.

Goal: A broad statement of a desired outcome. Goals are usually not quantifiable and may not have established timeframes for achievement.

Goal Interference: Recreationist pursuing desired beneficial outcomes is not able to realize the positive aspects of a visit because of the behavior of someone else.

Granitic: General term for all light-colored, granite-like igneous rocks (BOR no date).

Graze: (1) The consumption of standing forage by livestock or wildlife. (2) To put livestock to feed on standing forage.

Grazing: To graze.

Grazing License or Permit: Official written permission to graze a specific number, kind, and class of livestock for a specified period on a defined allotment or management area.

Grazing Management: The manipulation of grazing and browsing animals to accomplish a desired result.

Grazing Management Plan: A program of action designed to secure the best practicable use of the forage resource with grazing or browsing animals.

Grazing Period: The length of time that animals are allowed to graze on a specific area.

Grazing Permit: A document that authorizes grazing use of the public lands under Section 3 of the Taylor Grazing Act. A grazing permit specifies terms and conditions under which permittees make grazing use during the term of the permit. Terms and conditions include the area authorized for grazing use, the number of livestock, period of use, and amount of use in AUMs and others.

Grazing Preference: (1) Selection of plants, or plant parts, over others by grazing animals. (2) Grazing preference means a superior or priority position against others for the purpose of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by the permittee or lessee. (Title 43 CFR 4100.0-5).

Grazing Season: (1) On public lands, and established period for which grazing permits are issued. May be established on private land in a grazing management plan. (2) The time interval when animals are allowed to utilize a certain area.

Grazing System: A specialization of grazing management which defines the periods of grazing and non-grazing.

Great Basin: is a large, arid region of the western United States, commonly defined as the contiguous watershed region, roughly between the Rocky Mountains and the Sierra Nevada, that has no natural outlet to the sea (WordIQ no date).

Greenhouse Gas (GHG): Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the greenhouse effect. Water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere.

Growing Season: In temperate climates, that portion of the year when temperature and moisture permit plant growth.

Guidelines: Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as best management practices. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory.

Guzzler: A water development for wildlife.

Habitat: The natural abode of a plant or animal, including all biotic, climatic, and edaphic factors affecting life.

Habitat Fragmentation: The destruction or splitting up of continuous habitat by a physical barrier (e.g., fence) or a land use that results in surface disturbance (e.g., road construction, development, or agriculture).

Habitat Guild: A group of species that tend to occur in similar types of habitats.

Habitat Management Area (HMA): An area containing a specific habitat type(s) that is managed for the maintenance or recovery of a particular species.

Habitat Management Plan (HMP): A written and approved activity plan for a geographical area of public lands which identifies wildlife habitat management actions to be implemented in achieving specific objectives related to RMP planning document decisions (BLM 1987).

HABS/HAER: The Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) is an integral component of the federal government's commitment to historic preservation. The program documents important architectural, engineering and industrial sites throughout the United States and its territories. A complete set of HABS/HAER documentation, consisting of measured drawings, large-format photographs, and written history plays a key role in accomplishing the mission of creating an archive of American architecture and engineering and in better understanding what historic resources tell us about America's diverse ethnic and cultural heritage. To insure that such evidence is not lost to future generations, the HABS/HAER Collections are archived at the Library of Congress, where they are made available to the public.

Hazard Fuels: A fuel complex defined by kind, arrangement, volume, condition, and location that presents a threat of ignition and resistance to control.

Hazardous Material: A substance or combination of substances that, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either: (1) cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Heavy Equipment Use: This phrase is used in fire management and is relative to limiting fire suppression tactics. In this context it refers to not using dozers, skidders, or graders in areas where important resource values are in need of protection. Fire engines and water tenders used during suppression activities would be allowed.

Held by Production: Leases that become productive and do not terminate until all wells on the lease have ceased production.

High Potential Historic Site: Historic sites related to the route or sites in close proximity thereto which provide opportunity to interpret the historic significance of the trail during the period of its major use. The criteria for consideration of sites as high potential historic sites include historic significance, presence of visible historic remnants, scenic quality, and relative freedom from intrusion. High potential historic sites are assumed to contain remnants, artifacts, and other properties eligible for the National Register of Historic Places, pending evaluation. Under the National Trails System Act, high potential historic sites located on federally owned land are referred to as Federal Protection Components.

High Potential Route Segment: Segments of a trail which would afford a high-quality recreation experience in a portion of the route having greater than average scenic values or affording an opportunity to vicariously share the experience of the original users of a historic route. National Historic Trail high potential route segments are assumed to contain remnants, artifacts, and other properties eligible for the National Register of Historic Places, pending evaluation. Under the National Trails System Act, high potential route segments located on federally owned land are referred to as Federal Protection Components.

Historic: Referring to the time after written records or after the Europeans first came and wrote about the people and events in America.

Historic Trails: Generally those routes utilized during the initial exploration and settlement of an area. These routes are known from maps and other documents and may also retain physical integrity on the ground (see also *National Historic Trails).*

History: The study of past events and times through use of written and recorded sources. In some cases, oral sources may also be available.

House Pit: A dwelling that had an excavated floor and a roof of poles covered with branches or hides. An earth sheltered home that was probably used on a seasonal basis.

Hunter-gatherers: People who depend on seasonally available wild animals and plants for food to survive.

Hydrologic Units: The United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions).

I Category (Improve): See *Allotment Categorization*.

Impact Analysis for Planning (IMPLAN 2000) Model: IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the "ripple effect" (also called the "multiplier effect") of changes in economic sectors that may not be directly impacted by management actions, but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly affected) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

Important Cultural Resources: All historic properties allocated to Conservation for Future, Scientific, and Traditional use categories. Additionally on a case by case basis some historic properties assigned to Experimental, and Public use categories may be determined to be included in this class of resource.

Important Cultural Sites: See *Important Cultural Resources*.

Inceptisol: A soil order in the United States Department of Agriculture (USDA) soil taxonomy characterized by young soils just starting to show horizon development.

Increaser: Plant species of the original vegetation that increase in relative amount, at least for a time, under continued disturbance to the norm.

Indicator: An indicator is a component of a system whose characteristics (for example, presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. An indicator can be evaluated at a site- or species-specific level. Monitoring of an indicator must be able to show change within timeframes acceptable to management and be capable of showing how the health of the ecosystem is changing in response to specific management actions. Selection of the appropriate indicators to be observed, measured, or monitored in a particular allotment is a critical aspect of early communication among the interests involved on-the-ground. The most useful indicators are those for which change or trend can be easily quantified and for which agreement as to the significance of the indicator is broad based.

Indigenous: Born, growing, or produced naturally (native) in an area, region or county.

Infestation: The inhabitation of a host by large numbers of pests, such as bark beetles on pine trees. Invasion by large numbers of parasites or pests.

Infiltration: The downward entry of water into the soil or other material.

Integrated Weed Management: The use of all appropriate weed control measures, including fire, as well as mechanical, chemical, biological, and cultural techniques, in an organized and coordinated manner on a site-specific basis.

Interested Public: Interested public means an individual, group, or organization that has: (1)(i) Submitted a written request to BLM to be provided an opportunity to be involved in the decision making process as

to a specific allotment, and (ii) Followed up that request by submitting written comment as to management of a specific allotment, or otherwise participating in the decision making process as to a specific allotment, if BLM has provided them an opportunity for comment or other participation; or (2) Submitted written comments to the authorized officer regarding the management of livestock grazing on a specific allotment (CFR 4100.0-5).

Interim Management Policy (IMP): The policy and guidelines under which the BLM manages lands under wilderness review (known as Wilderness Study Areas). This policy is referred to as the "interim" management policy because it applies to specific areas of the public lands for a limited amount of time, depending upon various stages and schedules of the review process (BLM Manual 8550).

Intermittent Stream: A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas. Confusion over the distinction between intermittent and ephemeral streams may be minimized by applying Meinzer's suggestion that the term "intermittent" be arbitrarily restricted to streams that flow continuously for periods of at least 30 days (Prichard et al. 1998).

Invasive Species: According to Executive Order 13112, an invasive species is an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. The executive summary of the National Invasive Species Management Plan further clarifies and defines an invasive species as a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Inventory: Gathering of baseline information (including quantitative data, cultural knowledge, and qualitative observations) about condition of resources. Examples of inventory are Ecological Site Inventory, and Population Counts of Threatened or Endangered Species (BLM 2001).

Karst Region: Karst topography is a landscape shaped by the dissolution of a layer or layers of soluble bedrock, usually carbonate rock such as limestone or dolomite. Due to subterranean drainage, there may be very limited surface water, even to the absence of all rivers and lakes. Many karst regions display distinctive surface features, with sinkholes or dolines being the most common. However, distinctive karst surface features may be completely absent where the soluble rock is mantled, such as by glacial debris, or confined by a superimposed non-soluble rock strata. Some karst regions include thousands of caves, even though evidence of caves that are big enough for human exploration is not a required characteristic of karst.

Key Area (grazing): A relatively small portion of a rangeland selected because of its location, use, or grazing value as an area on which to monitor the effects of grazing use. It is assumed that key areas, if selected properly, will reflect the effects of current grazing management over all or a part of a pasture, allotment or other grazing unit.

Key Area (greater sage-grouse): Sagebrush habitat where there are known leks, brood-rearing or winter sage-grouse habitat (BLM 2004).

Key Species: Those species which must, because of their importance, be considered in a management program, or forage species whose use serves as an indicator of the degree of use of associated species.

Kinds of Livestock (animal): An animal species or species group such as sheep, cattle, goats, deer, horses, elk, antelope, etc.

Lacustrine: Pertaining to, produced by, or formed in a lake or lakes (BLM 2006).

Land: The total natural and cultural environment within which production takes place; a broader term than soil. In addition to soil, its attributes include other physical conditions, such as mineral deposits,

climate, and water supply; location in relation to centers of commerce, populations, and other land; the size of the individual tracts or holdings; and existing plant cover, works of improvement, and the like.

Land Health: Degree to which the integrity of the soil and the ecological processes of ecosystems are sustained (BLM 2001).

Land Tenure: To improve the manageability of BLM lands and improve their usefulness to the public, the BLM has numerous authorities for "repositioning" lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land-pattern improvements are completed primarily through the use of land exchanges, but also through land sales, jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases. These ownership or jurisdictional changes are referred as "Land Tenure Adjustments."

Lands with Wilderness Characteristics: Lands that have been inventoried and found to contain wilderness characteristics as defined in Section 2(c) of the Wilderness Act of 1964.

Landscape Character: The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.

Leasable Minerals: Those minerals or materials subject to lease by the federal government under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium, and sodium minerals; oil and gas, as well as geothermal resources.

Lease: (1) A legal document that conveys to an operator the right to drill for oil and gas; (2) the tract of land, on which a lease has been obtained, where producing wells and production equipment are located. Contractual instruments granting rights to use specific managed public lands, with certain conditions, for specific purposes such as livestock grazing, timber harvesting, and energy or mineral development.

Lease Notice or Information Notice: Provides more detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A Lease Notice also addresses special items the lessee should consider when planning operations, but does not impose new or additional restrictions (Uniform Format for Oil and Gas Lease Stipulations, March 1989. Rocky Mountain Regional Coordinating Committee). An information notice has no legal consequences, except to give notice of existing requirements, and may be attached to a lease by the authorized officer at the time of lease issuance to convey certain operational, procedural or administrative requirements relative to lease management within the terms and conditions of the standard lease form. Information notices shall not be a basis for denial of lease operations (43 CFR 3101.1-3).

Lease Stipulation: A provision that modifies standard lease rights and is attached to and made a part of the lease (Uniform Format for Oil and Gas Lease Stipulations, March 1989. Rocky Mountain Regional Coordinating Committee). The authorized officer may require stipulations as conditions of lease issuance. "Stipulations shall become part of the lease and shall supersede inconsistent provisions of the standard lease form. Any party submitting a bid… shall be deemed to have agreed to stipulations applicable to the specific parcel…" (43 CFR 3101.1-3).

Lek: A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Before adding the suspected lek to the database, it must be confirmed by an additional observation made during the appropriate time of day, during the strutting season. Sign of strutting activity (tracks, droppings, feathers) can also be used to confirm a suspected lek. Sub-dominant males may display on itinerant (temporary) strutting areas during population peaks. Such areas usually fail

to become established leks. Therefore, a site where small numbers of males (<5) are observed strutting should be confirmed active for two years before adding the site to the lek database.

Lentic: Standing water riparian/wetland areas such as lakes, ponds, seeps, bogs, and meadows (University of Arizona No Date).

Limited Area: Means an area restricted, at certain times, in certain areas, and/or to certain vehicle use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: Number of vehicles; type of vehicles; time of season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions.

Livestock: Domestic animals.

Livestock Carrying Capacity: The maximum stocking rate possible without inducing damage to vegetation or related resources. It may vary from year to year on the same area due to fluctuating forage production.

Livestock Management: Application of technical principles and business methods to livestock production.

Livestock Operation: The management of a ranch or farm so that a significant portion of the income is derived from the production of livestock.

Livestock Production: (1) The weight, number of animals, etc., that a particular range, seeded pasture, or management system produces. (2) The business of producing livestock.

Locatable Minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of metallic minerals such as gold, silver, and other uncommon materials not subject to lease or sale.

Lotic: Running water riparian/wetland areas such as rivers, streams, and springs (University of Arizona No Date).

M Category (Maintain): See *Allotment Categorization*.

Major Constraints (Oil and Gas): Any stipulations or conditions of approval which may restrict the timing or placement of oil and gas developments and may result in an operator dropping the development proposal. Major constraints include NSOs, areas of overlapping TLS that last more than 6 months, areas closed to surface-disturbing activity, areas where surface-disturbing activity is prohibited, and VRM Class I areas. Leaseholders have the right to explore, develop, and produce mineral resources from any valid, existing lease, even if the area containing the lease were proposed to be closed to future leasing.

Major Land Resource Areas (MLRA): Broad geographic areas that are characterized by a particular pattern of soils, climate, water resources, vegetation, and land use.

Management Plan: A program of action designed to reach a given set of objectives.

Management Zone (greater sage-grouse): Biologically based management areas determined using sage-grouse populations and sub-populations identified within distinct floristic provinces. Management Zones reflect ecological and biological issues and similarities, not political boundaries. In addition, the vegetation communities found in the floristic provinces, as well as the management challenges within a given Management Zone, are similar and sage-grouse and their habitats are likely responding similarly to environmental factors and management actions (Stiver et al. 2006).

Mass Wasting: Down slope movement of soil or rock as a result of gravity.

Measureable Targeted Outcomes: A quantitative scale used to measure explicitly stated targeted experience and benefit outcomes as prescribed in each Recreation Management Area (SRMA, RMZ, Separate ERMA) though monitoring methods such as on site surveys, focus groups, or other means

appropriate and as funding allows to sample and collect data. Measurable targeted outcomes is ranged on a probability scale where 1=not at all, 2=somewhat, 3=neutral, 4=moderate, 5=total realization.

Mechanized Use: Use of public lands by human-powered vehicles (such as mountain bicycles).

Medicine Wheel: A stone structure or alignment which may include a ring, spokes, cairns, or other features. Many are rings with radial spokes and cairns in the center and along the ring. Others are simple radial spokes or combinations of both (Brumley 1988). These features are believed to have functions in ceremonial practices including astronomically based calendars. They are commonly found in association with other stone features (Brumley 1988).

Megafauna: Large animals especially in the last Ice Age or Pleistocene. These animals are now extinct and include mammoths, mastodons, American lions, American camels, and saber-toothed cats.

Mesic: Related to conditions of moderate moisture or water supply. Used to describe organisms occupying moist habitats.

Metamorphic Rock: Rocks that have undergone a fundamental change as the result of heat, pressure, and the chemical action of pore fluids and gases.

Middle Rocky Mountain Foreland: A sub-province within the Rocky Mountain System geologic province (see *Geologic Province*) that includes complex mountains with many intermontane foreland basins (see *Foreland Basin*) and plains.

Mineral Materials (Salables): Materials such as common varieties of sand, stone, gravel, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws, but can be acquired under the Mineral Materials Act of 1947, as amended.

Mineral Withdrawal: A formal order that withholds federal lands and minerals from entry under the Mining Law of 1872, as amended, and closes the area to mineral location (i.e., staking mining claims) and development.

Minimization Mitigation: Minimizing impacts by limiting the degree or magnitude of the action and its implementation (40 CFR 1508.20 [b]).

Minimum Impact Suppression Techniques: The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural and social impacts.

Mitigation:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation Measures: Methods or procedures designed to reduce or lessen the adverse impacts caused by management activities.

Moderate (recreation outcomes): See *Measurable Targeted Outcomes*.

Moderate Constraints (Oil and Gas): Any stipulations or conditions of approval which may restrict the timing or placement of oil and gas development, but would not otherwise restrict the overall

development. Moderate constraints include all timing restrictions (TLS), CSUs, areas where surface-disturbing activity is avoided, and VRM Class II areas.

Mollisol: Dark colored grassland type soils with high base status.

Monitoring: The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives.

Multiple Use Reservoir: A human-created lake or pond with a combination of balanced uses, including, but not limited to, recreation, livestock watering, watershed health, and wildlife and fish.

National Historic Trails: A protected area designation containing historic trails and surrounding areas authorized under the National Trails System Act of 1968. National Historic Trails may only be designated by an act of Congress.

National Register of Historic Places: The official list of the Nation's historic places worthy of preservation. Properties listed or eligible for listing are associated: with events, activities, or developments that were important in the past; with the lives of people who were important in the past; with significant architectural history, landscape history, or engineering achievements; or have already, or have the potential, to yield important information through investigation about our past. These may include districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association as appropriate.

National Trail Management Corridor: Allocation established through the land use planning process, pursuant to Section 202 of Federal Land Policy and Management Act and Section 7(a)(2) of the National Trails System Act ("rights-of-way") for a public land area of sufficient width within which to encompass National Trail resources, qualities, values, and associated settings and the primary use or uses that are present or to be restored.

National Wild and Scenic Rivers System: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams:

(1) Recreation – rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past;

(2) Scenic – rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads; and

(3) Wild – rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

Native American: The people living in North and South America prior to European exploration. Many groups of people today are Native Americans and have ancestors who lived on these continents for thousands of years before Columbus came. They are also called American Indian, First American, Alaska Native and Native People.

Native Species: A species that is a part of the original fauna or flora of a given area in question.

Native Species Status: Native Species Status (NSS) refers to the population status of species native to the area in which their habitats occur. The NSSs are divided into the following categories:

NSS1 **Native Species Status 1**

Populations are greatly restricted or declining, extirpation appears possible; or ongoing significant loss of habitat.

NSS2 **Native Species Status 2**

Populations are declining, extirpation appears possible; habitat is restricted or vulnerable, but no recent or ongoing significant loss; species may be sensitive to human disturbance; or

Populations are declining or restricted in numbers and (or) distribution, extirpation is not imminent; ongoing significant loss of habitat.

NSS3 **Native Species Status 3**

Populations are greatly restricted or declining, extirpation appears possible; habitat is not restricted, vulnerable, but no loss; species is not sensitive to human disturbance; or

Populations are declining or restricted in numbers and (or) distribution, extirpation is not imminent; habitat is restricted or vulnerable, but no recent or ongoing significant loss species may be sensitive to human disturbance; or

Species is widely distributed; population status or trends are unknown, but are suspected to be stable; ongoing significant loss of habitat.

NSS4 **Native Species Status 4**

Populations are greatly restricted or declining, extirpation appears possible; habitat is stable and not restricted; or

Populations are declining or restricted in numbers and (or) distribution, extirpation is not imminent; habitat is not restricted, vulnerable, but no loss; species is not sensitive to human disturbance; or

Species is widely distributed, population status or trends are unknown, but are suspected to be stable; habitat is restricted or vulnerable, but no recent or ongoing significant loss; species may be sensitive to human disturbance; or

Populations that are stable or increasing and not restricted in numbers and (or) distribution; ongoing significant loss of habitat.

Natrargid: Aridisols with an accumulation of clay and sodium.

Natural Fire Regime: The general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995).

Nature and Purposes: The term used to describe the character, characteristics, and congressional intent for a designated National Trail, including the resources, qualities, values, and associated settings of the areas through which such trails may pass; the primary use or uses of a National Trail; and activities promoting the preservation of, public access to, travel within, and enjoyment and appreciation of National Trails.

Necessary Tasks (Clause): Work requiring the use of motor vehicles. Examples include using motor vehicles to repair range improvements, manage livestock, perform geophysical exploration activities and other types of leasable mineral exploration activity (other than casual use), and performing mining claim functions resulting in less than 5 acres of surface disturbance as described in 43 CFR 3809.

Net Conservation Gain: The actual benefit or gain above baseline conditions.

No Surface Occupancy (NSO): Used to prohibit the physical presence of oil and gas operations and associated facilities on the surface of Public Lands in a specified area to protect sensitive surface resource values. The NSO provision is reserved for use in fluid mineral land use planning and allocation decisions and lease stipulations. Other terms, such as restricted area, avoidance area, exclusion area, etc., are used with non-fluid mineral functions.

Nomad: A person who belongs to a group of people who have no permanent home, but wander from place to place searching for water, food, or grazing land.

Nonconsumptive Use: A use that does not reduce supply. For example, wildlife viewing does not.

Nonmarket Values: These values are not revealed through market transactions that establish market prices. For example, clean air, open space, preservation of critical wildlife habitat, etc., are not traded in the market place and therefore there is no market price for them. Nonetheless, there is a value for these resources that can be measured based on how much people would be willing to pay for them.

Objective: A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established timeframes for achievement.

Occupied Lek: A lek that has been active during at least one strutting season within the last 10 years.

Off-Highway Vehicle (OHV): Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding (1) any nonamphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used in times of national defense emergencies.

Off-Highway Vehicle (OHV) Management Designations: All public lands are required to have off-highway vehicle area designations. Areas must be classified as open, limited, or closed to motorized travel activities. Travel by over-snow vehicles is subject to the same requirements and limitations as all other vehicles unless specifically addressed otherwise in activity plans.

> **Closed:** Vehicle travel is prohibited in the area. Access by means other than motorized vehicle is usually permitted. This designation is used if closure to all vehicular use is necessary to protect resources, to ensure visitor safety, or to reduce conflicts. Use of vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer.
>
> **Open:** Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner not causing, or unlikely to cause, significant undue damage to or disturbance of the soil, wildlife, wildlife habitats, improvements, cultural or vegetative resources, or other authorized uses of the public lands. These areas are used for intensive OHV use where there are no compelling resource needs, user conflicts, or public safety issues to warrant limiting cross-country travel.

Limited: (a) Vehicle travel is permitted only on roads and vehicle routes which were in existence prior to the date of publication in the Federal Register. Vehicle travel off of existing vehicle routes is permitted only to accomplish necessary tasks and only if such travel does not result in resource damage. Random travel from existing vehicle routes is not allowed. Creation of new routes or extensions and (or) widening of existing routes are not allowed without prior written agency approval.

(b) Vehicle travel is permitted only on roads and vehicle routes designated by the BLM. Vehicle travel off of designated vehicle routes is permitted only to accomplish necessary tasks and only if such travel does not result in resource damage. Random travel from designated vehicle routes is not allowed. In areas where final designation has not been completed, vehicle travel is limited to existing roads and vehicle routes as described above. Designations may include, but are not limited to, the following:

(1) Vehicle route is open to vehicular travel.

(2) Vehicle route is closed to vehicular travel.

(3) Vehicle travel is limited by number or type of vehicle such as:

- Vehicle route limited to four-wheel drive vehicles only.
- Vehicle route limited to motorbikes only.

(4) Vehicle route limited to ATVs only.

(5) Area is closed to over-snow vehicles.

(6) Vehicle travel is limited to licensed or permitted use.

(7) Vehicle travel is limited to time or season of use.

Where specialized restrictions are necessary to meet resource management objectives, other limitations also may be developed. The BLM may place other limitations, as necessary, to protect other resources, particularly in areas that motorized OHV enthusiasts use intensely or where they participate in competitive or group events.

Oil and Gas Management Area: Intensively developed existing fields to be managed primarily for oil and gas exploration and development.

Old-Growth Forest: Ecosystem distinguished by old trees and related structural features. Old growth encompasses the later stages of stand development that typically differs from earlier stages in several ways, including tree size, accumulation of large dead woody material, number of canopy layers, species composition, and ecosystem function. Old-growth forest is typically distinguished by the following:

- Large-sized trees of specific species
- Wide variation in age classes and stocking levels
- Accumulations of large-sized dead standing and fallen trees
- Decadence in the form of broken or deformed tops and boles
- Multiple canopy layers
- Canopy interspaces and understory patchiness (BLM 2008c).

Open: Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs.

Open Area (Vehicle Use): All types of vehicle use is permitted at all times anywhere in the area. However, motor vehicles may not be operated in a manner causing or likely to cause significant, undue damage to or disturbance of the soil, wildlife, wildlife habitat, improvements, cultural or vegetative resources or other authorized uses of the public lands (see 43 CFR 8340.0-5) (Manual 1626 Travel and Transportation Management). Accordingly, in "Open" areas, driving off-road to perform necessary tasks, for recreational activities, or any other purpose, is allowed. The experience in the western United States suggests that "Open" designations encourage route proliferation and unlimited cross-country driving and is causing degradation of the lands and resources. It is the policy of the BLM in Wyoming to limit the use of "Open" designations to areas suitable for unlimited off-road driving such as sand dune areas that are essentially devoid of vegetation.

Operator: Any person who has taken formal responsibility for the operations conducted on the leased lands.

Outbreak: The infestation of a relatively small and contained grouping of trees by bark beetles.

Outstandingly Remarkable Values: Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values." Other values that may be considered include, but are not limited to, ecological, biological or botanical, paleontological, hydrological, traditional cultural uses, water quality, and scientific values. The Wild and Scenic Rivers Act does not further define outstandingly remarkable values. Agency resource professionals develop and interpret criteria in evaluating river values (unique, rare, or exemplary) based on professional judgment on a regional, physiographic, or geographic comparative basis.

Over-the-snow Vehicle: A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow.

Overgrazing: Continued heavy grazing that exceeds the recovery capacity of the forage plants and creates deterioration of the grazing lands (Valentine 1990).

Paleo-Indian: The name given to the oldest known cultural group in North America.

Paleocene Eocene Thermal Maximum (PETM): The Paleocene-Eocene Thermal Maximum (PETM) is one of the most intense and abrupt intervals of global warming in the geological record. It occurred around 56 million years ago, at the boundary between the Paleocene and Eocene epochs and lasted about 200,000 years. This warming has been linked to a similarly rapid increase in the concentration of greenhouse gases in Earth's atmosphere, which acted to trap heat and drive up global temperatures by more than 5 degrees Celsius in just a few thousand years. The fossil record gives us the means of understanding how life was affected by the PETM, and so provides an excellent opportunity to study the relationships between evolution, extinction, migration and climate change. See http://www.palaeontologyonline.com/articles/2011/the-paleocene-eocene-thermal-maximum/.

Paleoclimate Change: Changing climatic conditions during past geologic ages.

Paleoecological: Relating to the study of ancient or prehistoric ecosystems (National Park Service no date).

Paleontological Locality: A geographic point or area where a fossil or associated fossils are found in a related geological context. A paleontological locality is confined to a discrete stratigraphic layer, structural feature, or physiographic area.

Paleontological Resource Monitoring: The systematic examination for and often collection of paleontological resources associated with surface disturbance.

Paleontological Resources: Paleontological resources are any fossilized remains, traces, or imprints of organisms, preserved in or on the Earth's crust, that are of paleontological interest and that provide information about the history of life on Earth.

Paleontological Resources Protection Stipulations:

Collecting: The project proponent/Operator is responsible for informing all persons associated with this project including employees, contractors and subcontractors under their direction that they shall be subject to prosecution for damaging, altering, excavating or removing any vertebrate fossils or other scientifically significant paleontological resources from the project area. Collection of vertebrate fossils (bones, teeth, turtle shells) or other scientifically significant paleontological resources is prohibited without a permit. Unlawful removal, damage, or vandalism of paleontological resources will be prosecuted by federal law enforcement personnel.

Discovery: If vertebrate or scientifically significant paleontological resources are discovered on BLM-administered land during operations, the Operator shall suspend operations that could disturb the materials, and immediately contact the BLM Cody or Worland Field Manager. The BLM will arrange for evaluation of the find by an appropriate BLM paleontologist, Paleontological Coordinator, or Paleontological Use Permittee within an agreed timeframe. The BLM will determine the need for any mitigation actions that may be necessary. Any mitigation would be developed in consultation with the Operator, who would be responsible for the cost of site evaluation and mitigation of project effects to the paleontological resources. Depending on site evaluation, operations within 100 feet of a paleontological discovery will not be resumed in written authorization to proceed is issued by the Field Office Manager.

Avoidance: All vertebrate or scientifically significant paleontological resources found as a result of the project/action will be avoided during operations. Avoidance in this case means "no action or disturbance within a distance of at least 100 feet of the outer edge of the paleontological locality".

Paleontology: The study of ancient life, particularly the fossil record (BLM 2008d).

Parturition Areas: Documented birthing areas commonly used by females. They include calving areas, fawning areas, and lambing grounds. These areas may be used as nurseries by some big game species.

Pasture: (1) A grazing area enclosed and separated from other areas by fencing or other barriers; the management unit for grazing land. (2) Forage plants used as food for grazing animals. (3) Any area devoted to the production of forage, native or introduced, and harvested by grazing. (4) A group of subunits grazed within a rotational grazing system.

Pemmican: A mixture of dried meat mixed with crushed berries and fat. It was used as food on hunting trips and other journeys because it kept well without spoiling.

Perennial Stream: A stream that flows continuously. Perennial streams generally are associated with a water table in the localities through which they flow (Prichard et al. 1998).

Permit: Contractual instruments granting rights to use specific managed public lands, with certain conditions, for specific purposes such as livestock grazing, timber harvesting, paleontology, and energy or mineral development.

Permitted Use: (1) The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease and is expressed in AUMs. (2) A paleontologist must have a valid paleontological resource use permit before collecting or disturbing fossil resources on BLM-administered lands. Permitted uses for paleontology include activities related to paleontological surveys, excavation and consulting.

Permittee: One who holds a permit to graze livestock on state, federal, or certain privately-owned lands.

Period of Use: The time of livestock grazing on a range area based on type of vegetation or stage of vegetative growth.

Pest: With the exception of vascular plants classified as invasive nonnative plant species, a pest can be any biological life form that poses a threat to human or ecological health and welfare. For the purposes of this planning effort, an "animal pest" is any vertebrate or invertebrate animal subject to control by Animal and Plant Health Inspection Service (APHIS). APHIS is currently BLM's authorized agent for controlling "animal pests." For this reason, "animal pests" will be considered a subset of Pest. An annoying or troublesome animal or thing; nuisance.

Pestle: A tool used to mash or grind substances.

Petroglyph: Pictures created on rock faces by removing a portion of the rock by pecking, abrading, incising, or scratching.

Pictograph: Picture created on a rock face by applying pigment or charcoal.

Planning Area: A geographic area for which land use and resource management plans are developed and maintained.

Play Area (OHV): An area where on- or off-route OHV use is nearly unrestricted. Often attracting many riders, such areas may be on dunes, in sand and gravel pits, and in other areas that present challenges to OHV users. Structured recreation management is applied to these areas so as to appropriately manage for health and safety, resource protection, and use and user conflicts. Play areas are designated on OHV "Open" Areas. See *Open Area* (BLM 2007a).

Pleistocene: The epoch of geologic time, about 1.6 million to 10,000 years ago, characterized by the appearance and disappearance of continental ice sheets.

Potential Fossil Yield Classification (PFYC): Occurrences of paleontological resources are closely tied to the geologic units that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils, with a higher class number indicating a higher potential. The classification uses a ranking of 1 through 5, with Class 5 assigned to units with a very high potential for paleontological resources. The classifications are described below.

> **Class 1 – Very Low.** Igneous or metamorphic geologic units, or other units not likely to contain recognizable fossil remains. Management concern is very low or negligible, Assessment or mitigation is usually unnecessary except in very rare or isolated occurrence.
>
> **Class 2 – Low.** Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant invertebrate and pant fossils. Management concern for paleontological resources is generally low. Assessment or mitigation is usually unnecessary except in rare or isolated occurrences.
>
> **Class 3 – Moderate or Unknown.** Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance and predictable occurrence; or sedimentary units of unknown fossil potential. Management concern may extend across the entire range of management. PFYC 3 (Moderate) Units may require field surveys for determination of appropriate course of actions. Mitigation may be necessary before and/or during these actions. Avoidance or non-site monitoring may be necessary during project activities. Justification required for survey decisions

on PFYC 3 (Moderate) formations (i.e., whether a survey is required or not). PFYC 3 (Unknown) Units will require pre-disturbance field surveys prior to surface disturbing activities or land tenure adjustments. Mitigation may be necessary before and/or during these actions. Avoidance or non-site monitoring may be necessary during project activities.

Class 4 – High. Geologic units containing a high occurrence of vertebrate fossils or scientifically significant invertebrate or plant fossils, but may vary in occurrences and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases, management concern for paleontological resources is high, depending on the proposed action. Pre-disturbance field surveys are usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. Avoidance or non-site monitoring may often be necessary during project activities.

Class 5 – Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils. Paleontological resources are highly susceptible to adverse impacts from surface disturbing activities. Management concern for paleontological resources is very high. Pre-disturbance field surveys are usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. Avoidance or non-site monitoring may often be necessary during project activities. Special management designations may be appropriate for protection or interpretation. These units are often the focus of illegal collecting activities.

Potential Natural Community (PNC): The biotic community that would become established if all successional sequences were completed without interference by humans under the present environmental conditions. Natural disturbances are inherent in development. PNCs can include naturalized nonnative species.

Pottery: Earthenware or clayware pots, dishes, or vases. These cups, bowls, and other dishes or objects were made from clay and hardened by heat.

Prairie Dog "Complex": Defined as a cluster of two or more prairie dog towns within 3 kilometers of each other (Clark and Stromberg 1987; Luce 2003), and bounded by either natural or artificial barriers (Whicker and Detling 1998) which effectively isolate one cluster of colonies from interacting/interchanging with another. Prairie dogs may commonly move among colonies of a cluster, and thereby foster reproductive/genetic viability, but exhibit little emigration/immigration between clusters. A cluster may include some currently unoccupied, through physically suitable (i.e., vegetation, soils, topography, etc.), land immediately adjacent to occupied colonies that support other prairie dog-associated (ecosystem function), obligate or facultative species (e.g., swift fox, mountain plover, burrowing owl, etc.).

Preference: (1) Selection of plants, or plant parts, over others by grazing animals. (2) In the administration of public lands, "Grazing preference" or "preference" means a superior or priority position against others for the purpose of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by a permittee or lessee (43 CFR Part 4100).

Prehistory/Prehistoric: Information about past events prior to the recording of events in writing. The period of prehistory differs around the world depending upon when written records became common in a region.

Prescribed Burning: Controlled application of fire to wildland fuels in either their natural or modified state under specified environmental conditions that allow the fire to be confined to a predetermined area and at the same time to produce the fire intensity and rate of spread required to attain planned resource management objectives.

Prescribed Fire: The introduction of fire to an area under regulated conditions for specific management purposes.

Priority Fish Species: Priority fish species are species considered to be sport fish and native species.

Priority Habitat Area (greater sage-grouse): Habitat designated to maintain sage-grouse distribution and population sustainability. In this document, management for priority habitat is based on areas encompassed by either Priority Habitat Management Areas or Key Habitat Areas.

Produced Water: Groundwater removed to facilitate the extraction of minerals, such as coal, oil, or gas.

Projectile Point: A point or tip attached to a projectile to increase its ability to penetrate a target. These points are frequently made from stone, bone, ivory, antler, wood, or metal. The method, shape and material used to manufacture these points are frequently used to identify the groups making and using them.

Proper Functioning Condition: Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

(1) dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality;

(2) filter sediment, capture bedload, and aid floodplain development;

(3) improve flood-water retention and ground-water recharge;

(4) develop root masses that stabilize streambanks against cutting action;

(5) develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and

(6) support greater biodiversity.

Proper Grazing: Proper grazing is the practice of managing forage use by grazing animals at a sustainable level that maintains rangeland health. Proper grazing will maintain or increase plant cover, including residue, which acts to slow down or reduce runoff, increase water infiltration, and keep erosion and sedimentation at or above acceptable levels within the potential of ecological sites within a given geographic area (e.g., watershed, grazing allotment, etc.).

Protohistoric: Immediately before written history. The period when artifacts imported from other continents are found but for which no historic records exist.

Public Land: Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM, except lands located on the Outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos.

Range: Any land supporting vegetation suitable for grazing including rangeland, grazable woodland and shrubland. Modifies resources, products, activities, practices and phenomena pertaining to rangeland.

Range Condition: (A) A generic term relating to present status of a unit of range in terms of specific values or potentials. Specific values or potentials must be stated. (B) Some agencies define range condition as follows: The present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site.

Range Improvement Project: A structural improvement requiring placement or construction to facilitate management or control distribution and movement of grazing or browsing animals. Such improvements may include, but are not limited to, fences, wells, troughs, reservoirs, water catchments, pipelines, and cattleguards. The project also may include a practice or treatment which improves rangeland condition and or resource production for multiple use. Nonstructural types of projects may include, but are not limited to, seeding and plant control through chemical, mechanical, and biological means or prescribed burning.

Range Management: A distinct discipline founded on ecological principles and dealing with the use of rangelands and range resources for a variety of purposes. These purposes include use as watersheds, wildlife habitat, grazing by livestock, recreation and aesthetics, as well as other associated uses.

Range Site: Synonymous with ecological site when referring to rangeland. An area of rangeland which has the potential to produce and sustain distinctive kinds and amounts of vegetation to result in a characteristic plant community under its particular combination of environmental factors, particularly climate, soils, and associated native biota. Some agencies use range site based on the climax concept, not potential natural community.

Rangeland: Land on which the native vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing. This includes lands re-vegetated naturally or artificially when routine management of that vegetation is accomplished mainly through manipulation of grazing. Rangelands include natural grasslands, savannas, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows.

Rangeland Health: The degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained.

Raptor: Bird of prey with sharp talons and a strongly curved beak, such as hawks, falcons, owls, vultures, and eagles.

Reasonable Access: For lands not involving Wilderness Study Areas (WSAs), reasonable access means access determined on a case by case basis using site specific NEPA analysis. Access to private land across public land in a WSA is addressed in the Wilderness Interim Management Policy for lands under Wilderness Review (IMP).

Recreation and Public Purposes Act (R&PP): The Recreation and Public Purposes Act (43 USC 869 et. seq.) authorizes the sale or lease of public lands for recreational or public purposes to state and local governments and to qualified nonprofit organizations. Examples of typical uses under the act are historic monument sites, campgrounds, schools, fire houses, law enforcement facilities, municipal facilities, landfills, hospitals, parks, and fairgrounds.

Recreation Area Management Plan (RAMP): An officially approved document for a specific area of public land that identifies the management actions to be implemented to achieve recreation related decisions made in a management framework of a resource management plan. The Recreation Area Management Plan is the link between the allocation of land for recreation uses in the multiple-use planning process and the actions necessary to implement such allocations (BLM 2005).

Recreation Experiences: Psychological outcomes realized either by recreation-tourism participants as a direct result of their on-site leisure engagements and recreation-tourism activity participation or by nonparticipating community residents as a result of their interaction with visitors and guests within their community or interaction with the BLM and other public and private recreation-tourism providers and their actions.

Recreation Management Areas: Recreation management areas are units within a planning area guiding recreation management on public lands having similar recreation related issues and concerns. There are two types of recreation management areas, extensive and special (ERMAs and SRMAs):

> **Extensive Recreation Management Areas (ERMA):** The ERMAs are identified areas where recreation is planned for and actively managed on an interdisciplinary-basis in concert with other resources/resource programs. ERMAs offer recreation opportunities that facilitate visitors' freedom to pursue a variety of outdoor recreation activities and attain a variety of outcomes. They include all lands that are not designated as an SRMA or closed to public use. Recreation management actions within an ERMA are limited to only those of a custodial nature and address visitor health and safety, resource protection and use and user conflicts.
>
> **Special Recreation Management Areas (SRMA):** SRMAs are designated administrative units where a commitment has been made to emphasize recreation by managing for specific recreation opportunities and settings on a sustained or enhanced, long-term basis. SRMAs are designated through the land use plan process. Plans establish SRMA management objectives and identify supporting management actions and allowable uses.
>
> **Recreation Management Zones:** Subunits within a SRMA managed for distinctly different recreation products. Recreation products are composed of recreation opportunities, the natural resource and community settings within which they occur, and the administrative and service environment created by all affecting recreation-tourism providers, within which recreation participation occurs.

Recreation Niche: The place or position within the strategically targeted recreation-tourism market for each SRMA that is most suitable (i.e., capable of producing certain specific kinds of recreation opportunities) and appropriate (i.e., most responsive to identified visitor or resident customers), given available supply and current demand, for the production of specific recreation opportunities and the sustainable maintenance of accompanying natural resource or community setting character.

Recreation Opportunities: Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes from the combination of recreation settings, activities, and experiences provided by the area.

Recreation Opportunity Spectrum: A means of classifying and managing recreational opportunities based on physical, social, and managerial settings. Each of the following six ROS classes is defined in terms of its combination of activity, setting, and experience: Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Road Natural, Rural, and Urban.

Recreation Setting Characteristics (RSC): RSCs are derived from the Recreation Opportunity Spectrum. It is a continuum divided into a spectrum of classes from primitive to urban recreation settings. The continuum of classes is characterized by three components; physical, social and operational.

Recreation Settings: The collective distinguishing attributes of landscapes that influence and sometimes actually determine what kinds of recreation opportunities are produced.

Recreation-Tourism Market: Recreation and tourism visitors and local residents who affect local governments and private sector businesses and the communities or other places where these customers originate (local, regional, national, or international). Based on analysis of supply and demand, land use plans strategically identify primary recreation-tourism markets for each special recreation management area—destination, community, or undeveloped.

Reference State: A reference state is recognized in each state-and-transition model that describes the ecological potential and natural or historical range of variability of the ecological site (Caudle et al. 2013).

Renewable Energy: Energy generated from renewable resources such as sunlight, wind, and biomass.

Required Design Features (RDFs): Required Design Features (RDFs) are required for certain activities in all priority greater sage-grouse habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;
- An alternative RDF is determined to provide equal or better protection for greater sage-grouse or its habitat;
- A specific RDF will provide no additional protection to greater sage-grouse or its habitat.

Reserve Common Allotment – A reserve common allotment is an area which is designated in the land use plan as available for livestock grazing but reserved as an area available for use as an alternative to grazing in another allotment in order to facilitate rangeland restoration treatments and recovery from natural disturbances such as drought or wildfire. The reserve common allotment would provide needed flexibility that would help the agency apply temporary rest from grazing where vegetation treatments and/or management would be most effective.

Residual Impacts: Impacts from an authorized land use that remain after applying avoidance and minimization mitigation; also referred to as unavoidable impacts.

Resource Management Plan: A land use plan as prescribed by the Federal Land Policy and Management Act which establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives and actions to be achieved.

Resource Uses: Activities that utilize resources, such as minerals development, livestock grazing, forestry, OHV use, and recreation.

Resources, Qualities, and Values: The significant scenic, historic, cultural, recreation, natural (including biological, geological, and scientific), and other landscape areas through which such trails may pass as identified in the National Trails System Act (see associated settings).

Rest: Leaving an area ungrazed, thereby foregoing grazing of one forage crop. Normally rest implies absence of grazing for a full growing season or during a critical portion of plant development; i.e., seed production. In the Cody Field Office, rest is defined as foregoing grazing for a full grazing year defined as starting on March 1 and ending on February 28.

Rest-Rotation: A grazing-management scheme in which rest periods, usually for a full growing season, for individual grazing units are incorporated into a grazing rotation.

Restricted Disposal: Parcels identified for restricted disposal may be disposed of under the Recreation and Public Purposes Act, by exchange, may limit the disposal to a particular type of entity capable of preserving

the resource values, or may include the use of covenants in the deed or land sale patent to ensure the resource values are protected.

Right-of-Way (ROW) Corridor: Public land where rights-of-way are concentrated and where the placement of future rights-of-way would be favored over lands that are currently unaffected by these disturbances. The designation of right-of-way corridors would be used to facilitate the regional development of major rights-of-way, by linking right-of-way concentration areas between planning areas. Major rights-of-ways are defined as ROW authorizations for pipelines 24-inches in diameter or greater or high voltage transmission lines greater than 115 kilovolts.

Rights-of-Way (ROW): A ROW grant is an authorization to use a specific piece of public land for a specific project, such as roads, pipelines, transmission lines, and communication sites. The grant authorizes rights and privileges for a specific use of the land for a specific period of time.

Riparian: A form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas (See BLM Manual 1737). Included are ephemeral streams that have vegetation dependent upon free water in the soil. All other ephemeral streams are excluded.

Riparian/Wetland Functionality Classification:

Functional-At-Risk: Riparian/wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Proper Functioning Condition (PFC): A riparian or wetland area is considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to do the following:

- Dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality
- Filter sediment, capture bedload, and aid floodplain development
- Improve floodwater retention and groundwater recharge
- Develop root masses that stabilize streambanks against cutting action
- Develop diverse ponding and channel characteristics to provide the habitats and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses
- Support greater biodiversity.

Non-functional: Riparian or wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, and so on, as listed above. The absence of certain physical attributes, such as a floodplain where one should be, are indicators of nonfunctioning conditions.

Unknown: Riparian or wetland areas that the BLM lacks sufficient information on to make any form of determination.

Roasting Pit: A pit dug into the ground that was used for cooking. The pit contained fire-cracked rocks, charcoal, ash, and sometimes the remains of whatever was cooked.

Rotation (forest): The period of years between when a forest stand (i.e., primarily even-aged) is established (i.e., regeneration) and when it receives its final harvest. This time period is an administrative decision based on economics, site condition, growth rates, and other factors (BLM 2007b).

Rotation Grazing: A grazing scheme where animals are moved from one grazing unit in the same group of grazing units to another without regard to specific graze: rest periods or levels of plant defoliation.

Salable Minerals: Common variety of minerals on public lands, such as sand and gravel, used mainly for construction. Salable minerals are disposed of by sales to the public or free-use permits to government agencies or nonprofit organizations.

Scenic Area: An area whose landscape character exhibits a high degree of variety and harmony among the basic elements which results in a pleasant landscape to view.

Scenic Quality: The relative worth of a landscape from a visual perception point of view. Scenic quality is rated as Class A (high), Class B (medium), or Class C (low).

Season-long Use: Grazing throughout the growing period, with little or no effort to control the amount of distribution of livestock use in area/pasture/allotments. Generally defined in the Cody Field Office as starting on April 1 and ending September 30.

Seasonal Grazing: Grazing use throughout a specific season.

Seasonal Ranges: The Wyoming Game and Fish Department has identified various ranges for big game species. These ranges are defined as follows:

> **Summer or Spring-Summer-Fall:** A population or portion of a population of animals uses the documented habitats within this range annually from the end of previous winter to the onset of persistent winter conditions.
>
> **Severe Winter Relief:** A documented survival range, which may or may not be considered a crucial range area as defined above. It is used to a great extent, but only in extremely severe winters. It may lack habitat characteristics that would make it attractive or capable of supporting major portions of the population during normal years, but is used by and allows at least a significant portion of the population to survive the occasional extremely severe winter.
>
> **Winter:** A population or portion of a population of animals annually uses the documented suitable habitat sites within this range in substantial numbers during the winter period only.
>
> **Winter/Year-long:** A population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis. During the winter months there is a significant influx of additional animals into the area from other seasonal ranges.
>
> **Year-long:** A population or substantial portion of a population of animals makes general use of the suitable documented habitat sites within the range on a year-round basis. On occasion, animals may leave the area under severe conditions.

Section 106 of the National Historic Preservation Act: "The head of any Federal agency having direct or indirect jurisdiction over a proposed federal or federally assisted undertaking in any state and the head of any federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking" (16 U.S.C. 47 df).

Sedimentary Rock: Rock that has formed through the deposition and lithification of sediment, especially sediment transported by water (rivers, lakes, and oceans), ice (glaciers), and wind; or rocks that are chemically precipitated (BLM 2008c).

Sensitive Sites or Resources: Sensitive sites or resources refer to significant cultural resources that are or may be eligible for nomination to the National Register of Historic Places. This category also refers to cultural resources that require management under the American Indian Religious Freedom Act, the Native American Grave Repatriation Act or Executive Orders independent of the National Register of Historic Places.

Sensitive Species: Species designated as sensitive by the BLM State Director include species that are under status review, have small or declining populations, live in unique habitats, or require special management. BLM Manual 6840 provides policy and guidance for special status species management. The BLM Wyoming Sensitive Species Policy and List are provided in a memorandum updated annually. Primary goals of the BLM Wyoming policy include maintaining vulnerable species and habitat components in functional BLM ecosystems and preventing a need for species listing under the Endangered Species Act.

Seral Stage: One of a series of plant communities that follows another in time on a specific ecological site.

Setting: Setting is the physical environment of a historic property and how the property evokes a sense of feeling and association with past events. Accordingly, setting referees to the character of the place in which the property played its historic role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space. These features and their relationships should be considered not only within the exact boundaries of the property, but also between the property and its surroundings.

Shaman: A medicine man or religious leader; a person who calls upon the spirits to cure the sick and to control events (weather or hunting).

Significant Factor (S&G): Principal causal factor in the failure to achieve the land health standard(s) and conform with the guidelines. A significant factor would typically be a use that, if modified, would enable an area to achieve or make significant progress toward achieving the land health standard(s). To be a significant factor, a use may be one of several causal factors contributing to less-than-healthy conditions; it need not be the sole causal factor inhibiting progress towards the standards.

Significant Paleontological Resource: Any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils.

Site: A location, place. Is a term used by archaeologists for places that prehistoric and historic people lived in or used. Sites are places where humans left things behind.

Slope: A slant or incline of the land surface, measured in degrees from the horizontal, or in the percent (defined as the number of feet or meters change in elevation per 100 of the same units of horizontal distance); may be further characterized by direction (exposure).

Soil Moisture Regimes: The categorization of the presence or absence of water in soils.

> **Aridic:** Soils dry more than half of the time when they are warm enough for plant growth. These soils are too dry for annual cropping and many require irrigation for crop production.
>
> **Udic:** The udic moisture regime implies that, in 6 or more out of 10 years, the soil moisture control section is not dry in any part for as long as 90 cumulative days per year.

Ustic: The ustic moisture regime implies that moisture is limited but is present at a time when conditions are suitable for plant growth.

Xeric: The xeric moisture regime implies that, in 6 or more out of 10 years, the soil moisture control section is dry in all parts for 45 or more consecutive days in the four months following the winter solstice.

Soil Write-up Area (SWA): The smallest geographical unit delineation to be used as a base for collecting vegetation data and resource information. It is the smallest mapped soil – vegetation unit. For management purposes, SWA boundaries can be set on administrative boundaries such as allotments, pasture, wildlife habitat areas or watersheds.

Special Recreation Management Areas (SRMA): A public lands unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities (i.e., activity, experience, and benefit opportunities). Both land use plan decisions and subsequent implementing actions for recreation in each SRMA are geared to a strategically identified primary recreation-tourism market – destination, community, or undeveloped, as well as a corresponding and distinguishing recreation management strategy. Recreation setting conditions are prescribed as part of the land-use allocation decision. Subsequent implementing actions, as identified in the activity planning framework, are proactive and address management, marketing and visitor information, and monitoring and administration.

Special Status Species: Special status species are species proposed for listing, officially listed as threatened or endangered, or are candidates for listing as threatened or endangered under the provisions of the endangered species act; those listed by a state in a category such as threatened or endangered implying potential endangerment or extinction; and those designated by the State Director as sensitive (BLM 6840 Manual 2001). Special Status Species may include wildlife (including fish and invertebrate) or plant species.

Species: A taxon or rank species; in the hierarchy or biological classification, the category below genus.

Species Diversity: The number, different kinds of, and relative abundances of species present in a given area.

Split-Estate: Surface land and mineral estate of a given area under different ownerships. Frequently, the surface will be privately owned and the minerals federally owned.

Spring: Flowing water originating from an underground source.

SRMA: See *Recreation Management Areas*.

Stakeholder: Federal, state, or local governments and agencies, or other entities where a Memorandum of Understanding, Cooperative Agreement, Interagency Agreement, or other such agreement has been executed with the BLM, or an applicant for a BLM authorization or permit.

Stand Basal Area: The sum of the cross-sectional area of all living trees in a stand, measured at "breast height" or 4.5 feet high on the uphill side of the trees.

Stand Productivity: Measured by comparison to site index. If the site index is 75 feet at 100 years, but the stand averages 65 feet at 100 years, then a factor such as high basal area or mistletoe might be decreasing stand productivity.

Stand Vigor: General term that refers to the current growth and health of the stand. Live crown ratio is a measure of stand vigor. For example, most stands with an average live crown ratio of 50% or more have vigorous growth. Most stands with an average of less than 20% live crown ratio have poor vigor.

Standard: A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards).

State-Listed Species: Species proposed for listing or listed by a state in a category implying, but not limited to, potential endangerment or extinction. Listing is either by legislation or regulation.

Stipulations: Requirements that are part of the terms of a mineral lease. Some stipulations are standard on all Federal leases. Other stipulations may be applied to the lease at the discretion of the surface management agency to protect valuable surface resources and uses.

Stock Trail: A trail constructed across a natural barrier to permit movement of livestock to otherwise inaccessible areas.

Stocking Rate: The number of specific kinds and classes of animals grazing a unit of land for a specified time period. May be expressed as AUMs or animal unit days per acre, hectare, or section, or the reciprocal (area of land/AUM or day).

Stratigraphy: The science of studying layers of materials, as in rock layers in the Earth or deposits in archaeological sites. Cultural remains and dirt become buried over time and, usually, the layer on the bottom is the oldest, the layer on the top is the youngest. Dirt of different layers is often colored differently.

Suitable River: An eligible river segment found through administrative study to meet the criteria for designation as a component of the National System, as specified in Section 4(a) of the Wild and Scenic Rivers Act.

Surface Water Classes and Uses: The following water classes are a hierarchical categorization of waters according to existing and designated uses. Except for Class 1 waters, each classification is protected for its specified uses plus all the uses contained in each lower classification. Class 1 designations are based on value determinations rather than use support and are protected for all uses in existence at the time of or after designation. There are four major classes of surface water in Wyoming with various subcategories within each class (see "Wyoming Surface Water Classification List" for current listing).

> **Class 1 – Outstanding Waters:** Class 1 waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices. Pursuant to Section 7 of these regulations, the water quality and physical and biological integrity that existed on the water at the time of designation will be maintained and protected. In designating Class 1 waters, the Environmental Quality Council shall consider water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archeological, fish and wildlife, the presence of substantial quantities of developable water, and other values of present and future benefit to the people.
>
> **Class 2 – Fisheries and Drinking Water:** Class 2 waters are waters, other than those designated as Class 1 that are known to support fish or drinking water supplies or where those uses are attainable. Class 2 waters may be perennial, intermittent, or ephemeral and are protected for the uses indicated in each subcategory listed below. Five subcategories of Class 2 waters exist.
>
> **Class 3 – Aquatic Life Other than Fish:** Class 3 waters are waters other than those designated as Class 1 that are intermittent, ephemeral, or isolated waters, and because of natural habitat conditions, do not support nor have the potential to support fish populations or spawning or certain perennial waters that lack the natural water quality to support fish (e.g., geothermal areas). Class 3 waters provide support for invertebrates, amphibians, or other flora and fauna that

inhabit waters of the state at some stage of their life-cycles. Uses designated on Class 3 waters include aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value. Generally, waters suitable for this classification have wetland characteristics; and such characteristics will be a primary indicator used in identifying Class 3 waters. There are four subcategories of Class 3 waters.

Class 4 – Agriculture, Industry, Recreation, and Wildlife: Class 4 waters are waters other than those designated as Class 1 where it has been determined that aquatic life uses are not attainable pursuant to the provisions of Section 33 of these regulations. Uses designated on Class 4 waters include recreation, wildlife, industry, agriculture and scenic value (Wyoming DEQ, Wyoming Surface Water Quality Standards).

Surface-Disturbing Activities: An action that alters the vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either authorized or prohibited. (Information Bulletin WY-2007-029).

Suspension: The temporary withholding from active use, through a decision issued by the authorized officer or by agreement, of part or all of the permitted use in a grazing permit or lease (43 CFR Part 4100). These AUMs could potentially be re-authorized for use if range conditions improve.

Sustainability: The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

Syncline or Synclinal: A fold in rocks in which the rock layers dip inward from both sides toward the axis, like a hot dog bun (BLM 2002a).

Tank: A reservoir of any construction for water storage.

Tanning: The process which turns animal hides into leather.

Technical/Economically Feasible: Actions that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant. It is the BLM's sole responsibility to determine what actions are technically and economically feasible. The BLM will consider whether implementation of the proposed action is likely given past and current practice and technology; this consideration does not necessarily require a cost-benefit analysis or speculation about an applicant's costs and profit. (Modified from the Council on Environmental Quality's 40 Most Asked Questions and BLM NEPA Handbook, Section 6.6.3)

Tentative Classification: The process where rivers are segmented according to the criteria and classes established in Section 2(b) of the Wild and Scenic Rivers Act. These classifications are based on an analysis of the present level of development within the stream corridor at the time the inventory was completed. These classifications also control the level of development that may occur within a stream corridor, once a stream is determined eligible or suitable and a classification is assigned. The classifications are:

(1) recreational: rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past.

(2) scenic: rivers or sections of rivers free of impoundments, with shorelines or watersheds still largely undeveloped but accessible in places by roads.

(3) wild: rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

Threatened Species: Any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range; listings are published in the *Federal Register*.

Timeliness: The lack of a time lag between impacts and the achievement of compensatory mitigation goals and objectives (BLM Manual Section 1794).

Timing Limitations (TLS): Prohibits surface use during specified time periods to protect identified resource values (BLM 2009).

Tipi: A cone-shaped tent used especially by Plains Indians usually made of skins or bark spread over a frame of poles. Also spelled tepee or teepee.

Torrifluvents: Entisols formed in stream deposited materials under limited moisture conditions.

Torriorthents: Entisols formed under very limited moisture conditions.

Traditional Cultural Property: A cultural property eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (A) are rooted in that community's history, and (B) are important in maintaining the continuing cultural identity of the community. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property is derived from the role the property plays in a community's historically rooted beliefs, customs, and practices.

Trail: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high clearance vehicles.

Travois: A device used by Plains Indians to move things. It consisted of two long poles with a platform or netting to carry objects. Originally pulled by dogs, horses were later used to pull it.

Trend: The direction of change in ecological status or resource value rating observed over time. Trend in ecological status should be described or toward, or away from the potential natural community, or as not apparent. Trend in resource value rating for a specific use should be described as up, down or not apparent. Trends in resource value rating for several uses on the same site at a given time may be in different directions, and there is no necessary correlation between trends in resource value rating and trend in ecological status.

Two-track Vehicle Trails: A two-track is where perennial vegetation is devoid or scarce, or where wheel tracks are continuous depressions in the soil yet evident to the casual observer and are vegetated.

Undeveloped Recreation-tourism Market: National, regional, or local recreation-tourism visitors, communities, or other constituents who value public lands for the distinctive kinds of dispersed recreation produced by the vast size and largely open, undeveloped character of their recreation settings. Major investments in facilities are excluded within special recreation management areas where the BLM's strategy is to target demonstrated undeveloped recreation-tourism market demand. Here, recreation management actions are geared toward meeting primary recreation-tourism market demand to sustain distinctive recreation setting characteristics; however, major investments in visitor services are authorized both to sustain those distinctive setting characteristics and to maintain visitor freedom to choose where to go and what to do—all in response to demonstrated demand for undeveloped recreation.

Unoccupied Lek: There are two types of unoccupied leks, "destroyed" and "abandoned." Unoccupied leks are not protected during surface disturbing activities.

Uplands: Lands at higher elevations than alluvial plains or low stream terraces; all lands outside the riparian-wetland and aquatic zones.

Use: (1) The proportion of current years forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole. (2) Utilization of range for a purpose such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, etc.

Ustorthents: Entisols formed under limited moisture conditions.

Utilization: The proportion or degree of current year's forage production that is consumed or destroyed by animals (including insects). It may refer either to a single plant species, a group of species, or to the vegetation as a whole, generally expressed as a percentage.

Vegetation: Plants in general, or the sum total of the plant live above and below ground in an area.

Vegetation Treatments:

> **Mechanical Treatment:** Use of vehicles such as wheeled tractors, crawler type tractors, or specially designed vehicles with attached implements designed to cut, uproot or chop existing vegetation. Includes manual treatments involving hand tools, and hand operated power tools to cut, clear or prune herbaceous and woody species.
>
> **Biological Treatments:** Intentional use of domestic animals, insects, nematodes, mites, or pathogens that weaken or destroy vegetation.
>
> **Chemical Treatments:** Use of chemicals (herbicides), to kill or injure plants.

Vegetative Diversity: The variety of vegetative types in an area, including species, the genetic differences among species and populations, the communities and ecosystems in which vegetation types occur, and the structure and seral stage of these communities. Vegetative diversity includes rare as well as common vegetative types, and typically supports a diverse array of animal species and communities.

Viewshed: Term used in Visual Resource Management (VRM) to describe "…landscape that can be seen under favorable atmospheric conditions from a viewpoint (key observation point) or along a transportation corridor" (BLM 1984).

Vision Quest: A method used by American Indians, and others to seek spiritual power and knowledge through a vision of a guardian spirit or other entity. The process normally involves fasting and praying for extended periods of time.

Visual Resource Management (VRM) Classes:

> **Class I:** The objective of this class is to maintain a landscape setting that appears unaltered by humans. It is applied to wilderness areas, some natural areas, wild portions of wild and scenic rivers, and other similar situations in which management activities are to be restricted.
>
> **Class II:** The objective of this class is to design proposed alterations so as to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
>
> **Class III:** The objective of this class is to design proposed alterations so as to partially retain the existing character of the landscape. Contrasts to the basic elements (form, line, color, and texture)

caused by a management activity may be evident and begin to attract attention in the characteristic landscape; however, the changes should remain subordinate to the existing characteristic landscape.

Class IV: The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, changes should repeat the basic elements (form, line, color, and texture) inherent in the characteristic landscape.

Rehabilitation Area: Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point at which rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement; i.e., add acceptable visual variety to an area or site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired VRM class should be identified.

Visual Resources: The visible physical features of a landscape (topography, water, vegetation, animals, structures, and other features) that constitute the scenery of an area.

Voluntary Non-Use: When a grazing permittee voluntarily agrees to not use a portion of the allotted AUMs in an allotment.

Watershed: See *Basin*.

Weed: Any undesirable or troublesome plant, especially one that grows profusely where it is not wanted. Weeds can be native or non-native, invasive or noninvasive, and noxious or not noxious.

Wetlands: Areas that are inundated or saturated by surface or groundwater often and long enough to support and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wilderness: A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value. The definition contained in Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891) (from H-6310-1, Wilderness Inventory and Study Procedures).

Wilderness Characteristics: Wilderness characteristics include size, the appearance of naturalness, outstanding opportunities for solitude, or a primitive and unconfined type of recreation. They may also include ecological, geological, or other features of scientific, educational, scenic, or historical value. However Section 2(c) of the Wilderness Act of 1964 has been updated by IM-2003-195, dated June 20, 2003. Indicators of an area's naturalness include the extent of landscape modifications, the presence of native vegetation communities, and the connectivity of habitats. Outstanding opportunities for solitude or primitive and unconfined types of recreation may be experienced when the sights, sounds, and evidence of other people are rare or infrequent, in locations where visitors can be isolated, alone or secluded from

others, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered.

Wilderness Study Area: A roadless area or island that has been inventoried and found to have wilderness characteristics as described in Section 603 of FLPMA and Section 2 (c) of the Wilderness Act of 1964 (78 Stat. 891).

Wildland Fire: A general term describing any non-structure fire that occurs in the vegetation and/or natural fuels.

> **Wildfire:** Unplanned ignition caused by lightning, volcanoes, unauthorized and accidental human-caused fires and escaped prescribed fires.
>
> **Prescribed Fire:** Any fire intentionally ignited by managed under an approved plan to meet specific objectives.

Wildland Industrial Interface: The area where industrial development meets or intermingles with undeveloped wildland.

Wildland Urban Interface (WUI): Healthy Forest Recreation Act 2003: defines wildland urban interface (WUI) (section 101) as an area within or adjacent to an at risk community that has been identified by a community in its wildfire protection plan or, for areas that do not have such a plan, an area extending; (1) ½ mile from the boundary of an at risk community, or (2) 1½ miles when other criteria are met. (e.g., a sustained steep slope or a geographic feature aiding in creating an effective fire break or is condition class III land, or (3) is adjacent to an evacuation route.

Wildlife Habitat Management Area (WHMA): Special management areas that are designed to protect or preserve certain qualities or uses for wildlife and plant species. The environment in these areas is unique in some respects, and it is therefore desirable to apply different management prescriptions to these areas from those of the surrounding public lands. The integration of different land management goals, objectives, and actions will be implemented to ensure that the integrity of these areas will be maintained. They will be directed toward habitat management rather than species management and encompass featured species and species diversity to ensure compliance with existing laws; prevent species from becoming threatened or endangered; and provide values and uses for the public. The BLM will implement site-specific management actions in coordination with other agencies to maintain and/or improve these unique wildlife habitat management areas (BLM 2008e).

Wildlife Security Area: A geographic location or area that typically provides for some, if not all, of the wildlife species cover and forage needs and where wildlife are free from human caused disturbance and/or disruption.

Wildlife-Disturbing Activity: BLM-authorized activities other than routine maintenance that may cause displacement of or excessive stress to wildlife during critical life stages. Wildlife-disturbing activities include human presence, noise, and activities using motorized vehicles or equipment.

Withdrawal: Removal or withholding of public lands, by statute or Secretarial order, from operation of some or all of the public land laws. A mineral withdrawal includes public lands potentially valuable for leasable minerals, precluding the disposal of the lands except with a mineral reservation clause, unless the lands are found not to contain a valuable deposit of minerals. A mineral withdrawal is the closing of an area to mineral location and development activities.

Woodlands: Not capable of producing 20 cubic feet of wood fiber from commercial species per acre per year.

Yearlong Grazing: Continuous grazing for a calendar year. In the Cody Field Office, the year is defined at starting on March 1 and ending on February 28.

Yellowcake: Yellowcake is the product of the uranium extraction (milling) process. Early production methods resulted in a bright yellow compound, hence the name yellowcake. The material is a mixture of uranium oxides that can vary in proportion and color from yellow to orange to dark green (blackish), depending at which temperature the material was dried (level of hydration and impurities). Higher drying temperatures produce a darker, less soluble material. Yellowcake is commonly referred to as U_3O_8 and is assayed as pounds U3O8 equivalent. This fine powder is packaged in drums and sent to a conversion plant that produces uranium hexafluoride as the next step in the manufacture of nuclear fuel.

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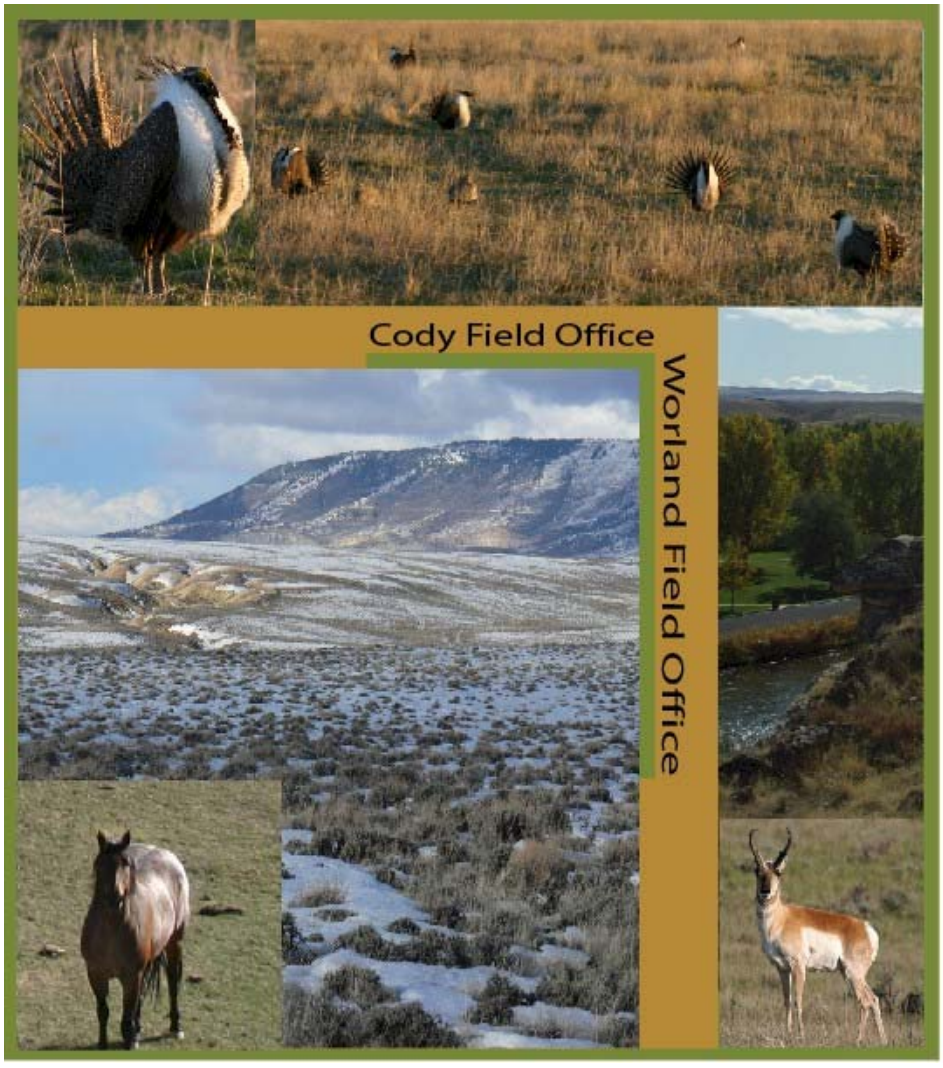
Bighorn Basin Resource Management Plan Revision Project

Proposed Resource Management Plan and Final Environmental Impact Statement



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The BLM's multiple-use mission is to sustain the health and productivity of public lands for the use and enjoyment of present and future generations.

The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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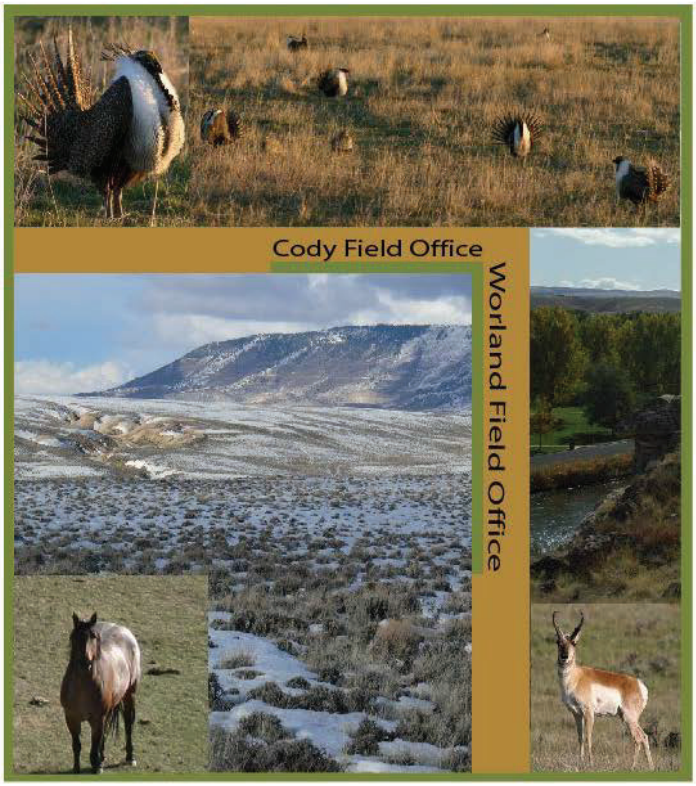
APPENDIX A

COMMENT ANALYSIS

Comment Analysis Report for the Bighorn Basin Resource Management Plan Revision Project



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Comment Analysis Report
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Revision Project

U.S. Department of the Interior
Bureau of Land Management, Wyoming

Cody Field Office
Worland Field Office

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Attachment E: Complete comments documents

ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AMP	Allotment Management Plan
APLIC	Avian Power Line Interaction Committee
AUM	Animal Unit Month
BER	Baseline Environmental Report
BLM	Bureau of Land Management
BMP	Best Management Practice
CBNG	Coalbed Natural Gas
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COT	Conservation Objectives Team
CSU	Controlled Surface Use
CYFO	Cody Field Office
CX	Categorical Exclusion
EIS	Environmental Impact Statement
EO	Executive Order
EOR	Enhanced Oil Recovery
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
FMP	Fire Management Plan
GIS	Geographic Information System
OHV	Off-Highway Vehicle
HMA	Herd Management Area
IM	Instruction Memorandum
IMPLAN	Impact Analysis for Planning Model
MLP	Master Leasing Plan
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOA	Notice of Availability
NOI	Notice of Intent
NSO	No Surface Occupancy
NTT	National Technical Team
OGMA	Oil and Gas Management Area
PHMAs	Priority Habitat Management Areas
RDF	Required Design Feature
RFD	Reasonably Foreseeable Development
RMP	Resource Management Plan
ROW	Rights-of-Way
SRMA	Special Recreation Management Area
TLS	Timing Limitation Stipulation
USFWS	United States Fish and Wildlife Service
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WAFWA	Western Association of Fish and Wildlife Agencies
WDEQ	Wyoming Department of Environmental Quality
WFO	Worland Field Office
WGFD	Wyoming Game and Fish Department
WSA	Wilderness Study Area
WSR	Wild and Scenic River

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1.0 INTRODUCTION

The Bighorn Basin Resource Management Plan (RMP) Revision Project is a combined effort to revise RMPs for the Bureau of Land Management (BLM) Cody Field Office (CYFO) and BLM Worland Field Office (WFO). This document refers to the combined CYFO and WFO planning areas as the Planning Area. The BLM published the Notice of Availability (NOA) announcing the release of the Bighorn Basin Draft RMP and Draft Environmental Impact Statement (EIS) for public review and comment in the Federal Register on April 22, 2011. This notice initiated the 90-day comment period. At the request of the public and cooperating agencies, the BLM extended the comment period by 45 days, for a total comment period of 135 days. The comment period ended on September 7, 2011. During the 135-day comment period, the BLM hosted six public meetings within the Planning Area to gather comments on the Draft RMP and Draft EIS and to answer questions from the public.

In July 2012, the BLM Rocky Mountain Regional Interdisciplinary Team identified the need to prepare a Supplement to the Bighorn Basin Draft RMP and Draft EIS (the Supplement) to consider incorporation of proposed management actions in designated greater sage-grouse Key and Priority Habitat Areas and to thoroughly consider the conservation measures identified in the Greater Sage-grouse National Technical Team (NTT) Report on National Greater Sage-Grouse Conservation Measures (Sage-grouse NTT 2011), as referenced in BLM Instruction Memorandum (IM) 2012-044 (BLM National Greater Sage-Grouse Land Use Planning Strategy). The NOA announcing the release of the Supplement published in the *Federal Register* on July 12, 2013, initiated a 90-day comment period. The BLM initially scheduled 90 days for public comment and the original date for the close of the comment period was October 12, 2013. However, due to the lapse in appropriations and the resulting federal government shutdown, the documents were not available on the BLM website from October 1 through October 16, 2013 and the BLM extended the comment period 20 days; ending on November 1, 2013. During the 110-day comment period, the BLM held six public meetings within the Planning Area (in the same locations as meetings for the Draft RMP and Draft EIS) to discuss the content of the Supplement and to answer questions.

This report provides a summary of public comments received on the Bighorn Basin Draft RMP and Draft EIS during the comment period as well as public comments received on the Supplement during the subsequent comment period. During the Draft RMP and Draft EIS comment period, the BLM received a total of 46,009 comment documents: 44,951 were submitted by email, 1,029 were submitted in hard copy or sent by mail, 11 documents were received during public meetings, and 18 submissions were received through the BLM website. During the Supplement comment period, the BLM received a total of 2,145 comment documents: 2,112 were submitted by email, 32 were submitted in hard copy or sent by mail, and 1 was received through the BLM website. No comments were submitted at the public meetings held for the Supplement.

A public comment document refers to the entire written submission from a commenter (e.g., full letter, e-mail, etc.), whereas a comment refers to an individual and identifiable substantive expression of interest or issue statement included within a public comment document. For example, a letter (i.e., public comment document) received within the comment period may contain one or more separate comments. A commenter refers to the individual or organization who submitted the comment document. Of the 46,009 documents received, the BLM identified 45,454 comment documents as form letters regarding the Draft RMP and Draft EIS. During the Supplement comment period, the BLM received a total of 2,145 documents, of which 2,067 were identified as form letters. The BLM defined form letters as letters containing identical text submitted by more than five individuals.

This report provides a summary of the full range of public issues and concerns as submitted during the comment periods. The submitted comments and summary presented in this report do not necessarily represent the sentiments of the public as a whole. However, this summary does attempt to provide fair representation of the wide range of views submitted during the comment periods. In consideration of these views, it is important for the public and decision makers to understand that this process does not attempt to treat input as if it were a vote. Instead, comment analysis is a process that allows the BLM to review and consider received comments, develop appropriate responses, revise the Draft RMP and Draft EIS in response to comments, and support the BLM's decision-making process.

The remainder of this report is organized as follows:

- **Content Analysis Process** – Describes how the BLM received, recorded, and categorized comment documents and comments.
- **Commenter Demographics** – Presents demographic information associated with submitted comment documents including geography and affiliation of commenters.
- **Summary of Public Responses to the Draft RMP and Draft EIS and Supplement** – Provides a breakdown of the number of comments received by issue category, a summary of comments received, and BLM's response to comments received.
- **Analysis of Comments** – Outlines the parameters for substantive and non-substantive comments and provides a brief summary of comments and responses.
- **Attachment A: Draft RMP and Draft EIS Public Comment Response Index** – Includes instructions on how to use the tables in Attachments A and B. It also includes an index listing the names of all commenters and their associated comment document number.
- **Attachment B: Draft RMP and Draft EIS Individual Comments and Index to Summary Comments and Summary Responses** – Includes all substantive public comments received during the comment period along with an index to help users find their associated summary comments and response.
- **Attachment C: Supplement Public Comment Response Index** – Includes instructions on how to use the tables in Attachments C and D, as well as an index listing the names of all commenters and their associated comment document number.
- **Attachment D: Supplement Individual Comments and Index to Summary Comments and Summary Responses** – Includes all substantive public comments received during the comment period along with an index to help users find their associated summary comments and response.
- **Attachment E: Comment Documents** – Includes all substantive public comment documents received during the public comment periods.

Attachments B, D, and E are available on the Bighorn Basin RMP project website at: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html.

2.0 COMMENT ANALYSIS PROCESS

The BLM defines comment analysis as a systematic method of compiling, categorizing, and evaluating written comments made by individuals, federal and state agencies, Tribal governments, elected representatives, and other organizations on the Draft RMP and Draft EIS and Supplement in order to identify substantive issues for review and response by BLM decision makers. The comment analysis process provides a methodical approach for the BLM to revise text in the RMP and EIS based on comments provided during the two comment periods. Additionally, through the comment analysis

process, BLM supplemented the project mailing list of commenters and compiled demographic information on the geographic distribution of commenters (see Section 3.0 of this report).

Public comment documents include hardcopy comments received at the public meetings and electronic or written comment documents postmarked or received via the project website within the comment periods. Methods of comment document submittal included mail, email, website submittals, and public meetings. All individuals attending public meetings were encouraged to submit comments in writing.

2.1. Analysis Process

The BLM comment analysis team utilized the program CommentWorks to catalogue, number, review, categorize, and respond to comments received during the Draft RMP and Draft EIS comment period as well as the Supplement comment period.

Upon receipt of a public comment document, a member of the comment analysis team logged the comment document into an Microsoft Excel comment tracking spreadsheet, assigned the document a unique identifier (i.e., Document 10001), and converted the comment document to a searchable electronic (i.e., PDF) document and a text file. The analysis team then added all pertinent commenter information (e.g., name, affiliation, address, and type of comment document) into CommentWorks and uploaded the electronic documents into the system.

The first step in the analysis process was to identify individual substantive comments within a public comment document. The comment analysis team identified each individual substantive comment based on guidance in the BLM National Environmental Policy Act (NEPA) Handbook (H-1790-1). Substantive comments are those that do one or more of the following:

- Question, with reasonable basis, the accuracy of information in the RMP and EIS;
- Question, with reasonable basis, the adequacy of, methodology for, or assumptions used for the environmental analysis;
- Present new information relevant to the analysis;
- Present reasonable alternatives other than those analyzed in the RMP and EIS; or
- Cause changes or revisions in one or more of the alternatives.

Comments that were not considered substantive included the following:

- Comments in favor of or against the proposed action or alternatives without reasoning that meet the substantive comment criteria listed above;
- Comments that only agree or disagree with BLM policy or resource decisions without justification or supporting data that meet the substantive criteria listed above;
- Comments that do not pertain to the Planning Area or scope of the Bighorn Basin RMP Revision Project; or
- Comments that take the form of vague, open-ended questions.

The analysis team established an issue coding structure for all substantive comments within CommentWorks that was used to bracket and sort comments into logical groups or issue categories (e.g., air quality, cumulative impacts, process and procedure). CommentWorks is the comment tracking and analysis platform within the ePlanning system, which is being used for the Bighorn Basin RMP Revision Project. A list of all issue categories identified for the Draft RMP and Draft EIS is located below in Table A-1. Table A-2 lists the issue categories for the Supplement.

Once assigned an issue category, the BLM reviewed individual substantive comments and provided direction to develop a response. The comment analysis team then used the individual comments and direction to analyze, group, and summarize comments, and to develop responses to the summary comments.

When reviewing comments, the analysis team looked not only for each action or change requested by the public, but also for any supporting information to capture the comment and its context. In doing so, paragraphs within a comment letter may have been divided into several comments because of multiple comments being presented or, alternatively, sections of a letter may have been combined to form one coherent comment.

It is important to note that during the process of identifying individual comments and concerns, the BLM treated all comments equally. The BLM did not weigh comments based on organizational affiliation and the number of duplicate comments did not increase the priority or merit of one comment over another. The process was not one of counting votes and the BLM did not make any efforts to tabulate the exact number of people for, or against, any given aspect of the Draft RMP and Draft EIS and Supplement. Rather, the BLM focused on an understanding of the content of a comment, information that would lead to a reasoned choice among the alternatives, and appropriate responses and revisions.

Table A-1. Draft RMP and Draft EIS Issue Categories

Issue Categories		
Air Quality	Master Leasing Plans	Soils
Areas of Critical Environmental Concern	Mineral Potential and Reasonably Foreseeable Development	Special Status Species
Climate Change	Minerals	Travel and Transportation Management
Cultural	NEPA	Vegetation
Cumulative Impacts	Paleontology	Visual Resource Management
Extension Request	Process and Procedure	Water
Fire and Fuels	Readability and Format	Wild and Scenic Rivers
Fish	Recreation	Wild Horses
Historic Trails	Renewable Energy	Wilderness Characteristics
Invasive Species	Rights-of-Way	Wilderness Study Areas
Lands and Realty	Greater Sage-Grouse	Wildlife
Livestock Grazing	Socioeconomic	-

Issue categories identified for the Supplement are listed below in Table A-2.

Table A-2. Supplement Issue Categories

Issue Categories		
Air Resources	Leasable Minerals – Oil and Gas	Socioeconomic
Areas of Critical Environmental Concern	Livestock Grazing Management	Special Status Species
Consultation	Locatable Minerals	Trails and Travel Management
Cultural	Minerals – General	Vegetation
Cumulative Impacts	Out of Scope	Visual Resource Management
Extension Request	Paleontological	Water
Fire and Fuels	Planning Issues	Wild Horses
Greater Sage-Grouse	Recreation	Wilderness Characteristics
Invasive Species	Renewable Energy	Wildlife
Lands and Realty	Rights of Way and Corridors	-
Laws, Regulations, Guidance, Process	Riparian-Wetland	-

3.0 COMMENTER DEMOGRAPHICS

This section provides a summary of commenter demographics. Demographic analysis allows the BLM to form an overall picture of issues, as well as a better understanding of who is submitting comments, the geographic distribution of commenters, their affiliations, and the format of the public comment documents.

3.1. Geographic Representation

The BLM tracked the geographic representation for each comment document that included such information. Tables A-3 and A-4 identify the number of comment documents received from individual geographic locations (excluding form letters). Figures 3 and 4 depict the geographic distribution of comment documents received from within the Planning Area, documents received from outside the Planning Area but within the state of Wyoming, and documents received from out of state. The BLM received the greatest number of comment documents for the Draft RMP and Draft EIS from commenters within the Planning Area. The greatest number of comment documents received for the Supplement were from commenters outside the State of Wyoming.

Table A-3. Number of Draft RMP and Draft EIS Commenters by Geographic Location

State	City	Number of Commenters
Alabama	Undisclosed	1
Arizona	Mesa	1
Arizona	Phoenix	1
Arizona	Scottsdale	1
California	Healdsburg	1
California	Oakland	1
California	Placerville	1
California	Redwood City	1
California	Somis	1
California	Tahoe City	1
California	Volcano	1
California	Undisclosed	1
Colorado	Arvada	1
Colorado	Boulder	1
Colorado	Colorado Springs	2
Colorado	Denver	11
Colorado	Fort Collins	1
Colorado	Lakewood	1
Colorado	Longmont	1
Colorado	Lyons	1
Colorado	Redvale	1
Colorado	Sedalia	1
Connecticut	Granby	1
Florida	Lighthouse Point	1
Florida	Orlando	1
Florida	Stuart	1
Georgia	Augusta	1
Idaho	Pocatello	1
Illinois	Evanston	1
Illinois	Rochelle	1
Illinois	Wheaton	2
Indiana	Boone	1
Maine	Tewksbury	1
Maryland	Gaithersburg	1

Table A-3. Number of Draft RMP and Draft EIS Commenters by Geographic Location (continued)

State	City	Number of Commenters
Massachusetts	Carlisle	1
Massachusetts	Hampden	3
Massachusetts	Holyoke	1
Michigan	Berkley	1
Mississippi	Becker	1
Montana	Belgrade	1
Montana	Billings	6
Montana	Bozeman	6
Montana	Dillon	1
Montana	Missoula	1
New Jersey	Lakewood	1
New York	New York	1
North Carolina	Gibsonville	1
North Carolina	Reidsville	1
Ohio	Cleveland	1
Ohio	Mentor	1
Ohio	Undisclosed	1
Oklahoma	Clinton	2
Oklahoma	Oklahoma City	1
Oregon	Portland	1
Other	Washington, DC	2
Pennsylvania	Philadelphia	1
Pennsylvania	Zelienople	1
Tennessee	Knoxville	2
Tennessee	Memphis	1
Texas	Austin	1
Texas	Belton	1
Texas	Denton	1
Texas	Houston	2
Texas	Sugarland	1
Utah	Salt Lake City	4
Virginia	Mechanicsville	1
Virginia	Williamsburg	1
Washington	Seattle	1
Washington	Spokane	1
Washington	Tacoma	1

Table A-3. Number of Draft RMP and Draft EIS Commenters by Geographic Location (continued)

State	City	Number of Commenters
West Virginia	Zanesville	1
West Virginia	Undisclosed	1
Wisconsin	Madison	1
Wyoming	Alpine	1
Wyoming	Basin	14
Wyoming	Burlington	1
Wyoming	Byron	5
Wyoming	Casper	3
Wyoming	Cheyenne	15
Wyoming	Clark	4
Wyoming	Cody	90
Wyoming	Covell	1
Wyoming	Cowley	3
Wyoming	Deaver	2
Wyoming	Emblem	3
Wyoming	Gillette	2
Wyoming	Greybull	14
Wyoming	Hyattville	7
Wyoming	Jackson	2
Wyoming	Lander	5
Wyoming	Laramie	9
Wyoming	Lovell	13
Wyoming	Manderson	1
Wyoming	Meeteetse	5
Wyoming	Moran	1
Wyoming	Parkman	1
Wyoming	Pinedale	1
Wyoming	Powell	59
Wyoming	Ralston	3
Wyoming	Riverton	3
Wyoming	Shell	1
Wyoming	Sheridan	5
Wyoming	St. Stephens	1
Wyoming	Ten Sleep	9
Wyoming	Thermopolis	53
Wyoming	Wapiti	1

Table A-3. Number of Draft RMP and Draft EIS Commenters by Geographic Location (continued)

State	City	Number of Commenters
Wyoming	Wilson	1
Wyoming	Worland	20
Wyoming	Undisclosed	34
Undisclosed Number of Commenters	Undisclosed City	82
Total		**579**

Note: Form letters were counted once based on the geographic location of the originating entity for the master form letter.

Table A-4. Number of Supplement Commenters by Geographic Location

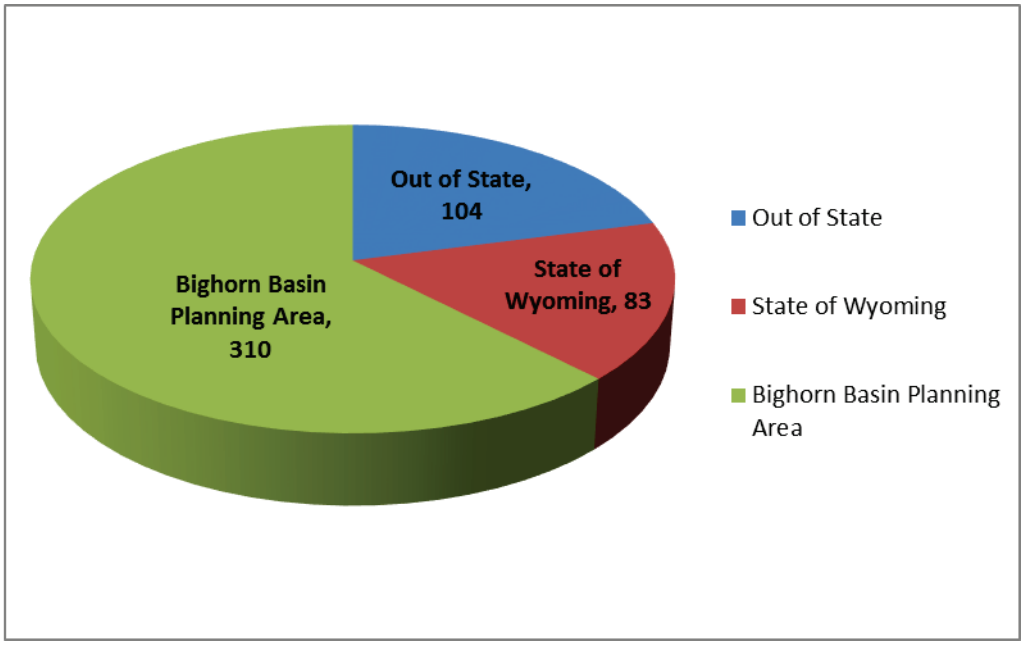
State	City	Number of Commenters
Arizona	Phoenix	1
Colorado	Craig	1
Colorado	Denver	5
Colorado	Fort Collins	1
District of Columbia	Washington	2
Idaho	Hailey	1
North Dakota	Bismarck	1
New York	Brooklyn	1
Oklahoma	Oklahoma City	1
Oregon	Bend	1
South Dakota	Black Hawk	1
Tennessee	Gatlinburg	1
Texas	Plano	1
Utah	Salt Lake City	2
Virginia	Alexandria	1
Washington	Spokane	1
Wyoming	Basin	1
Wyoming	Cheyenne	7
Wyoming	Cody	8
Wyoming	Greybull	5
Wyoming	Lander	2
Wyoming	Laramie	3
Wyoming	Lovell	2

Table A-4. Number of Supplement Commenters by Geographic Location (Continued)

State	City	Number of Commenters
Wyoming	Rock Springs	1
Wyoming	Sheridan	2
Wyoming	Ten Sleep	4
Wyoming	Thermopolis	6
Undisclosed	Undisclosed City	15
Total		**78**

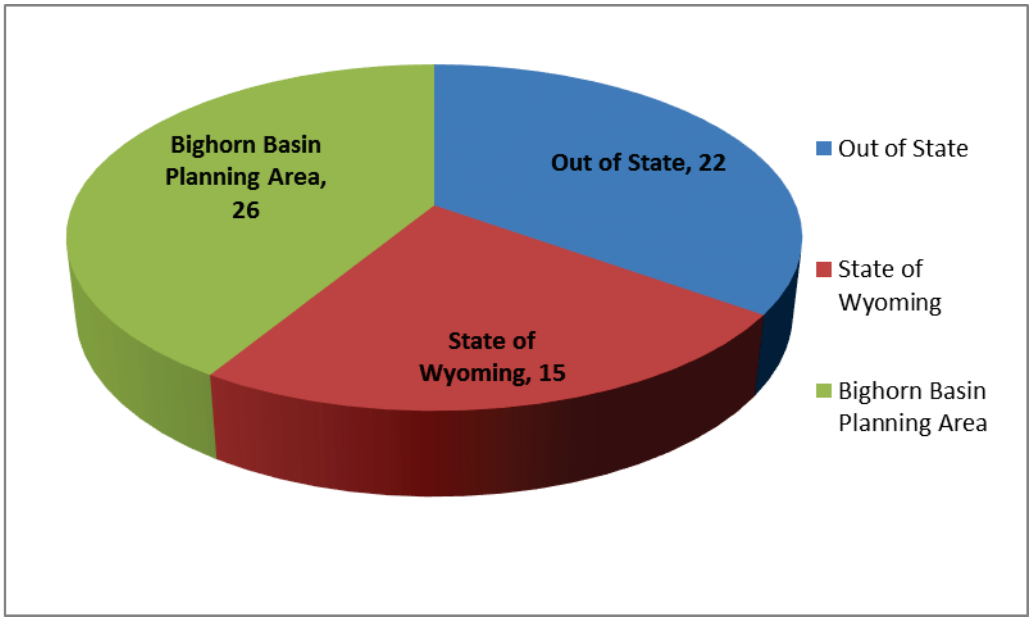
Note: Form letters were counted once based on the geographic location of the originating entity for the master form letter.

Figure A-1. Number of Draft EIS and Draft RMP Commenter Documents by Geography



Note: Comments received through email which did not contain mailing addresses or geographic representation accounted for a total of 82 submissions. Form letters were counted once based on the geographic location of the originating entity for the master form letter.

Figure A-2. Number of Supplement Commenter Documents by Geography



Note: Comments received through e-mail which did not contain mailing addresses or geographic representation accounted for a total of 15 submissions. Form letters were counted once based on the geographic location of the originating entity for the master form letter.

3.2. Organizational Affiliation

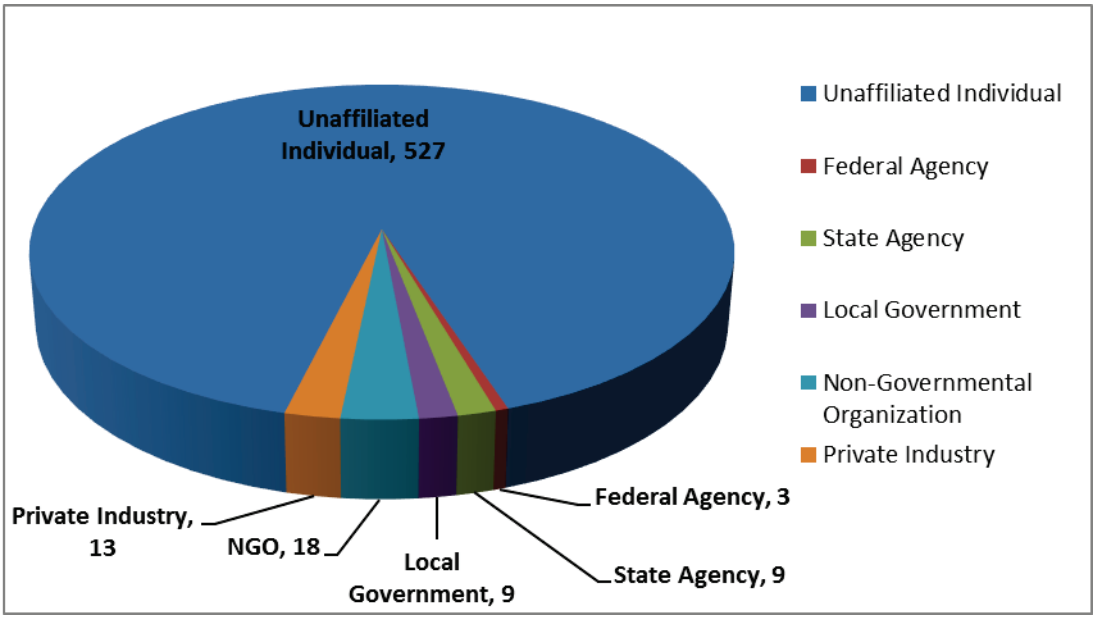
The BLM received comments from a range of entities including federal agencies, state agencies, local governments, non-governmental organizations, private industries, and unaffiliated individuals (Table A-5 and Figures 3 and 4). The BLM affiliated comment documents with a government or non-governmental organization if the document was received on official letterhead or was received through an official agency or organization email address. The BLM classified all other comment documents as unaffiliated individuals. The BLM received the greatest number of comment documents from unaffiliated individuals.

Table A-5. Number of Comment Documents by Affiliation (excluding form letters)

Affiliation	Number of Draft RMP and Draft EIS Public Comment Documents	Number of Supplement Public Comment Documents
Federal Agency	3	3
State Agency	9	2
Local Government	9	3
Non-Governmental Organization	18	22
Private Industry	13	19
Unaffiliated Individual	527	29
Total	**579**	**78**

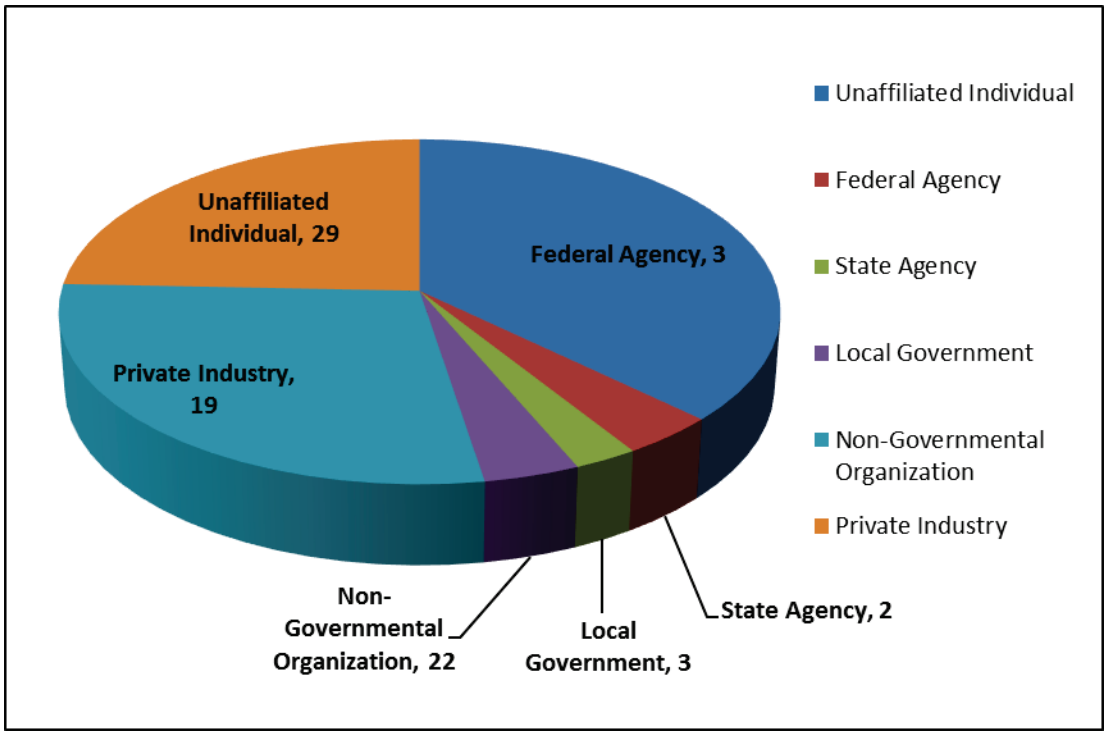
Note: Form letters were counted once based on the geographic location of the originating entity for the master form letter. See Section 3.4 for a breakdown of form letter affiliations.

Figure A-3. Number of Draft RMP and Draft EIS Comment Documents by Affiliation



Note: Form letters were counted once based on the geographic location of the originating entity for the master form letter. See Section 3.4 for a breakdown of form letter affiliations.

Figure A-4. Number of Supplement Comment Documents by Affiliation



Note: Form letters were counted once based on the geographic location of the originating entity for the master form letter. See Section 3.4 for a breakdown of form letter affiliations.

3.3. Public Comment Document Method of Delivery

The BLM received comment documents through a variety of delivery methods. Table A-6 identifies the number of documents received by method of delivery (e.g., email, letter, and website). The BLM received the greatest number of comment documents on the Draft RMP and Draft EIS through email (44,951) and mail (1,029). The BLM received the greatest number of comment documents on the Supplement through email (2,112) and mail (32).

Table A-6. Number of Public Comment Documents by Method of Delivery

Method of Delivery	Draft EIS and Draft RMP Number	Supplement Number
Email	44,951	2,112
Website	18	1
Mail	1,029	32
Public Meeting	11	0
Total	**46,009**	**2,145**

3.4. Form Letters

The BLM received 45,454 form letters from eight separate originating entities during the Draft RMP and Draft EIS comment period and 2,067 form letters from 2 non-governmental organizations and 55 from an unknown organization during the Supplement comment period. The BLM designated the first form letter from each originating entity as the "master" comment document and the BLM reviewed each subsequent form letter to ensure that the content was identical to the master comment document. The form letters were received primarily by email with the exception of 1 Marathon Oil form letter and 787 Greater Yellowstone Coalition postcards that were received by mail. Because the form letters contained identical text to their corresponding master comment document, the BLM analyzed the eight master comment documents. In those cases where form letters included additional text, they were reviewed and processed if substantive individual comments were identified. Table A-7 identifies the originating entity, affiliation, and number of each form letter received.

Table A-7. Form Letters Received by Affiliation

Originating Entity	Affiliation	Number Received on Draft RMP and Draft EIS	Number Received on Supplement
Natural Resources Defense Council	Non-Governmental Organization	43,286	-
Sierra Club	Non-Governmental Organization	98	7
Wilderness Society	Non-Governmental Organization	735	-
Greater Yellowstone Coalition	Non-Governmental Organization	1,222	-
Marathon Oil	Private Industry	73	-
Bighorn Basin RMP General Letter	Unaffiliated Individuals	12	-
Unknown Letter	Unaffiliated Individuals	-	55
Wild Horses Letter	Unaffiliated Individuals	20	-
Ward Letter	Unaffiliated Individuals	8	-
WildEarth Guardians	Non-Governmental Organization	-	2,005
Total		**45,454**	**2,067**

4.0 ANALYSIS OF COMMENTS

The BLM received 46,009 comment documents during the Draft RMP and Draft EIS comment period. As noted above, of the 46,009 letters received, 45,454 were form letters (which represented eight master form letter documents) and 571 were not form letters. The BLM analyzed a total of 579 comment documents, which included the 8 master form letter documents and 571 other comment documents.

The BLM received 2,145 comment documents during the Supplement comment period. Of the 2,145 letters received, 2,067 were form letters (which represented three master form letter documents) and 76 were not form letters. For the Supplement, the BLM analyzed a total of 78 comment documents, including the 3 master form letters documents and 76 other comment documents.

The 579 Draft RMP and Draft EIS public comment documents and 78 Supplement public comment documents contained substantive and non-substantive comments. Representative non-substantive comments included requests to be added to the project mailing list, requests for a copy of the Draft RMP and Draft EIS, personal preference or opinion, comments and questions that were not supported, and comments which are outside the scope of the Draft RMP and Draft EIS or Supplement. Non-substantive comments received during the two comment periods are further described in Section 4.1.3.

In accordance with the BLM's NEPA Handbook (H-1790-1), comments received on the Bighorn Basin RMP and EIS were analyzed and responded to if they: "are substantive and relate to inadequacies or inaccuracies in the analysis or methodologies used; identify new impacts or recommend reasonable new alternatives or mitigation measures; or involve substantive disagreements on interpretations of significance." (See 40 Code of Federal Regulations [CFR] 1502.19, 1503.3, 1503.4, 1506.6, and 516 DM 4.17). BLM's NEPA Handbook (H-1790-1) identifies the following comment category examples and appropriate responses.

Substantive Comments:

- **Questions, with a reasonable basis, the accuracy of the information in the environmental impact statement**. Factual corrections should be made in the Proposed RMP and Final EIS in response to comments that identify inaccuracies or discrepancies in factual information, data, or analysis.
- **Questions, with a reasonable basis, the adequacy of environmental analysis as presented**. Comments that express a professional disagreement with the conclusions of the analysis or assert that the analysis is inadequate may or may not lead to changes in the EIS. Interpretations of analyses should be based on professional expertise. Where there is disagreement within a professional discipline, a careful review of the various interpretations are warranted. In some cases, public comments may necessitate an evaluation of analytical conclusions. If, after reevaluation, the manager responsible for preparing the EIS does not think that a change is warranted, the response should provide the rationale for that conclusion.
- **Comments that identify new impacts, alternatives, or mitigation measures**. If public comments on a RMP and EIS identify impacts, alternatives, or mitigation measures that were not addressed in the draft, the manager responsible for preparing the RMP and EIS should determine if they warrant further consideration. If they do, that official must determine whether the new impacts, new alternatives, or new mitigation measures should be analyzed in either: the Proposed RMP and Final EIS; a supplement to the Draft RMP and Draft EIS; or a completely revised and recirculated Draft RMP and Draft EIS.
- **Disagreements with Significance Determinations**. Comments may directly or indirectly question determinations regarding the significance or severity of impacts. A reevaluation of these determinations may be warranted and may lead to changes in the Proposed RMP and Final EIS. If, after reevaluation, the manager responsible for preparing the EIS does not think that a change is warranted, the response should provide the rationale for that conclusion.

Non- Substantive Comments

- **Expressions of Personal Preferences**. Comments that express personal preferences or opinions on the proposal do not require further agency action. They are summarized whenever possible and brought to the attention of the manager responsible for preparing the RMP and EIS. Personal preferences and opinions generally will not affect the analysis.
- **Other**. In addition to the five categories from the NEPA Handbook described above, the BLM added a sixth category named “other” which includes requests for copies of the RMP and EIS, requests to be added to the project mailing list, requests for comment extensions, and comments that are outside the scope of the RMP and EIS. These comments are considered non-substantive and do not require further agency action.

4.1. Comment Submittals by Issue Category

Within the 579 received Draft RMP and Draft EIS comment documents, excluding multiple copies of form letters, the BLM identified 1,224 individual substantive comments covering a broad range of issue categories. The greatest number of substantive comments were associated with minerals (132), wildlife (126), livestock grazing (107), and NEPA-related comments (105). Attachment A includes an index for users to identify their comment documents and Attachment B includes all individual substantive comments and an index for users to identify the corresponding BLM summary comments and responses. Table A-8 and Figure A-5 identify the number of comments submitted by issue category for the Draft RMP and Draft EIS.

Table A-8. Number of Comments per Issue Category – Draft RMP and Draft EIS

Issue Category	Number of Comments Per Issue Category
Areas of Critical Environmental Concern	25
Air Quality	54
Climate Change	8
Cultural	25
Cumulative Impacts	4
Extension Request	12
Fire and Fuels	12
Fish	17
Historic Trails	4
Invasive Species	11
Lands and Realty	21
Livestock Grazing	107
Master Leasing Plans	15
Mineral Potential and Reasonably Foreseeable Development	15
Minerals	132
NEPA	105
Paleontological	3
Process and Procedure	9
Readability and Format	6
Recreation	48
Renewable Energy	5
Rights-of-Way	36
Sage-Grouse	59
Socioeconomic	42
Soil	10
Special Status Species	52

Table A-8. Number of Comments per Issue Category – Draft RMP and Draft EIS (Continued)

Issue Category	Number of Comments Per Issue Category
Travel and Transportation	35
Vegetation	50
Visual Resource Management	25
Water	42
Wild and Scenic Rivers	3
Wild Horses	30
Wilderness Characteristics	64
Wilderness Study Areas	12
Wildlife	126
Total	**387**

Note: Duplicative comments in form letters were only counted once.

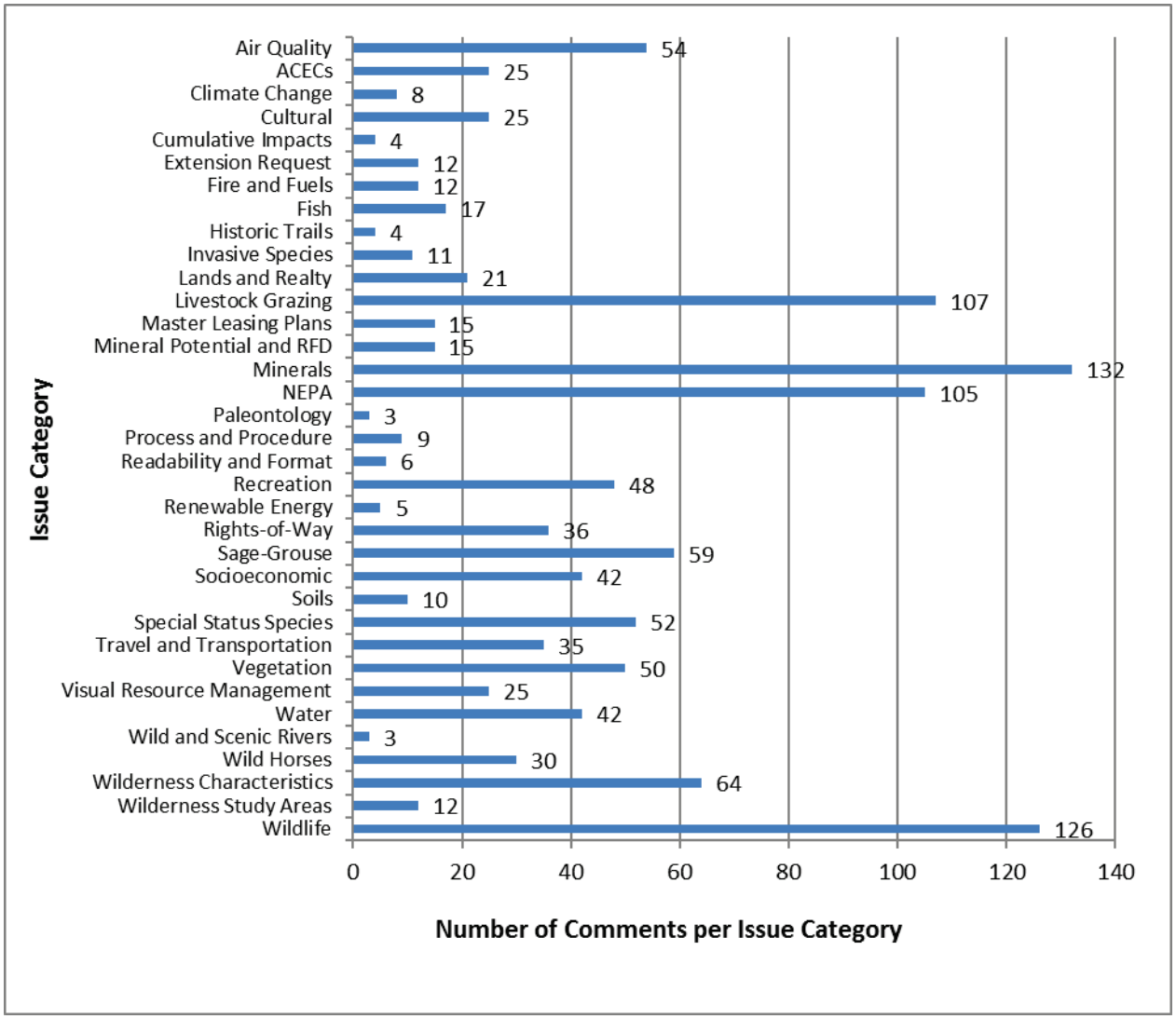
The BLM identified 920 individual substantive comments within the 78 comment documents received on the Supplement, excluding multiple copies of form letters. The greatest number of substantive comments were related to greater sage-grouse (323), Leasable Minerals – Oil and Gas (121), livestock grazing management (60), and Socioeconomics (59). Attachments C and D include indexes for users to identify their comment documents on the Supplement. Individual substantive comments on the Supplement are presented in Attachment D with an index for users to identify the corresponding BLM summary comments and responses. Table A-9 and Figure A-6 identify the number of comments submitted by issue category for the Supplement.

Table A-9. Number of Comments per Issue Category – Supplement

Issue Category	Number of Comments Per Issue Category
Areas of Critical Environmental Concern	30
Air Resources	8
Consultation	4
Cultural	2
Cumulative Impacts	4
Fire and Fuels	30
Greater Sage-Grouse	323
Invasive Species	3
Lands and Realty	7
Laws, Regulations, Guidance, Process	47
Livestock Grazing Management	60
Minerals – General	13
Locatable Minerals	18
Leasable Minerals – Oil and Gas	121
Paleontological	1
Planning Issues	20
Recreation	2
Renewable Energy	6
Rights-of-Way and Corridors	45
Riparian-Wetland	6
Socioeconomic	59
Special Status Species	19
Trails and Travel Management	20
Vegetation	11
Visual Resource Management	2
Water	4
Wild Horses	8
Wilderness Characteristics	13
Wildlife	18
Out of Scope	15
Extension Request	1
Total	**920**

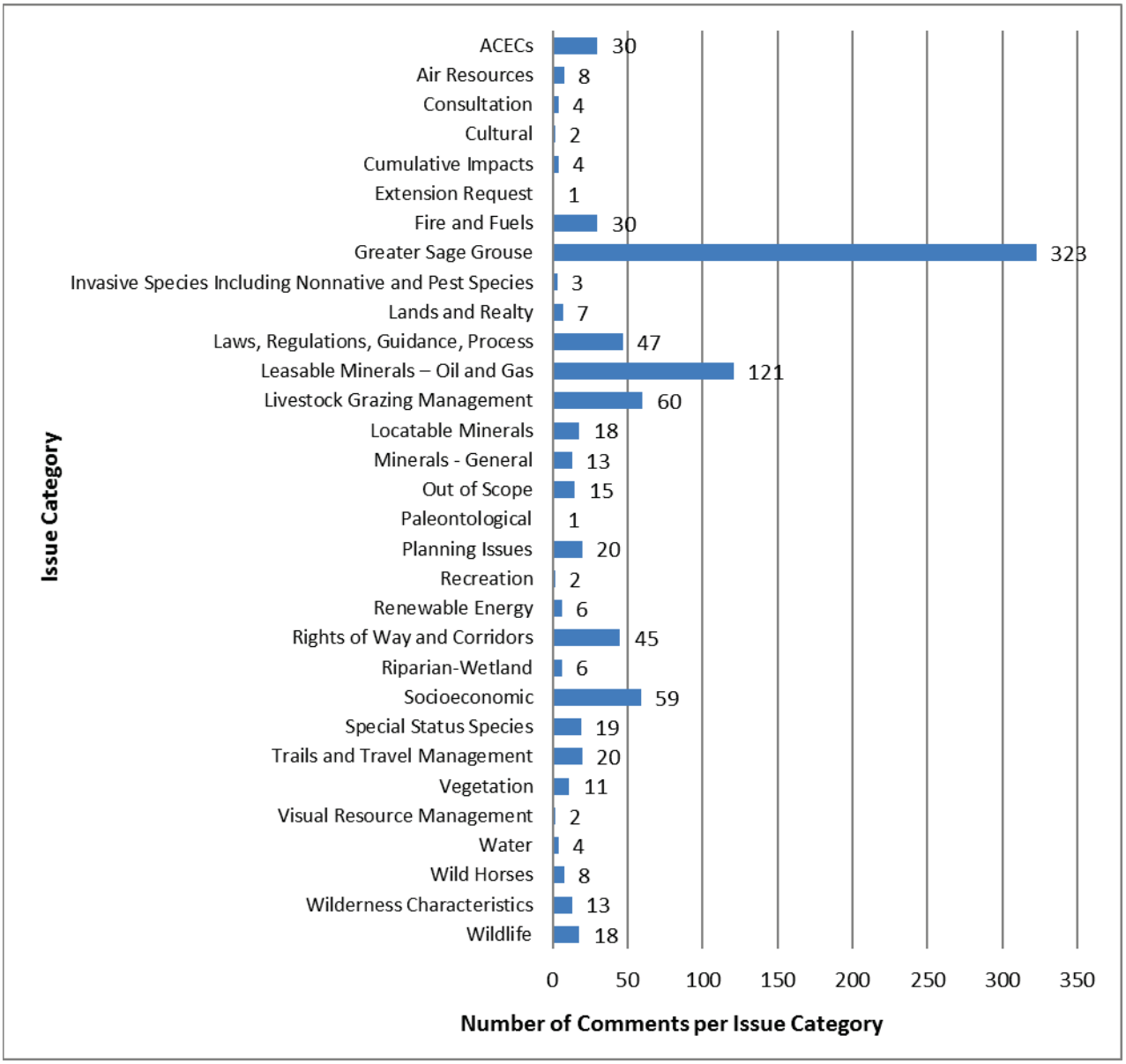
Note: Duplicative comments in form letters were only counted once.

Figure A-5. Number of Draft RMP and Draft EIS Individual Comments by Issue Category



Note: Duplicative comments in form letters were only counted once.

Figure A-6. Number of Supplement Individual Comments by Issue Category



Note: Duplicative comments in form letters were only counted once.

4.2. Substantive Comment Summary and Response

To provide a user-friendly method of understanding the broad themes and topics of concern expressed in the substantive comments, the BLM grouped individual comments with similar topics and concerns and developed 61 summary comments and responses for the Draft RMP and Draft EIS and 51 summary comments and responses for the Supplement. The summary comments and responses are presented below, and are generally organized alphabetically by BLM resource program or other appropriate issue categories (e.g., purpose and need) as described in Tables A-1 and 2. The summary comment numbers below can be used to track the summary comment and response to the individual comments presented in Attachments B and D on the project website: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html. Comments on the Draft RMP and Draft EIS are identified with 2000 series numbers and comments on the Supplement are identified with 3000 series numbers.

4.2.1. Draft RMP and Draft EIS

The summary comment numbers below can be used to track the summary comment and response to the individual comments in Attachment B.

Air Quality

Summary Comment #2009: Commenters expressed concern about the inclusion and/or omission of air quality monitoring stations utilized to represent baseline air quality conditions in the Planning Area. Specifically, commenters argued that the use of the monitoring station located in Yellowstone National Park and other locations outside the Planning Area are inadequate because conditions at those monitoring stations are not similar to conditions in the Planning Area.

Commenters indicated that the impact analysis did not adequately justify why data from selected monitoring stations were included and data from other monitoring stations were not included. Commenters requested additional information including maps depicting monitoring station locations, the criteria used to select monitoring stations, justification of the ability of monitoring sites to adequately characterize air quality in the Planning Area, and consideration of additional air quality monitors (including the Worland monitor).

Commenters also questioned the authority of the BLM to regulate air quality in the region and the State of Wyoming overall. Commenters requested additional text clarifying the scope of BLM's authority in regulating air quality.

Summary Response: The BLM considered including data from additional monitoring stations that may provide more localized data. If the BLM determined data from additional monitoring stations was more appropriate for the analysis, the data were incorporated into the Proposed RMP and Final EIS. Following the consideration of including data from additional monitoring stations, the BLM identified why monitoring

stations were added or excluded from the analysis in the Proposed RMP and Final EIS.

As stated in the Draft EIS and clarified in the Final EIS, the State of Wyoming has primacy with regard to air quality. The law requires the BLM to adhere to Wyoming Department of Environmental Quality (WDEQ) air quality standards. As the RMP is a planning level document, it is not possible to anticipate specific projects and specific air quality mitigation needs at this time. Accordingly, the BLM will consider mitigation for specific projects as needed. Special requirements to alleviate air quality impacts would be included on a case-by-case basis in future use authorizations (including lease stipulations for new leases) within the scope of the BLM's authority. The BLM has worked closely with the WDEQ and Environmental Protection Agency throughout the development of this RMP, and will continue that close working relationship in the development of specific projects in the future.

Summary Comment #2009_1: Commenters expressed concern about various instances of inadequate, inaccurate or insufficient information/data throughout the air quality impact analysis. For instance, commenters indicated that National Ambient Air Quality Standards (NAAQS) levels were not included or accurately listed for criteria pollutants including, but not limited to, ozone and carbon dioxide. Additionally, commenters noted that standard metrics were not utilized to determine visibility conditions within the Planning Area. Commenters questioned the use of qualitative data rather than quantitative data in assessing potential air quality impacts. Commenters also indicated that the analysis failed to clearly address or present whether or not “levels of concern” have been reached for specific criteria pollutants including oxides of nitrogen and sulfur. Commenters questioned why a thorough cumulative impact assessment of air quality was not included for the Planning Area.

Summary Response: The BLM utilized the best available data for the air quality analysis. In response to comments, the BLM reviewed the air quality analysis and revised any observed discrepancies and/or inaccuracies and added additional information including standard metrics used to determine visibility conditions, a list of criteria pollutants with concentrations that have reached a “level of concern,” and other information, as appropriate. The BLM included a specific air quality cumulative impact analysis.

Additionally, the BLM provided an updated emissions inventory and included an air resources appendix within the Proposed RMP and Final EIS.

Summary Comment #2009_2: Commenters requested additional reference to applicable air quality laws and policies and that management demonstrate compliance with WDEQ regulations and other applicable regulations. Commenters

expressed concern about the valuation of sources that would potentially contribute to air emissions/impacts. For example, commenters indicated that the BLM concluded, without warrant, that construction activities associated with oil and gas development would produce more fugitive dust than development associated with other construction activities such as renewable energy development. Additionally, commenters indicated that distant/regional sources would contribute a higher concentration of air emissions than local sources.

Summary Response: The BLM revised the air quality related text in the Proposed RMP and Final EIS including updating references to applicable air quality laws, regulations, and rules, and other revisions as appropriate. In addition, the BLM updated the emission inventory spreadsheets in the Proposed RMP and Final EIS. Emission spreadsheets were updated with the latest emission factors for motor vehicles, off-road engine types, and other activities corresponding to the base year (2005), and the out years, 2015 and 2024.

Areas of Critical Environmental Concern

Summary Comment #2001: Commenters questioned if the existing and newly proposed Areas of Critical Environmental Concern (ACECs) meet the relevance and importance criteria as stated in 43 CFR 1610.7-2(a). Commenters also questioned whether these areas require special management to (1) protect the area and prevent irreparable damage to resources or natural systems, and (2) protect life and promote safety in areas where natural hazards exist. Commenters questioned how the BLM applied the relevance and importance criteria and requested additional documentation to support the findings. In some cases, commenters cited specific research supporting their position that the areas did not need special management. In addition, commenters requested more detailed information and citations in the text.

Summary Response: The ACEC Evaluation Report (June 2010) documents the evaluation process for existing and newly proposed ACECs. The report outlines how each proposed ACEC meets or does not meet the relevance and importance criteria. The report is available on the project website at: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html.

The Proposed RMP and Final EIS includes additional citations to the ACEC report and other sources as appropriate to support the determinations.

Climate Change

Summary Comment #2003: Commenters recommended management to consider and address climate change impacts on ecosystems, wildlife, and other resources. Commenters identified several technical edits including requests for

clarification of language, quantification of air emissions data, and mitigation measures for greenhouse gas emissions. In addition, to be compliant with Secretarial Order 3289 commenters requested that BLM include information specific to climate change planning actions in the Planning Area.

Summary Response: The Proposed RMP and Final EIS incorporates revisions to the climate change sections of Chapters 3 and 4 based on commenter input. The BLM provided additional information throughout the text, made technical edits, and provided updated emission inventory information, as appropriate.

The BLM reviewed the document to ensure consistency with existing federal laws and guidance related to analyzing climate change in NEPA documents. Regarding the development and implementation of management that is responsive to potential climate change impacts on species and ecosystems, the BLM determined that the timing, impacts, and other variables associated with climate change are too uncertain to base long-term management decisions for the planning timeframe (20 years). The BLM will address management issues and planning for climate change impacts through re-evaluation to determine validity of RMP decisions and associated analysis in light of new climate change information and details about subsequent proposed actions in the Planning Area and continued compliance with federal guidance on climate change.

Cultural Resources

Summary Comment #2004: Commenters expressed concern about surface-disturbing activity prohibitions for cultural resources. Specifically, commenters indicated that the 3- and 5-mile buffers for cultural sites would prevent development throughout a significant portion of the Planning Area. Additionally, commenters indicated that the management actions associated with alternatives B and D could potentially interfere with existing leasing rights. In some cases, commenters questioned why certain cultural resources were not specifically discussed in the analysis. Commenters also recommended clarifying terminology used in the management actions and impact analysis for cultural resources.

Summary Response: The BLM is required to comply with Section 106 of the National Historic Preservation Act. As part of this compliance, cultural resource surveys are conducted prior to development on BLM surface to identify and provide field verified data regarding presence of cultural resources and heritage resources. It is often through these site specific surveys that cultural resources are identified and inventoried; the BLM acknowledges that it does not have a complete inventory of all cultural resources in the Planning Area, making an accurate calculation of acreages where a given management action would apply impossible. Therefore, for analysis purposes, an

assumption is made that the restriction would apply, although through site-specific analysis it may be determined that the restriction is not necessary.

The Proposed RMP and Final EIS presents an adequate range of alternatives for analysis purposes. Alternatives B and D are more restrictive than alternatives A and C. In relation to restrictions on surface-disturbing activities, the range of alternatives and analysis included current management (which only applies case-by-case restrictions on development) and other management actions (such as Alternative B, which includes restrictions out to 5 miles for certain cultural sites) to protect the elements that contribute to the sites eligibility under 36 CFR 60.4 (a), (b), or (c). The intent and extent of the application of these management actions is clarified in the Proposed RM P and Final EIS.

The National Trails System Act establishes that the purpose of a National Historic Trail is the identification and protection of the historic route and the historic remnants and artifacts for public use and enjoyment. The BLM manages, to the greatest extent possible, National Trails to safeguard the nature and purposes of the trail and in a manner that protects the values for which the trail was designated. BLM establishes a National Trail Management Corridor to achieve this purpose. The BLM requires the National Trail Management Corridor to be of sufficient width to constitute a manageable administrative unit that is identifiable on the ground and includes a public land area of sufficient width within which to encompass National Trail resources, qualities, values, and associated settings and the primary use or uses that are present or to be restored. The National Trail resources, qualities, values are the significant scenic, historic, cultural, recreation, natural (including biological, geological, and scientific), and other landscape areas through which such trails may pass as identified in the National Trails System Act.

The BLM revised the text in the Proposed RMP and Final EIS as needed to address commenter concerns regarding terminology.

Cumulative Impacts

Summary Comment #2005: Commenters indicated that the overall cumulative effects analysis failed to adequately address potential impacts to various resources including, but not limited to, wildlife, vegetation, livestock grazing, and water quality. Additionally, commenters raised concerns about projects and emerging technologies that were not considered in the Reasonably Foreseeable Development (RFD), specifically, projects that involve horizontal and directional drilling technologies. Commenters also indicated that the analysis of range improvements and other management actions did not address cumulative impacts to various

resources including, but not limited to, wildlife, vegetation, and water quality or consistency with existing livestock grazing permits. Commenters also noted that the RMP and EIS should further discuss the capacity of resources to absorb cumulative effects.

Summary Response: After additional review, the BLM determined the current cumulative impacts analysis is appropriate to compare impacts among the alternatives and adequately informs the decision-making process. The cumulative impacts analysis focuses on issues identified during scoping and other stakeholder coordination efforts. Chapter 3 of the RMP and EIS describes existing conditions resulting from past actions, including the current state of the environment resulting from cumulative past actions.

The RFD assumes technology improvement rates (Final RFD page 3) based on available information. Projects and technologies considered in the cumulative analysis are those that are proposed or highly probable, based on known opportunities or trends at the time of analysis, rather than projects or technologies that are potential or contemplated.

Fire and Fuels

Summary Comment #2008: Commenters indicated that the overall analysis of fire and fuels requires explanations that are more descriptive, quantifications, and scientific reference. Specifically, commenters questioned or raised concerns pertaining to: (1) the amount of and specific cover types that would be affected by prescribed fires/fuel treatments; (2) why no background information or quantification are included for existing fuel conditions; and (3) how the alternatives are analyzed and compared. In addition, commenters requested a more detailed analysis of cheatgrass in an effort to determine if prescribed fires of cheatgrass should be permitted if prescribed fires of cheatgrass would result in adverse impacts to sage-grouse habitats. Moreover, commenters expressed concerns with the analysis and classification of natural fire regimes and questioned the feasibility of restoring natural fire regimes to the entire landscape.

Summary Response: The BLM updated the fire and fuels section to include details regarding the expansion of cheatgrass by burns, indicators for making a reasoned choice among the alternatives, and various technical edits, as appropriate. The BLM also provided additional references as needed to support statements within the fire and fuels section. The BLM considered requests for text edits on an individual basis and addressed as necessary in the final document.

The BLM provides detailed information regarding fire regimes, condition classes, and background information for the Planning Area along with detailed maps at a course scale within the Fire Management Plan (FMP). On page 68 of the FMP, there is a condition

class map, which shows acres burned by vegetation type; additionally the FMP provides maps showing chemical, mechanical, and other treatment by vegetation type. The FMP and supporting maps are available at:
http://www.blm.gov/wy/st/en/programs/Fire/planning.html

Fish

Summary Comment #2002: Commenters identified a number of technical edits related to fish and their habitats. These edits included requests to use alternative language, corrections to technical statements and/or terms, definitions of terms, and clarification of language. In addition, commenters requested that BLM include a variety of references in the text as well as in the alternatives. Commenters asked that BLM incorporate recently released and updated information to the extent possible. Commenters also noted instances where proposed BLM management could be incompatible with current Wyoming law.

Summary Response: The BLM revised the *Fish and Wildlife - Fish* sections of the Proposed RMP and Final EIS based on commenter input. The BLM revised terminology definitions, technical edits, additional references, and changes to the management actions. The BLM updated all references that cite material or guidance to reflect the most current information.

The BLM reviewed the Draft RMP and Draft EIS to ensure the proposed management actions complied with all applicable laws and guidance; the BLM disagrees that the management of fish and fisheries proposed in the Draft RMP and Draft EIS violate applicable laws and guidance.

Historic Trails

Summary Comment #2010: Commenters indicated general concern regarding the proposed designation and protection offered to historic trails in the Planning Area, identified potential trails for BLM to apply protection, and indicated total surface acreage for historic trails is not provided within the alternatives tables. Specific concerns raised by commenters included the prohibition of surface-disturbing activities within 2 to 5 miles of a historic trail and improper designation of trail segments as being eligible for protections offered to historic trails.

Summary Response: BLM completed a Class I Regional Overview, in compliance with Section 106 of the National Historic Preservation Act, prior to the Draft RMP and Draft EIS. The intent of the Class I Regional Overview was to provide an accurate representation of historic trails and allow designation and protection of historic trail segments in the Planning Area.

Only the trail segments with current integrity of setting would have their setting managed; as noted throughout the RMP, the BLM has no

authority to manage activities on private or state lands, and management of setting for historic trails would not apply to these lands.

At this time, the BLM does not have sufficient information to determine the acreage of BLM-administered land where setting is important to the trail's eligibility to be placed on the NRHP and where the trail retains integrity.

The BLM provided additional information and clarification regarding historic trails where appropriate in the Historic Trails sections of the Proposed RMP and Final EIS.

Invasive Species

Summary Comment #2012: Commenters indicated that the overall analysis of invasive species required increased information on management actions, additional quantification, and more field verified data. Specifically, commenters questioned or raised concerns pertaining to a lack of emphasis and direction regarding invasive weed management, inadequate Geographic Information System (GIS) reporting of invasive species acreages and locations in the Planning Area, and lack of quantitative information for measuring impacts and comparing alternatives. Commenters requested an updated and expanded field verified inventory of all invasive species in the Planning Area along with representative GIS mapping, acreages, and indicators to be used when comparing alternatives.

Summary Response: The BLM acknowledges that complete inventories of invasive species are not currently available and that such inventories cannot be completed for this RMP revision project given budget and time constraints. The BLM also recognizes that there are more acres infested with cheatgrass and noxious weeds in the Planning Area than the numbers cited in the Draft RMP and Draft EIS. However, the BLM is not required to complete full inventories of all resources before conducting land use planning. Further discussion regarding BLM's treatment of invasive species and limitations on occurrence and spread of such species is available in Section 3.4.4 of the Proposed RMP and Final EIS.

The BLM reviewed GIS and other data presented in the Draft RMP and Draft EIS and made corrections or added clarification as appropriate. Specifically, the BLM clarified in Chapter 3 that the discrepancy between the 2004 and 2007 inventory data for invasive annual bromes resulted from the use of two different data sources. Further, an area may be infested with annual bromes, but annual bromes may not be the dominant vegetation cover. The difference, when land status is considered, is approximately 6,000 acres. The BLM cited these two data sources in the Proposed RMP and Final EIS.

For invasive species, acres of surface disturbance are used as an impact indicator; however, the BLM recognizes that the proportion of areas subject to surface disturbance that become infested with weeds is variable and will depend on a number of factors that are not known at the RMP level.

Lands and Realty

Summary Comment #2013: Commenters questioned how the total percent of land closures for leasing were determined and also inquired about the references and methodology used by the BLM when identifying land classifications, withdrawals, lands for disposal, and segregations among the alternatives. In addition, commenters requested clear requirements for re-analyzing the appropriateness of leasing expired or expiring leases.

Summary Response: The BLM revised the lands and realty sections based on commenter input and incorporated additional information and clarification regarding methodologies for identifying land tenure adjustments, land use classifications, and indirect impacts. The BLM also reviewed management actions and land use allocations associated with mineral leasing and updated the Minerals and Lands and Realty sections, as appropriate.

Land tenure adjustments criteria are further explained in Appendix M of the Proposed RMP and Final EIS.

Summary Comment #2013_1: Several commenters indicated that the overall analysis of lands and realty requires more descriptive explanations/definitions, clarification on BLM's analysis methods, and additional scientific reference. Specifically, commenters questioned or raised concerns pertaining to: (1) lack of discussion on how valid existing lease rights will relate or be impacted by land use decisions in the RMP and EIS; (2) BLM's methodology for determining the least restrictive stipulations for achieving resource objectives; (3) explanation of how geophysical explorations that do not require road construction can receive a Categorical exclusion (CX); and (4) detailed descriptions of special designations which qualify as acquisition areas.

Additionally, commenters noted missing information or editorial items in the Lands and Realty section and maps including missing GIS acreages within the Alternative A attribute table; inaccuracies in reported acreages for current oil and gas leasing; and reference citations pertinent to the lands and realty planning process which should be included.

Summary Response: The BLM revised the Lands and Realty section based on commenter input and provided additional reference information where available and appropriate. Within the Proposed RMP and Final EIS the BLM

provided additional information, clarification, definitions, and indicators and methods used to analyze impacts, as appropriate.

CXs are not always the best approach in land use planning, and do not apply to all road construction activities in the Planning Area. All projects receive NEPA review appropriate to the project proposal; all determinations as to the applicability of a CX are made on a case-by-case basis.

The BLM calculated the number of acres in the text from the areas depicted on representative GIS maps. In some cases, polygons on the maps may look larger than they should because RMP decisions do not apply to private or state-owned lands that may fall within the areas. The BLM believes all terms and descriptions are consistent throughout the Proposed RMP and Final EIS. Without specific examples where such inconsistencies exist, the BLM is unable to provide further response.

Livestock Grazing

Summary Comment #2074: Commenters expressed concern regarding the lack of disclosure of direct impacts to livestock grazing. Specifically, commenters requested a more detailed description for each alternative of the direct impacts that would result from management actions that change Animal Unit Month (AUM) allocations in the Planning Area.

Summary Response: The BLM developed and analyzed alternatives in the Proposed RMP and Final EIS using the best available information in compliance with federal laws, guidelines, and policies. The BLM included references that support decisions with regard to Livestock Grazing Management and made text edits on an individual basis as necessary.

The analysis in the Proposed RMP and Final EIS only considers losses of AUMs that occur as a result of closures or long-term surface disturbance. The Proposed RMP and Final EIS does not set utilization levels for livestock grazing, as those levels are established in site-specific Allotment Management Plan (AMPs). As stated in Appendix W, "utilization levels will be considered during the allotment monitoring, assessment, and evaluation process, as well as during activity plan development and the NEPA and permit/lease renewal process." Because an RMP is a high level planning document that does not include site-specific actions, it is not possible to predict if and where adjustments to utilization levels will be needed or their effects on permittees or AUMs.

Summary Comment #2076: Commenters recommended additional text on the process for modifying AUMs and AMPs and balancing livestock grazing and other resources.

Specific suggestions included that the BLM work directly with the permittees on monitoring and management development, and that

comprehensive monitoring studies and conflict resolution and mediation processes precede any AMP modification or elimination of grazing allotments.

Other comments requested language clarifications or additional analytic assumptions to characterize the influence of livestock grazing on other resources in a more positive light.

Summary Response: The BLM reviewed all sections pertinent to livestock grazing management and determined that the impact analysis conclusions in the Proposed RMP and Final EIS are appropriate. It is reasonable to consider and analyze changes in AUM or other grazing management in areas where current livestock grazing has the potential to result in adverse effects on wildlife, special status species, or other resources; it is not a foregone conclusion that where livestock grazing has historically occurred there is no potential for conflicts with other resources and uses.

The BLM clarified language in Chapter 3 to state that changes to grazing management are implemented when rangelands are not meeting standards due to current livestock grazing.

Summary Comment #2011: Commenters requested that the BLM incorporate additional text to better address livestock grazing management, particularly related to the BLM's proposed management of potential conflicts between livestock grazing and other resources and uses. Specifically, commenters requested more discussion on the impacts of livestock grazing on special status species (e.g., grizzly bears and greater sage-grouse) and wildlife; changes to vegetation as a result of livestock grazing; policies and specific management actions or changes to current management to guide livestock grazing activities in identified greater sage-grouse seasonal habitats; and reserve common allotments.

Commenters requested additional information on current livestock grazing AUMs by allotment and clarification of certain terms and concepts (particularly if livestock grazing was considered a surface-disturbing activity and the meaning of the phrase in consideration of other resource values).

Summary Response: One method to deal with actual or perceived conflicts between livestock grazing and other land use allocations is to eliminate the conflict by removing livestock grazing. Alternative B uses this approach. Alternatives A, C, and D prescribe varying methods of addressing competing land use allocations. The BLM analyzed a reasonable range of alternatives by including one alternative that reduces conflicts through removing livestock grazing, and three that prescribe other methods.

No areas were proposed for closure to livestock grazing due to grizzly bears; the impacts to grizzly bears from livestock grazing are discussed

in Chapter 4 and the Draft Biological Assessment (available on the project website). The BLM believes that properly managed livestock grazing is compatible with maintaining quality sagebrush habitat (see Appendix W), and such use would be compatible with management or objectives to preserve or enhance this habitat type.

The phrase "consistent with other resource objectives" occurs throughout this document and is intended to reference the fact that the BLM is required to consider multiple uses of the public lands under its management. The BLM discloses projected AUMs for each alternative. Actual AUM adjustments are made through subsequent implementation level analysis and decisions. Any future adjustments, if necessary, would be based upon site-specific AMPs. For example, discussions of how managing livestock grazing to meet DPC would affect livestock grazing permittees is not appropriate for an RMP level analysis as it would require a site-specific analysis. Because the RMP is a high level planning document that does not authorize these types of site-specific actions, it is not possible to predict if and where such adjustment will be needed or their effects on permittees.

The BLM updated the Livestock Grazing Management sections to include additional information on the types of activities that are addressed in AMPs, clarification on reserve common allotments, and polices used to guide livestock management activities. The BLM addressed requested text edits, additional information, and references as deemed necessary. In addition, the BLM reviewed and revised the Proposed RMP and Final EIS as necessary to reflect the fact that the BLM does not consider livestock grazing or other herbivory to be a surface-disturbing activity.

Master Leasing Plans

Summary Comment #2014: Commenters raised concerns about the potential closure of lands available for leasing and the resulting impacts on future lease sales in the Planning Area as well as the potential for slowed production and exploration activities. Additionally, commenters indicated that the BLM did not identify resources of concern in the three areas nominated for Master Leasing Plans (MLPs) reviews and requested the BLM to re-evaluate potential impacts associated with further land closures consistent with IM 2010-117. Moreover, commenters requested the use of phased leasing as a way to resolve potential resource conflicts in the Planning Area.

Commenters raised concerns regarding the lack of clear management and detailed information regarding conflicts between existing leases and the protections of important resources, specifically ACECs, lands with wilderness characteristics, and critical wildlife habitat. In addition, commenters indicated oil and gas leasing actions presented within the BLM Preferred Alternative are inconsistent with guidelines

established in the BLM IM 2010-117 Oil and Gas Leasing Reform. Specifically, commenters indicated under the Preferred Alternative BLM does not provide sufficient analysis, Best Management Practices (BMPs), or mitigation for biological resources in areas of oil and gas development as required by IM 2010-117.

Summary Response: In response to the comments, BLM revised several sections of the RMP and EIS including adding information on the cumulative impacts of surrounding wilderness areas and National Parks on minerals development, additional information on the complete MLP analysis, and other information, as appropriate.

MLPs have been brought forward from Appendix Y of the Draft RMP and Draft EIS and are fully incorporated into the alternatives and analyzed in the Final EIS.

The BLM maintains compliance with all federal laws and guidance. Reevaluation of federal and BLM policy is outside the scope of this RMP and EIS. The BLM reviewed the RMP and EIS document for consistency with state and federal laws and determined the Proposed RMP and Final EIS is compliant with IM 2010-117 and MLPs.

Mineral Potential and Reasonably Foreseeable Development Scenario for Oil and Gas

Summary Comment #2061: Commenters noted that the RFD scenario and the RMP and EIS underestimated mineral/oil and gas occurrence and development potential in several areas including the Mowry Shale and the Sub-Absaroka Play and that undiscovered reserves could increase drilling and production beyond the scenarios in the RFD and the analysis in the RMP and EIS. Commenters requested clarification of the role of the RFD in comparing impacts across alternatives in the RMP and EIS, noting that estimates of disturbance and other impacts are for analysis purposes only and exceedence of these analysis assumptions should not require a plan amendment. Commenters also requested that the RMP and EIS clarify that the RFD scenarios are not a cap or limitation on future development. Commenters noted that the RFD did not adequately consider several technologies that could increase development potential including horizontal drilling, carbon dioxide flooding, and other enhanced oil recovery (EOR) techniques. Commenters noted that the surface disturbance estimates in the RFD may need to be adjusted to reflect the larger well pad associated with horizontal drilling. Commenters requested that the RMP and EIS disclose the percent for high potential occurrence in the Planning Area.

Commenters requested that BLM provide inventories and mineral potential information for commercially viable deposits related to rare earth elements and fluvial placer deposits, as well as the acreage for occurrence of sand and gravel.

Summary Response: The BLM revised text in the Proposed RMP and EIS including clarification of the role of the RFD in the analysis, identification of the percent for high potential occurrence in the Planning Area, clarification of the difference between occurrence and development potential, and other information, as appropriate.

The RFD provides a reasonably foreseeable development scenario for oil and gas resources as well as predicted fluid mineral potential based on staff knowledge, input from industry, and other information. The BLM acknowledges that the RFD is a best estimate of reasonable development based on available information and a current understanding of conditions and technologies (including horizontal drilling and EOR) and that actual development may vary from these estimates.

The Solid Mineral Occurrence and Development Potential Report provided information on mineral materials and other solid minerals. While sand and gravel occurrence acreages were available, acreage for potential occurrence for rare earth minerals, were not available due to a lack of data on such minerals in the Bighorn Basin.

Minerals

Summary Comment #2015: Commenters questioned the data and methods used by the BLM to conduct the analysis and calculate acreage related to minerals management using GIS and noted potential inconsistencies in data and numbers within the document and compared to other data sources. Commenters raised specific questions and concerns pertaining to: (1) the source and accuracy of data, (2) lack of attribute information and metadata for certain GIS files, (3) the method used to generate mineral constraints, and (4) lack of documentation of methods used to calculate certain values. Some commenters explained that, in using the BLM's own GIS data, they were unable to reproduce the GIS-generated numbers presented in the Draft RMP and Draft EIS. Commenters also cited specific numbers in the document and raised questions about their accuracy and the consistency of their use throughout the document.

Summary Response: The BLM reviewed GIS data, methods, and mapping products associated with minerals and revised and updated shapefiles, tables, acreages, text, and maps, as appropriate.

Summary Comment #2016: Commenters requested clarification about how the BLM would manage geophysical exploration in the Planning Area including lessee requirements and site-specific NEPA analysis. Commenters also questioned how BLM management would affect a lessee's ability to obtain valid geophysical data under an approved exploration lease.

Summary Response: As described in the RMP and EIS, all activities in the Planning Area will be subject to the goals and objectives identified in the RMP. All

individual geophysical operations will be assessed on a case-by-case basis consistent with the terms of the RMP and other applicable federal guidance.

Summary Comment #2017: Commenters questioned the way the BLM portrayed the potential for coal production in the Planning Area, and, citing an outside study, requested the BLM modify the discussion on coal to more accurately reflect the potential for coal production.

Summary Response: The BLM revised the text in Chapters 3 and 4 of the Proposed RMP and Final EIS to more adequately describe the potential for coal production from federal mineral estate in the Planning Area.

Summary Comment #2077: Commenters asked the BLM to identify acreage of withdrawals proposed in ACECs, and modify Visual Resource Management (VRM) Class II boundaries around the Sheep Mountain Anticline ACEC to include areas of bentonite potential. A commenter asked the BLM not to issue new leases in areas where there are few existing leases. Another commenter indicated that Timing Limitation Stipulation (TLS) and Controlled Surface Use (CSU) stipulations are too restrictive where habitats of species overlap. Regarding Alternative D, commenters believed that classifying certain right-of-way avoidance areas would hurt the bentonite industry and that an increase in the areas closed to oil and gas leasing would be inconsistent with goals and policies of county and conservation district land use plans. One commenter asked that the BLM include restrictions on salable mineral development at sage-grouse leks.

Summary Response: The BLM revised the Proposed RMP and Final EIS to include clarification of the process by which ACECs may be withdrawn on a case-by-case basis, adjustment of VRM boundaries as needed, and other revisions, as appropriate.

Summary Comment #2047: Commenters expressed concern that lease stipulations, constraints, and mitigation measures for mineral development are more restrictive than necessary and may not be compliant with Federal Land Policy and Management Act (FLPMA) and the Energy Policy Act of 2005; commenters recommended that stipulations be the least restrictive necessary to adequately protect other resource values. Commenters questioned the need for additional restrictions on oil and gas development in the Planning Area considering the existing restrictions in surrounding wilderness areas and National Parks.

Commenters requested a more detailed description of the reasoning behind increasing restrictions, stipulations, and areas closed to oil and gas leasing in the Planning Area as well as more information regarding impacts to state and local economies from restrictions on minerals development. Commenters requested several modifications in the RMP and EIS including changing VRM Class II areas from a moderate to a major restriction and further describing the impacts from managing big game crucial winter range as No Surface Occupancy

(NSO) Special Recreation Management Area (SRMA) under Alternative B. Commenters noted that closing an area to leasing is effectively a withdrawal and that withdrawals can only be made using specific procedures mandated by FLPMA.

Summary Response: The BLM revised text in the Proposed RMP and Final EIS to include a description of cumulative impacts on minerals development considering management in surrounding Wilderness and National Parks, clarification of the application of NSO stipulations, and other information, as appropriate.

In accordance with NEPA and other guidance, the BLM provided and analyzed a range of alternatives and management scenarios for minerals development. Chapter 2 provides the rationale and restrictions on oil and gas development in the alternatives. Regarding comments related to closing an area to leasing being considered as a withdrawal, the BLM considers closure to leasing a discretionary action that does not constitute a withdrawal from mineral entry under the mining laws.

The BLM also notes that stipulations are attached prior to lease sale and issuance. Mitigation measures are attached as conditions of approval on site-specific projects. Should stipulations be determined unwarranted, they are subject to exception, modification, and waiver.

Summary Comment #2049: Commenters requested reference to BLM and other agency policies, guidance, and requirements for minerals development and subsequent reclamation. Commenters requested that the BLM should update certain data to reflect current information including employment data for mining industry and number of Application for Permit to Drill approved in recent years. Commenters also requested the establishment of thresholds related to locatable minerals development. Commenters asked BLM to consider effects of management restrictions, implementing policies, and market conditions and cycles on mineral development. Commenters requested additional analysis on resources from bentonite mining and damage to oil and gas wells if they are shut-in on an annual basis.

Commenters requested modification to minerals management in the alternatives related to Oil and Gas Management Areas (OGMAs) and Rights-of-Way (ROW) corridors in relation to mining. Additionally, commenters requested clarifying language, correction of technical statements, and incorporation of additional information related to minerals in the RMP and EIS. Commenters requested the BLM to base management decisions on sound science, monitoring, and field data.

Summary Response: The BLM revised the minerals and other appropriate sections in the Proposed RMP and Final EIS to include references to appropriate BLM Handbooks and other guidance, clarify reclamation standards and requirements, update the number of APDs, revise management

actions, clarify language regarding the shut-in of wells, and other information, as appropriate.

Regarding the development of thresholds for locatable minerals, the application of a threshold to locatable mineral development is unreasonable as the 1872 mining law, as amended, allows for mining activities unless withdrawn from appropriation under the mining laws.

Summary Comment #2050: Commenters provided several recommendations related to OGMAs including reconsideration of the number of designated OGMAs, adding language that allows for modification and expansion of OGMAs if development extends beyond the identified OGMA areas, adding certain areas to OGMAs under Alternative C, and modifying management actions associated with OGMAs.

Summary Response: The BLM reviewed the provided comments and revised Alternative D management and other sections in the Proposed RMP and Final EIS including adjustment of OGMA boundaries, addition of language allowing flexibility for expansion of OGMAs in the future if development extends beyond the currently identified OGMAs, and other revisions, as appropriate.

Summary Comment #2051: Commenters indicated that the RMP and EIS did not adequately consider EOR and other technologies such as horizontal-well drilling, and CO_2 sequestration related to EOR. Commenters noted that such technologies could increase oil and gas development beyond what is included in the RMP and EIS. Commenters indicated that the RFD scenario and Proposed RMP and Final EIS should analyze the potential for EOR to increase oil and gas production in the Planning Area. Commenters urged BLM to keep lands open to leasing and development to allow for advances in horizontal drilling and other technologies. Commenters indicated that EOR should be analyzed to allow future project development under Environmental Assessments rather than EISs.

Summary Response: The RFD and the RMP and EIS did include assumptions associated with technology improvements (see RFD page 30) including EOR. The BLM added these technology improvement assumptions to Chapter 4. The BLM also clarified the minerals sections of Chapters 3 and 4 with regard to the potential for EOR techniques to change the potential for oil and gas development in the Bighorn Basin, and included other information, as appropriate.

Summary Comment #2052: Commenters referenced several laws, policies, guidance documents, and case law regarding valid existing rights. Commenters indicated that the BLM does not have the authority to modify stipulations, apply unreasonable mitigation measures, or impose restrictions (such as NSO) on existing leases after a lease has been issued. Commenters also opposed management in alternatives B and D that would allow the BLM to prohibit suspension of existing leases. Commenters noted that a lease can only be modified by the mutual agreement of both

the lessee and the lessor and recommended revisions to reflect this in the RMP and EIS.

Summary Response: The BLM updated management in the minerals sections in the Proposed RMP and Final EIS including clarification that stipulations on existing leases can only be added with the consent of the lease owner. The BLM included additional information on leasing adjacent to existing leases, clarification that the BLM may apply Conditions of Approval in conformance with Section 6 of the Standard Oil and Gas Lease Terms while recognizing valid existing rights, and other information as appropriate.

NEPA

Summary Comment #2055: Commenters indicated a preference for the development of an alternative that implements a multiple use approach that would provide for resource extraction while also providing for the conservation for wildlife and biological resources. In addition, commenters requested an analysis of proposed management actions specific to wildlife resources, and, in some cases, requested the development of additional management actions and/or management areas be applied where appropriate. Commenters requested the inclusion of other alternatives including a phased oil and gas development alternative. Commenters also indicated that measurement indicators were missing making it difficult to perform an effects analysis of the alternatives.

Summary Response: The BLM revised the text of the Proposed RMP and Final EIS based on received commenter input, providing additional information, definitions, details in the text and management actions within Alternative B geared toward conservation measures, reference citations and clearly identified impact indicators. Additionally, Alternative D was updated and contains language that implements a multiple-use approach which balances the needs of resource extraction with wildlife and biological resource conservation needs.

Performing an alternative analysis specific to wildlife resources is not feasible as this action would preclude the BLM from managing public lands for multiple uses and would not meet the purpose and need for the plan revision.

Phased development and phased leasing alternatives were considered, but not carried forward for detailed analysis for the reasons cited in Section 2.3. This does not preclude, however, the consideration of phased leasing or phased development on a site-specific basis.

Note: MLPs, as outlined in the alternatives of the Proposed RMP and Final EIS may include phased leasing.

Summary Comment #2057: Commenters indicated that various maps contained in the Draft RMP and Draft EIS are inaccurate, incomplete, and, in some cases, unable to be reproduced. Commenters also pointed to various inconsistencies associated with maps contained in the Draft RMP and Draft EIS. For instance, acreage inconsistencies were observed in shapefiles associated with Recreation Management Areas, Travel Management, Withdrawals, Geothermal Constraints, ROW Avoidance and Exclusion Areas, and Mineral Constraints. Furthermore, commenters requested an update of the administrative record to include documentation utilized to develop GIS analysis and all metadata utilized to generate maps.

Summary Response: The BLM reviewed GIS data, methods, and mapping products and revised and updated shapefiles, tables, acreages, and maps, as appropriate. The administrative record provides information documenting the GIS analysis process.

Summary Comment #2054: Commenters requested that the BLM incorporate additional information into the text of the RMP/EIS including, but not limited to an explanation of discrepancies between alternatives A and D in acres closed to oil and gas leasing within the Planning Area; providing more information on the effects of different levels of development on biological resources in the Planning Area; and providing specific direction for the completion of rangeland health standards assessments. Comments also requested additional information for the analysis including more current information on jobs associated with Bentonite mining, local research and modeling on the contribution of the oil and gas industry to local economics and air quality modeling to estimate potential impacts of planning decisions on the air quality resources within the Planning Area.

Commenters also requested a more detailed discussion of the purpose, implementation and enforcement of BMPs for resources in the Planning Area and additional information on timeframes and milestones associated with management and BMPs. Commenters expressed concern regarding the need for a greater use of scientific data to characterize historic and current conditions within the Planning Area as well as to substantiate the need for proposed changes in management.

Commenters requested additional information for the RFD including discussing potential increases in production from enhanced recovery techniques, requests for management to better accommodate EOR, and requests for other provisions related to EOR.

Commenters identified a number of technical edits related to the NEPA analysis including requests to use alternative language, correct technical statements and/or terms, define terms, and clarify language.

Summary Response: The BLM has reviewed and revised the text of the Proposed RMP and Final EIS. Based on commenter input, the Proposed RMP and Final EIS

includes revised glossary definitions, additional information, technical edits, clarifications, references, and other revisions, as appropriate.

Paleontological Resources

Summary Comment #2059: Commenters expressed concern regarding the proposed designation of ACECs in the Planning Area based on the protection of specific paleontological fossil locations. Specifically, commenters requested detailed information on how restricting surface disturbance in these areas would help to preserve paleontological resources. Additionally, commenters questioned the necessity of restricted surface disturbance when these areas are exposed to high volumes of natural wind and water erosion. Moreover, commenters questioned why fossil collection is prohibited in these areas and requested the inclusion of scientific citations within the RMP and EIS to provide a better description of the affected environment.

Summary Response: The BLM included additional references where appropriate in the Paleontological Resources section. The BLM considered commenter submitted edits and made technical corrections in the Proposed RMP and Final EIS, as necessary.

Process and Procedure

Summary Comment #2060: Commenters expressed frustration regarding the BLM not fully attending meetings held by the LGCA and noted their beliefs that the BLM's lack of participation and coordination with counties and other stakeholders is not consistent with FLPMA, NEPA, the terms of Memorandums of Understanding (MOUs), and other policies and guidance. Commenters expressed concern regarding the BLM's non-participation in local government public meetings.

Summary Response: The BLM developed the scope, management, and content in the RMP and EIS through a collaborative process that involved numerous public meetings between the BLM cooperating agencies, counties, the public, and other affected parties. The RMP and EIS was prepared consistent with NEPA, FLPMA, the BLM Land Use Planning Handbook, and other applicable guidance and policy.

Readability and Format

Summary Comment #2006: Commenters identified several readability issues and provided suggested format changes regarding the layout and presentation of information in the RMP and EIS. Specifically, commenters noted problems with viewing maps on their computer screens, indicated that the length of the document was excessive, and requested the use of pull out indexes for various large-scale tables and appendices.

Summary Response: The BLM evaluated all submitted requests regarding document readability and format on an individual basis and revised the text, tables, and maps, as appropriate.

Recreation

Summary Comment #2062: Commenters recommended managing additional areas in the Planning Area as SRMAs, while other commenters recommended dropping SRMA management for certain areas or revising management actions governing those areas. Commenters requested that clarifying language be added to the Draft RMP and Draft EIS to describe what types of recreation uses would benefit from specific SRMA designation, as well as more detailed information describing the goal of the SRMA designation.

Additionally, commenters requested clarification or revision of potential impacts to recreation from specific management actions under the various alternatives.

Summary Response: The BLM developed a reasonable range of alternatives for recreation and recreation management areas that were analyzed and considered for the Proposed RMP and Final EIS. Where appropriate, the BLM revised the text in the Proposed RMP and Final EIS to address comments on potential management of recreation and to clarify impacts.

Renewable Energy

Summary Comment #2065: Commenters requested that citations be included for information pertaining to increases in renewable energy development and associated activities in the Planning Area. In addition, commenters recommended that the BLM incorporate wind energy development guidance from the U.S. Fish and Wildlife Service (USFWS) and Wyoming Game and Fish Department (WGFD) and apply these guidelines in the RMP and EIS text.

Summary Response: Citations documenting increases in renewable energy development and associated activities are presented in the *Reasonable Foreseeable Development for Renewable Energy Resources in the Bighorn Basin RMP Planning Area* posted on the project website and referenced throughout the Draft RMP and Draft EIS. The *Summary of Environmental Consequences* table in Chapter 2 further illustrates impacts to and from renewable energy development in the Planning Area. The BLM will continue to consider federal and state guidance on mitigation measures associated with wind development throughout the planning period.

Rights-of-Way and Corridors

Summary Comment #2066: Commenters questioned the overall adequacy of the analysis in the ROW and corridors section and requested additional explanation/rationale to support the proposed ROW corridors and the exclusion and avoidance/mitigation areas under each alternative. Some commenters sought specific information about the proposed ROW programs under each alternative including the width of designated corridors, the requirements for colocation of projects, and the specific management prescriptions for avoidance/mitigation areas. Commenters also expressed concern that the criteria and process for identification of ROW corridors and ROW exclusion and avoidance/mitigation areas were unclear and did not account for some existing ROW projects in the Planning Area or adequately estimate the demand for future ROW projects such as carbon dioxide sequestration. Some commenters requested additional analysis of the impact of ROW management areas on ROW holders and applicants including the ability of an oil and gas lessee to access its lease, and consideration of the regulatory and economic constraints facing utility companies. Commenters also requested definition of terms and clarification of the differences in impacts to the ROW program among alternatives.

Summary Response: In response to comments, the BLM reviewed the ROW sections and provided additional information in the Proposed RMP and EIS, including clarifying resource impacts associated with ROW corridors and exclusion and avoidance areas, clarifying definitions, updating the glossary, and other appropriate revisions.

Summary Comment #2067: Commenters expressed concern regarding discrepancies between information in the Draft RMP and Draft EIS and the GIS data used by the BLM to delineate ROW avoidance and exclusion areas within the Planning Area. Commenters requested that the BLM reconcile the discrepancies or remove the information from the Draft RMP and Draft EIS. Commenters recommended the addition of new information that takes into account the increase in ROW use by future development in the Planning Area such as electrical transmission lines and CO_2 pipelines. Commenters also requested that BLM include a variety of references in the text as well as in the alternatives.

Summary Response: The BLM reviewed GIS data, methods, and mapping products associated with the ROW land use allocations and revised and updated shapefiles, tables, acreages, and maps, as appropriate. In addition, the BLM reviewed and revised the ROW sections in relation to the comments and provided additional information including clarification of existing and new ROWs, clarification of management precedence where ROW corridors overlap ROW exclusion and avoidance/mitigation areas, added language for management actions, and additional reference information, as appropriate.

Greater Sage-Grouse

Summary Comment #2068: Commenters indicated greater sage-grouse information in the Draft RMP and Draft EIS did not provide adequate details for the reader to draw conclusions about impacts among the different alternatives. Commenters raised concerns and requested information regarding: (1) invasive species management and livestock impacts on greater sage-grouse habitat; (2) missing scientific references and/or data to support BLM's conclusions regarding impacts to greater sage-grouse under each alternative; (3) clarification regarding limiting noise levels around greater sage-grouse leks; and (4) disclosure of economic impacts resulting from land closure to livestock grazing as a protection measure for greater sage-grouse.

Summary Response: The BLM revised management actions and greater sage-grouse related text in the Proposed RMP and Final EIS, including clarification that management of livestock grazing under Alternative A may not improve the quality or quantity of sage-grouse habitat, and clarification regarding consistency with the Wyoming Governor's Executive Order (EO) "Greater Sage-Grouse Core Area Protection" (EO 2011-5). In addition, BLM clarified language on impacts and included scientific references, as appropriate. (See also the Supplement EIS summary comments and responses in Section 4.2.2)

Summary Comment #2069: Several commenters raised concerns that management and identified Key Habitat Areas in the Draft RMP and Draft EIS may not be compliant with the State of Wyoming's greater sage-grouse policy including IM WY-2010-012 and EO 2011-5. Commenters questioned BLM's decision to expand Key Habitat Areas beyond the existing greater sage-grouse Core Area boundaries and requested scientific reasoning for the decision.

Summary Response: The BLM revised management in the alternatives, analysis, and applicable greater sage-grouse text to be consistent with current State of Wyoming policies and guidance on the management of greater sage-grouse and their habitat. As discussed Appendix Q of the Draft RMP and Draft EIS BLM intends to maintain consistency with the Core Areas as identified by the State of Wyoming. The Proposed RMP and Final EIS includes a reasonable range of alternatives for greater sage-grouse management. (See also the Supplement EIS summary comments and responses in Section 4.2.2)

Summary Comment #2071: Commenters indicated that the analysis of impacts to greater sage-grouse in the Draft RMP and Draft EIS could be improved through the inclusion of more descriptive explanations, editorial changes, clarification of terminology, and scientific references. Specifically, commenters questioned or raised concerns pertaining to: (1) impacts on livestock grazing, oil and gas, and other resources resulting from management of greater sage-grouse and their habitat; (2) suggestions that the BLM defer to the Wyoming Governor's EO 2011-5 for BMPs

regarding greater sage-grouse and correctly reference this EO throughout the document; (3) inconsistencies between BLM decisions and guidance provided in EO 2011-5; and (4) expanded detail on the management challenges for greater sage-grouse populations in the Planning Area.

Commenters cited specific research that could be referenced by the BLM to inform their decisions regarding impacts on and from other resources from management of greater sage-grouse. Additionally, commenters requested the BLM fully define terminology, add scientific references, and disclose detailed information pertinent to the planning and management of greater sage-grouse.

Summary Response:

The BLM revised management actions, Chapters 3 and 4, and other greater sage-grouse related text in the Proposed RMP and Final EIS to ensure consistency with EO 2011-5, included additional citations of scientific studies and research to support text, added references (to maps and other sections) where necessary, and made other revisions supplying clarifying language, as appropriate. (See also the Supplement EIS summary comments and responses in Section 4.2.2)

Regarding requests for additional details about sage-grouse nest cover and potential impacts, the BLM notes that greater sage-grouse nest cover amounts change from year to year, and it would be unreasonable to provide this kind and amount of data, annually, given the many variables, besides livestock grazing that affect it. It is reasonable to provide a livestock grazing utilization limit or level that allows for adequate greater sage-grouse nest cover, which is summarized in Appendix W. The BLM added a reference to this appendix in the livestock grazing section.

Socioeconomic Resources

Summary Comment #2046:

Commenters indicated that the analysis does not adequately address potential impacts to local communities and focuses too much on impacts at a regional or statewide level. For instance, commenters expressed concern about the use of the Impact Analysis for Planning Model (IMPLAN) because this model does not address how implementation of the alternatives would affect specific local communities. Additionally, commenters indicated that the analysis does not include historical or qualitative information associated with local communities, which prevents the analysis from accurately estimating the socioeconomic impacts to local communities.

Commenters indicated that the analysis fails to quantify and, thereby, consider the importance of the oil and gas industry to the economic wellbeing of local communities throughout the Planning Area. Commenters expressed concern that an Economic Strategies Workshop was never conducted, which, as a result, renders the analysis inadequate because it does not include the input of the public

as it pertains to desired social and economic conditions. Additionally, commenters indicated that the analysis undervalues the potential output of oil and gas development with respect to job creation and other economic factors.

Summary Response: The level of impact analysis for individual communities in the Proposed RMP and Final EIS provides as accurate and geographically specific an assessment as available data allow. Additionally, as described in the Proposed RMP and Final EIS appendices, the IMPLAN model uses economic sector information from the four counties (not the entire state of Wyoming) to calculate potential indirect and induced impacts. The Final EIS for the Proposed RMP is at the programmatic level, and subsequent site-specific NEPA analysis and other actions such as APDs will have separate environmental clearance processes that consider impacts on socioeconomics.

In response to comments, the Proposed RMP and Final EIS includes historical information on local communities in the affected environment (Chapter 3). The affected environment section for economic conditions provides detailed information about the contribution of the mining and oil and gas industries to employment, wages, and tax revenues for local as well as state and federal governments.

The description of the affected environment and impacts analysis for socioeconomics utilized the best and most appropriate data and methods. The BLM held an Economic Strategies Workshop for the RMP and EIS in 2008 and used results of the workshop, in combination with input obtained during scoping and cooperator and agency review of draft document versions, to inform and refine the affected environment and impacts analysis for socioeconomics.

Summary Comment #2046_1: Commenters indicated that the analysis did not consider several potential socioeconomic impacts including those that would result from management of special designations, management actions such as seasonal restrictions, as well as potential oil and gas development in Mowry Shale Formation of the Bighorn Basin. Commenters indicated that the implementation of seasonal restrictions could potentially result in “boom and bust” scenarios. Commenters requested that the RMP and EIS include an analysis of impacts to affected communities that would result from a potential boom and bust scenario.

Summary Response: The BLM reviewed the socioeconomic analysis in response to the comments and revised text including clarifying potential impacts of an aging population, consideration of differences in local ad valorem production tax credits between BLM provided information in the RMP and EIS and Ecosystem Research Group information, and other information, as appropriate. The alternatives included restrictions

resulting from special designations that were considered in the economic analysis.

The Proposed RMP and Final EIS contains discussion on the seasonal boom and bust cycle by comparison with Alternative C, which would provide exceptions to discretionary seasonal restrictions in OGMAs and ROW corridors.

It is not possible to design specific mitigation at the RMP level, because the RMP will not directly authorize any on-the-ground activities. The appropriateness of onsite and offsite mitigation, and the methods to be used, must be tied to a proposal where specific impacts can be predicted. The range of alternatives analyzed in detail provides for development of such mitigation during the analysis of a specific proposal (see management actions 8001, 8004, and 8005).

Summary Comment #2046_2: Commenters noted that none of the alternatives considered, but eliminated dealt with socioeconomics. Additionally, commenters raised concerns that the *Key Terms and Concepts by Resources* section only discusses socioeconomics in the context of mitigation. Commenters requested the inclusion of socioeconomic factors in the discussion of key concepts including, but not limited to, Livestock Grazing, Mineral Leasing, and Well Withdrawals. Commenters also provided data and recommendations for considering recreation and tourism data in the analysis.

Summary Response: As noted by commenters, the BLM considered several alternatives that had corresponding connections to socioeconomic resources and scenarios and did not carry them forward as described in Section 2.3 of the Proposed RMP and Final EIS. In addition, the socioeconomic impact analysis considers the economic and social impacts of alternatives in their entirety, including all relevant effects from management actions in other sectors (e.g., livestock, geothermal, oil and gas, etc.). The BLM reviewed the provided data on recreation and tourism in the region and revised the socioeconomic analysis and sections, as appropriate.

Soil

Summary Comment #2045: Commenters expressed concern regarding the WEPP model used to predict soil erosion rates for the Planning Area. Commenters requested that a more detailed description of the WEPP model parameters be given in the text of the Draft RMP and Draft EIS along with language explaining why those parameters were chosen. Commenters recommended that impacts to soils from certain resources and activities be re-assessed while considering the scientific literature and examples provided. Commenters also recommended identifying priority areas in the Planning Area for soil erosion management in the text.

Summary Response: With respect to issues pertaining to soil loss, Chapter 3, section 3.1.3 identifies the threshold for soil loss in the Planning Area. Currently, there is no data available regarding the number of acres in the Planning Area where soil loss thresholds have been exceeded. The BLM acknowledges the need for additional soils data in the Planning Area and Management Action 1015 requires future soil survey efforts include erosion rates and soil stability parameters.

Appendix V of the Proposed RMP and Final EIS provides details regarding the WEPP parameters; additionally, the BLM added additional references as needed to support statements within the Soils section of the Proposed RMP and Final EIS.

Special Status Species

Summary Comment #2036: Commenters indicated the level of information within the special status species alternatives analysis did not supply adequate details for the reader to draw conclusions about impacts among the different alternatives. Specifically commenters raised concerns and requested information about: (a) detailed protections offered to species from future developments; (b) the size and use of protective buffers; and (c) why the BLM did not include quantifiable data (acres) for comparison of impacts between alternatives.

Summary Response: The BLM developed and analyzed alternatives within the Proposed RMP and Final EIS using the best available information in compliance with federal laws, guidelines, and policies. As necessary, the BLM included additional references and analysis that support decisions concerning special status species management.

The Proposed RMP and Final EIS provides an estimate of potential surface disturbance, sufficient for making a reasoned choice among the alternatives, and employs the assumption that such disturbance would affect vegetation communities proportionally to their current extent. However, the exact location of projects and their effects on various habitat types will not be known until projects are proposed.

Summary Comment #2041: Commenters recommended several changes to the discussion and analysis for the mountain plover. These edits included requests to use alternative language, correct technical statements, and clarify management actions for mountain plover protection. In particular, commenters requested the BLM reevaluate its analysis and alternatives to reflect mountain plover preferred habitat conditions. Commenters also requested the BLM update the Proposed RMP and Final EIS to incorporate the recently released determination from the USFWS removing the mountain plover from consideration of protections under the Endangered Species Act (ESA).

Summary Response: The BLM revised the Proposed RMP and Final EIS to reflect the USFWS ESA determination for the mountain plover. However, despite its

change in status with the USFWS, the mountain plover is a BLM Wyoming special status species and, as such, requires additional consideration and conservation measures.

The BLM acknowledges that mountain plover prefer sparsely vegetated sites; within the Bighorn Basin, the birds inhabit areas with very little vegetation that, consequently, receive little pressure from grazing animals. The Bighorn Basin has an abundance of naturally sparse habitats for mountain plover nesting and the BLM and USFWS do not see the need for, and have not proposed to, create more through application of heavy grazing or other management. Where appropriate, the Proposed RMP and Final EIS have been revised to clarify the focus of habitat management for this species.

Summary Comment #2042: Commenters raised concerns about the overall adequacy of the special status species analysis and indicated several areas that could benefit from more detailed explanations. Specifically, commenters requested additional information be included within the analysis and raised questions regarding: (a) detailed information on BLM management direction and monitoring actions pertaining to special status species protection and habitat; (b) the accuracy of facts and data presented by the BLM; (c) requests for detailed explanations of BLM's stated methods and assumptions for special status species; and (d) greater protections and safety measures for listed species.

Summary Response: The BLM incorporated, in coordination with the USFWS and the WGFD, commenter requests for specific revisions and clarifications, technical edits, changes to management actions, and updates to data and mapping as appropriate.

The USFWS and WGFD are the lead authorities responsible for the protection, management, and monitoring of all flora and fauna species within the Planning Area. Both the USFWS and WGFD provided guidance to the BLM, which is reflected in the special status species sections and management actions in the Proposed RMP and Final EIS. In addition, the BLM coordinated with the USFWS and the WGFD in the collection of GIS data and the mapping of special status species.

Travel and Transportation Management

Summary Comment #2034: Commenters indicated that travel management and travel restrictions would have a negative effect on energy development, grazing, and recreation uses. Commenters requested expansion of the analysis to fully describe the BLM's reasoning behind travel management designations, including references to other resource uses that would be affected by these designations. Commenters also recommended designating certain areas in the Planning Area as Off-Highway Vehicle (OHV) Riding Parks or All-Terrain Vehicle "Open" areas. Additionally, commenters requested that management actions include restrictions

that are more stringent in an effort to protect resources including, but not limited to, wildlife and cultural resources. In addition, commenters highlighted various instances of missing and/or inadequate information.

Summary Response: The BLM reviewed and revised the RMP and EIS in response to comments including additional references to applicable travel management plans, revision and addition of definitions to the glossary, edits to management actions, and other revisions, as appropriate.

The BLM will address site-specific road closures during subsequent travel management planning. The goal of travel management in the RMP is to identify broad travel management designations (i.e., areas closed, open, or limited for travel).

The BLM must provide a reasonable range of alternatives, and given the resource values associated within suggested open OHV areas, the range of alternatives is in the EIS is deemed reasonable and appropriate for consideration.

43 CFR 8342.1, Designation Criteria, includes a basis for considering open OHV areas, and other travel management designations and directs the BLM as follows: "(a) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and (b) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitat."

Public sentiment and BLM transportation and planning guidance does not support unlimited off-road, cross-country motorized travel. Generally, unlimited motorized cross-country travel may be warranted in areas where it does not affect other valuable resources, where conflicts with other recreational activities are insignificant, and where a substantial demand for this type of motorized recreational activity has been demonstrated.

Summary Comment #2034_1: Commenters noted several inconsistencies between travel management acreages in GIS data and those reported in the RMP and EIS. Commenters also identified blank records and other data issues in the GIS data for travel management.

Summary Response: The BLM reviewed the travel management data and information in the GIS files and the RMP and revised acreages, shapefiles, attributes, and maps, as appropriate.

Vegetation

Summary Comment #2033: Commenters expressed concern regarding the overall analysis of vegetation in the RMP and EIS. Commenters indicated that the

vegetation information was not adequate and could be improved by using LANDFIRE data instead of GAP vegetation data; replacing incomplete inventories of existing conditions with more complete versions; comparing in greater detail historic and current vegetation conditions; reconciling discrepancies in acreages in the RMP and EIS and between the RMP and EIS and BLM-provided GIS data; and having a more in-depth discussion of the role of fire accompanied by tabular and spatial data. Commenters also recommended that the RMP and EIS provide a more detailed description of why certain events or activities are categorized as having an adverse or beneficial impact to vegetation.

Commenters expressed concern that the RMP and EIS does not provide significant changes in management for invasive species in the Planning Area and requested that the further assessment of invasive species management be initiated. Commenters requested that changes in AMPs be accompanied by a comprehensive monitoring study of the Planning Area based on livestock grazing as well as a comprehensive noxious weed inventory of the Planning Area. Additionally, commenters identified a number of technical edits related to vegetation including requests to use alternative language, correct technical statements and/or terms, define terms, and clarify language. Commenters requested that BLM include a variety of references in the text as well as in the alternatives.

Summary Response: The BLM reviewed the provided vegetation comments and revised the RMP and EIS including adjustment and clarification of management actions, updates for ESA-listed and sensitive species, and other information, as appropriate.

The BLM will consider using LANDFIRE data in the future as part of keeping the Analysis of the Management Situation current. Neither the BLM nor any participating cooperators made a proposal to implement a comprehensive monitoring study of the vegetation resources, noxious weeds, or sensitive plant species within the Planning Area during the alternative development process. Therefore, under the Proposed RMP, the BLM will continue to manage the vegetation resources at the allotment and watershed level with an emphasis on large contiguous blocks of native plant communities.

The Wyoming North Zone FMP (May 2004) contains a more in depth discussion of the role of fire in each of the Planning Area's five Fire Management Units.

Visual Resources

Summary Comment #2032: Commenters indicated that the proposed VRM restrictions would significantly reduce oil and gas development potential in the Planning Area. Some commenters stated that the BLM did not have the authority to impose VRM restrictions on state or private lands, as well

as on areas that have existing leases or permits for oil and gas development. In addition, commenters indicated that the determinations of visual inventory classes are unclear and not defined, specifically pertaining to sensitivity levels. Furthermore, commenters questioned the reasoning behind expanding several VRM classes from Alternative A to Alternative D. Commenters indicated that there are several editorial issues associated with the analysis.

Summary Response: The BLM maintains an inventory of all resources on public lands, which includes maintaining an inventory of visual resources. As part of this RMP revision project, the WFO and CYFO conducted new inventories or updated their existing visual resource inventories. These updated inventories identified changes in sensitivity levels and scenic quality, which changed the Visual Resource Inventory (VRI) classes. Some areas moved from VRI Class II and III to IV, and other areas from VRI Class III and IV to II. The BLM reviewed the manageability of these VRI classes, resulting in the VRM classes analyzed in the Proposed RMP and Final EIS alternatives. The full visual resource inventories are available for public viewing at the CYFO and the WFO, and information on how the BLM conducts inventories is available in Manual 8410-1, Visual Resource Inventory (BLM 1986c).

The Proposed RMP only directs management of public lands and resources administered by the BLM within the Cody and Worland field offices. VRM management classes, therefore, do not apply to any state or private lands. The BLM added this information to the Proposed RMP and Final EIS.

In the case of split estate lands, the application of VRM management class objectives apply to the development of the mineral estate as they would to federal mineral estate on federal surface lands, provided the stipulations do not adversely affect the surface owner's land use or actions. Exceptions to surface development restrictions could be granted if requested or agreed to by the surface owner.

Water

Summary Comment #2031: Commenters requested that the BLM include additional protective management for water resources. Specific requests included NSO restrictions for areas proximate to drinking water sources, such as aquifers, and the identification of BMPs and monitoring programs to protect and evaluate water quality. Commenters requested justification or clarification concerning several management actions.

Commenters also questioned the BLM's authority to regulate surface water quality, which they noted was under the jurisdiction of WDEQ.

Summary Response: The BLM revised the text in the Proposed RMP and Final EIS where appropriate to provide additional information and references, and to

clarify the intent of management actions. BLM clarified the intent to require water management plans for new authorizations resulting in produced water. Additionally BLM made changes to Management Action 1029, requiring the development of a groundwater monitoring program in accordance with state requirements.

Appendix L includes a list of standard BMPs for groundwater protection. The inclusion of circumstances under which BMPs would be applied is beyond the scope of this RMP, however, general criteria for application of BMP's to projects is provided in the final document.

While the BLM acknowledges that WDEQ is the authority for water regulation in the State of Wyoming, it is the BLM's responsibility to consult with WDEQ regarding water-related issues during permitting processes that occur on public lands and to follow-up if issues associated with permitted discharges are discovered.

Summary Comment #2031_1: Commenters indicated that the water section was missing information demonstrating compliance with Wyoming water laws as well as the characterization of specific water resource types such as groundwater and Class I waters. Additionally, commenters indicated that the analysis failed to use the most recent data pertaining to the characterization and classification of specific water resource types. Commenters indicated that the analysis did not provide data or baseline conditions for water resources indicators that would allow for an evaluation of potential impacts including chemical characteristics, physical characteristics, and biological characteristics. Commenters also questioned the determination that no violations of water quality standards would occur under any of the alternatives. Finally, commenters expressed concern that the analysis did not consider the beneficial uses of water produced by development activities including, but not limited to livestock grazing and the creation of riparian zones and wetlands.

Summary Response: The BLM revised the text in the Proposed RMP and Final EIS based on commenter input to provide definitions, technical corrections, additional text, and clarifications as needed. Specifically, the BLM included additional discussion on the beneficial and adverse effects of produced water discharges. The BLM revised the document where appropriate to include commenter suggested data and reference updates, and conducted additional reviews to ensure consistency with current federal laws and guidance.

BLM RMP's are planning level documents that cannot analyze many site-specific impacts that will affect water quality. While the BLM acknowledges that waters can be described based on their chemical, physical, and biological characteristics, the BLM did not intend these to be the impact indicators used in Chapter 4 of the RMP and EIS and, therefore, did not include baseline information on these characteristics in Chapter 3. Specific water quality indicators

suggested by commenters would likely be addressed during permitting for site-specific actions.

The BLM recognizes that many stream segments do not meet state water quality standards (refer to Chapter 3, Table 3-6). To this end, the BLM revised Chapter 2 and 4 of the final document to state that no additional impacts to surface water quality are anticipated other than the potential for those waters currently impaired to continue to exceed standards for fecal coliform and E. coli. In addition, the BLM revised Chapter 4 to include an expanded discussion of Management Action 1040, which would have a positive impact on water quality due to cooperation with adjacent landowners and implementation of BMPs.

Summary Comment #2031_2: Commenters expressed concern related to the assumptions and modeling used in the water quality analysis. Commenter questioned the assumption that Coalbed Natural Gas (CBNG) produced water would be of the same quality and quantity as produced water from oil and gas development. Additionally, commenters indicated that the WEPP model utilized in the analysis was inadequate due to underestimations of natural and manmade erosion and runoff rates. Commenters stated that the model did not appear to have been calibrated to represent conditions specific to the Bighorn Basin.

Summary Response: The BLM revised the text in the Proposed RMP and Final EIS to provide additional text, reference, and clarifications as appropriate. Specifically, the BLM included information on the role of the Wyoming Pollutant Discharge Elimination System in increasing beneficial impacts and reducing adverse impacts, the quality of produced water from CBNG versus conventional oil and gas development, and an expanded discussion on the assumption and limitations of the WEPP model.

The WEPP model is a high level-planning tool; the results presented in the Proposed RMP and Final EIS are not intended to show an accurate projection of total natural and manmade runoff in the Planning Area, but instead to provide a way to evaluate the effects of the alternatives in relation to one another. This type of comparative analysis is appropriate at the RMP level; impacts on runoff will vary based on project type, mitigation and BMPs applied, and other site-specific factors that will be identified at the project level.

Wild and Scenic Rivers

Summary Comment #2018: Commenters expressed concern regarding the selection of a Preferred Alternative that does not protect and enhance potential Wild and Scenic River (WSRs) resources in the Planning Area. Commenters recommended that the BLM give additional information in the Proposed RMP and Final EIS regarding the basis for the listing of waterways within the Planning Area with special consideration for

consistency of WSR designation between the BLM and agencies with which the BLM shares a boundary.

Summary Response: The BLM developed and analyzed a reasonable range of alternatives for the Proposed RMP and Final EIS. WSR guidance directs the BLM to analyze suitability for each eligible waterway segment before making a decision on whether or not to recommend an eligible waterway segment to Congress for inclusion in the Wild and Scenic River System. The BLM used the RMP revision as the suitability analysis, which included scoping, public meetings, and intimate planning with the local cooperators and public comments to the Draft RMP and Draft EIS. Appendix F addresses the determination of suitability. In addition, the WFO and CYFO WSR reports are available on the project website.

Wild Horses

Summary Comment #2030: Commenters presented recommendations on the potential management of wild horses in the Draft RMP and Draft EIS that would both expand and reduce wild horse herds and ranges. Commenters requested the BLM include an option for increasing the appropriate management level for wild horse Herd Management Areas (HMAs). Commenters also requested an option for decreasing the appropriate management level and the AUMs allotted for wild horses or managing wild horses to the lowest allowable appropriate management level. Additionally, commenters suggested the BLM expand HMA boundaries or manage all HMAs and HAs for wild horses, while other commenters suggested the BLM remove wild horses from certain HMAs. Other comments either requested the consideration of additional specific protections for wild horses or questioned the need for specific management actions considered in the Draft RMP and Draft EIS.

Commenters requested that the Proposed RMP and Final EIS include provisions for rangeland health assessments for the HMAs. Commenters identified a number of technical edits related to wild horses, including requests for BLM to use revised language, correct technical statements, define terms, and clarify language. Commenters also requested that BLM include a variety of references in the text as well as in the alternatives.

Summary Response: The Proposed RMP and Final EIS analyzes a full range of alternatives. This range included alternatives that prioritize forage allocation for wild horses, as well as alternatives that prioritize other resources and uses. Some issues (e.g., stocking level for the HMAs and setting appropriate management level) are not RMP level decisions, and would be addressed as applicable in subsequent NEPA or permit renewal processes, or HMA plans.

Section 3.4.10 Wild Horses of the Draft RMP and Draft EIS incorporates by reference previous analysis that determined that managing wild horses in Herd Areas resulted in management issues or conflicts that were most appropriately resolved by the removal of wild horses or the management of horses in smaller HMAs within the original Herd Area boundaries. The BLM reviewed these analyses and determined them to be valid, with the exception of a portion of the McCullough Peaks area. In the case of McCullough Peaks, the BLM considered alternatives that would expand the HMA boundary to address issues and conflicts.

The BLM revised the text in the Proposed RMP and Final EIS based on commenter input to provide additional information, definitions, details, technical edits and citations as deemed necessary.

Wilderness Study Areas

Summary Comment #2019: Commenters recommended that the acreage for Wilderness Study Areas (WSAs) in the Planning Area be increased to protect, through adaptive management, wilderness characteristics and WSAs. Additionally, commenters expressed concern that citizen proposed WSAs were not included in the proposed alternatives. Commenters requested a description of the reasoning behind recommending WSAs near ongoing operations that may preclude the area from WSA designation.

Summary Response: The BLM's authority to recommend areas as WSAs under FLPMA section 603 (43 U.S.C. § 1782) has expired and only Congress can make determinations regarding the status of WSAs pending before it. Comments requesting consideration of WSAs have been addressed through identification and analysis of lands with wilderness characteristics.

The BLM conducted a wilderness characteristics inventory of lands in the Planning Area to identify areas with wilderness characteristics. The BLM disclosed the results of that inventory and developed and analyzed a reasonable range of alternatives for managing areas with wilderness characteristics. The inventory forms are available for public review at the WFO and the CYFO and on their respective websites.

Wildlife

Summary Comment #2020: Commenters raised several questions and concerns regarding wildlife management in the alternatives. Specifically, commenters raised concerns and provided information for BLM's consideration including: (a) recommended constraints on federal mineral estate in Wildlife Management Areas; (b) requests for clarification of management including leasing restrictions in the Absaroka Front; (c) preferences to

allow reasonable access to existing oil and gas well locations even in sensitive wildlife habitat; (d) concerns some alternatives are not in compliance with BLM's wildlife policy; (e) recommendations for BMPs; (f) recommendations regarding applying seasonal wildlife protections on a case-by-case basis; (g) flexibility in management to effectively manage wildlife through hunting; (h) additional information on wildlife management challenges associated with predation; (i) and requests for revision of wildlife information in the Affected Environment.

Summary Response: The BLM updated wildlife management in the alternatives and other wildlife-related text in the Proposed RMP and Final EIS, including revisions to the referenced management actions, clarification of terminology, clear identification of areas open and closed to leasing under each alternative, addition of references and citations to support stated information, incorporation of submitted commenter input, and other revisions, as appropriate.

Summary Comment #2022: Commenters provided several edits for GIS and mapping, as well as other revisions to support the wildlife impacts analysis. Commenters questioned or raised concerns pertaining to: (1) the need for additional maps and revision to big game wildlife species maps; (2) inconsistencies between the BLM and WGFD big game crucial winter range acreages and mapping; (3) factual corrections on area classification; and (4) missing acreage and/or details within the analysis, including summer range acres unavailable for and/or closed to oil and gas development.

Summary Response: The BLM revised the Proposed RMP and Final EIS in response to comments, as appropriate. The BLM coordinated with WGFD during the preparation of the Draft RMP and Draft EIS and the WGFD concurred with the big game crucial winter range maps as depicted in the Proposed RMP and Final EIS.

Summary Comment #2025: Commenters raised concerns about completeness of data presented in the wildlife analysis and indicated several areas that could benefit from additional explanations. Specifically, commenters requested additional information be included in the analysis and raised questions regarding: (1) the impacts/effects resulting from wildlife and livestock grazing management, mineral development, and other resource uses; (2) the BLM's quantification of baseline data; and (3) requests for detailed explanation of BLM's methods and assumptions for wildlife resources.

Additionally, commenters indicated the Draft RMP and Draft EIS had several deficiencies, specifically in relation to: (a) a clearly stated monitoring and evaluation protocol for the RMP goals and objectives; (b) inconsistencies between objectives for wildlife and special status species; and (c) clear direction regarding public and land manager involvement with the monitoring and evaluation protocol.

Summary Response:

The BLM incorporated commenter requests for specific revisions and clarifications, technical edits, and updates to data as appropriate. Appendix D of the Draft RMP and Draft EIS outlines opportunities for public involvement.

Big game and wildlife population numbers and management are ultimately a WGFD issue. When wildlife population numbers and effects on other resources become an issue, the BLM has several ways to resolve the issue. Examples include habitat enhancement projects to disperse elk use, increased hunter access, and increased harvest negotiated with the WGFD. Additionally, the BLM proposed to help the WGFD manage wildlife populations towards stated objectives by managing identified important habitats (e.g., aspen, willow, mixed conifer and spruce fir communities).

Wilderness Characteristics

Summary Comment #2027:

Commenters expressed concern that based on the guidelines set forth in BLM Manual 6301 the BLM did not properly conduct the lands with wilderness characteristics inventory for the Planning Area. Commenters requested that the BLM include a more detailed discussion, with references to guidance material, of the reasoning behind the inclusion of each land with wilderness characteristics identified in the inventory. Commenters noted that many proposed lands with wilderness characteristics contained numerous roads and other man-made structures that were not discussed in the text or disclosed on the maps of the RMP and EIS. In addition, commenters recommended the BLM clarify the definition of roads as used in the lands with wilderness characteristics inventory.

Commenters also expressed concern regarding the recent changes in the Department of the Interior's administration of lands with wilderness characteristics and recommended removal of all lands with wilderness characteristics references from the text of the Draft RMP and Draft EIS.

Some commenters requested that BLM institute specific management prescriptions for lands identified as having wilderness characteristics for protection of those characteristics. Commenters expressed concern that the Draft RMP and Draft EIS did not fully address how the proposal of lands with wilderness characteristics would impact resource uses such as ranching and mineral development.

Commenters identified a number of technical edits related to wilderness characteristics including requests to use alternative language, correcting technical statements and/or terms, defining terms, and clarifying language. Commenters also requested the BLM include a variety of references in the text as well as in the alternatives.

Summary Response:

FLPMA, Section 201, requires the BLM to maintain its inventory of wilderness characteristics, which includes augmenting inventory efforts by analyzing additional and new information submitted by the public. BLM's inventory obligation is a continuous one and is not merely an activity that BLM completes during the land use planning process. The intent of an RMP is to set forth the management of areas with inventoried wilderness characteristics, which includes analyzing potential management of areas containing wilderness characteristics for those characteristics.

The BLM is not required to manage lands outside of WSAs or Wilderness Areas for wilderness characteristics. However, the BLM developed a reasonable range of alternatives for lands with wilderness characteristics that were analyzed and considered for the Proposed RMP and Final EIS. This range included alternatives designed to protect wilderness characteristics in these areas, as well as alternatives without such protections. Where specific management actions for the protection of wilderness characteristics were considered, managed lands with wilderness characteristics would still allow for grandfathered uses and would be subject to valid existing rights.

Based on commenter input, the BLM revised the lands with wilderness characteristics sections in the Proposed RMP and Final EIS as appropriate to provide clarifying information, define terminology, and provide references.

The BLM has been updating its inventory of lands with wilderness characteristics consistent with FLPMA, and the discussion in the Proposed RMP and Final EIS is based on information in the updated inventory. As such, the Proposed RMP and Final EIS is consistent with recent policy and guidance (BLM Manuals 6310 and 6320) on lands with wilderness characteristics. For example, while lands with wilderness characteristics continue to be a resource the BLM is required to consider consistent with FLPMA, the BLM concurs that references to the term "Wild Lands" and Secretarial Order 3310 are no longer appropriate and have, therefore, removed them in the Proposed RMP and Final EIS.

4.2.2. Supplement to the Draft RMP and Draft EIS

Similar to that described for the Draft RMP and Draft EIS, the summary comments and responses are presented below, and generally organized by BLM resource program or other appropriate issue categories (e.g., greater sage-grouse) as described in Table A-2. The summary comment numbers below can be used to track the summary comment and response to the individual comments presented in Attachment D.

Air Quality

Summary Comment #3002: Commenters requested BLM provide the rationale for concluding that Alternative E will not exceed the NAAQS or Wyoming Ambient Air Quality Standards.

Commenters questioned why Tables 4-3 and 4-4 only included carbon dioxide emissions, did not include other greenhouse gases, and the years chosen for the carbon dioxide analysis. Commenters suggested "equivalent" be removed in the titles of Tables 4-3 and 4-4 and the footnotes deleted. Commenters requested BLM provide a reference supporting the statement that carbon dioxide from prescribed fires is considered to be counterbalanced by increased productivity of existing larger vegetation and new growth.

Summary Response: The BLM updated the text in the Air Quality sections to provide additional explanation, clarification and/or references; updated the emissions spreadsheets and tables including adding CH_4 and N_2O emissions; and added an Air Resource Management Plan as an appendix to the Proposed RMP.

Areas of Critical Environmental Concern

Summary Comment #3001: Commenters requested the BLM provide clarification on the ACEC designation process, why the ACECs were necessary for conservation of greater sage-grouse, and possible acreage discrepancies between ACEC boundaries overlapping federal mineral estate. Other commenters requested BLM develop other habitat management solutions instead of designating greater sage-grouse ACECs.

Additionally, commenters questioned the scientific facts behind the proposed ACEC designations, if the ACECs met the relevance and importance criteria for designation, and suggested ACEC designation violated the BLM multiple use mandate. Commenters offered support for Alternative D suggesting that the protections in place under the Wyoming Governor's EO 2011-5 were sufficient to protect greater sage-grouse and its habitat, stating that alternatives E and F were not consistent with the Wyoming Governor's EO 2011-5. Commenter noted that the two EOs used to inform sage-grouse management efforts had been replaced or are no longer in effect. Other commenters called into question the level of constraints on oil and gas development described in the document due to ACEC designation. Commenters noted that ACEC designation unreasonably encumbered other resource uses and prioritized protection of greater sage-grouse over other resource uses. Commenters also offered that due to the size of the area designated as ACECs, enforcement and management would be burdensome for BLM.

Summary Response: The BLM developed the greater sage-grouse ACECs (under alternatives E and F in the Supplement) to respond to the needs to

address goals, objectives, and conservation measures to conserve greater sage-grouse in response to the potential of its being listed under the ESA, as well as to consider ACEC nominations submitted by the public in response to the 2011 NOI for preparation of EISs and Supplemental EISs to Incorporate Greater Sage-grouse Conservation Measures into Land Use Plans and Land Management Plans (76 FR 77008, December 9, 2011). Additionally, alternatives E and F thoroughly considered the conservation measures identified in the NTT report, as required by the BLM National Greater Sage-Grouse Land Use Planning Strategy (IM 2012-044). The values of concern for both proposed ACECs are sagebrush steppe vegetation communities that provide habitat for special status wildlife species, including areas designated as greater sage-grouse Key Habitat Areas and Priority Habitat Management Areas (PHMAs).

BLM's planning process allows consideration of a range of alternatives that identifies and incorporates appropriate regulatory mechanisms to address these needs to ensure that a balanced management approach was recommended. The Supplement included alternatives that provide a greater and lesser degree of restrictions in various use programs, but would not eliminate or invalidate any valid existing development rights.

BLM's Proposed RMP and Final EIS is consistent with the Wyoming Governor's EO 2011-5 that has been determined sufficient to conserve greater sage-grouse throughout Wyoming.

The BLM provided additional explanation about the ACEC nomination process, updated acreages, and updated text as needed.

Climate Change

Summary Comment #3003: Commenters suggested the BLM did not account for the impacts of livestock grazing on climate change, except for acknowledging that reducing AUMs would reduce methane emissions from cattle. Commenters requested additional analyses be conducted for the Proposed RMP and Final EIS, including impacts of livestock grazing on carbon sequestration and vegetation utilization.

Summary Response: The comments regarding the impacts of livestock grazing on climate change, carbon sequestration, and vegetation utilization are outside the scope of the Supplement. Climate change is addressed as appropriate in the Proposed RMP.

Consultation

Summary Comment #3006: Commenters recommended close coordination with all appropriate state and federal wildlife agencies (e.g., Western Association of Fish and Wildlife Agencies [WAFWA], WGFD) to minimize and mitigate adverse impacts to wildlife species from BLM-authorized activities.

Specifically, commenters recommended working with state agencies to develop planning and habitat management objectives to maintain population objectives and ensure RMP management is flexible enough to respond to changes in state management needs, including coordinating WAFWA recommended dates for big game restrictions and greater sage-grouse management.

Summary Response: The USFWS and WGFD are cooperating agencies for the RMP and involved in development of the Final EIS. Current and proposed BLM management is designed to help support WGFD population objectives for big game and greater sage-grouse. The management actions related to fish, wildlife, and special status species, included in this RMP, are expected to mitigate impacts to wildlife and are based on recommendations from the appropriate state and federal agencies; the BLM will continue to work with the USFWS and WGFD when implementing the RMP.

Cultural Resources

Summary Comment #3007: Commenters recommended the BLM not unreasonably constrain oil and gas development since it often leads to discovery and preservation of cultural resources due to Section 106 compliance.

Summary Response: The BLM developed the Supplement to ensure that a balanced multiple-use management strategy addresses the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands.

Cumulative Impacts

Summary Comment #3008: Commenters indicated that the cumulative impacts analysis did not adequately address the potential impacts of greater sage-grouse management actions on the local economy and resource uses when combined with existing or proposed regulations or plans of other state and federal agencies including the Shoshone Forest Management Plan, the Big Horn River Total Maximum Daily Load Study, and current WGFD and USFWS practices. Commenters also suggested the BLM address the cumulative impacts of Greater sage-grouse management on oil and gas development due to an increased length in permitting.

Commenters suggested cumulative impacts of greater sage-grouse management were understated and requested BLM analyze of the cumulative impacts on livestock grazing from other RMP revisions within Wyoming and Idaho.

Commenters expressed concern that the cumulative impacts analysis did not include information from the USGS baseline study that identifies overlapping direct and indirect impacts on priority greater sage-grouse habitat.

Summary Response:

The BLM thoroughly explained its consideration and analysis of cumulative effects in the Supplement in Section 4.9, including assumptions regarding proposed projects and other reasonably foreseeable future actions. The Supplement considered the present effects of past actions, to the extent that they are relevant, and present and reasonably foreseeable (not highly speculative) federal and non-federal actions, taking into account the relationship between the proposed alternatives and these reasonably foreseeable actions.

The BLM complied fully with the requirements of Council on Environmental Quality (CEQ) regulations (40 CFR 1508.7) and prepared a cumulative impact analysis to the extent possible based on the broad nature and scope of the proposed management options under consideration at the land use planning level.

Additionally, to ensure consistency across the greater sage-grouse's range, BLM's National Operation Center conducted management zone and range-wide cumulative impact analysis, which is included in the Proposed RMP Chapter 7.

Fire and Fuels

Summary Comment #3011-1:

Commenters requested the BLM provide additional explanation and/or information on fire and fuels management, including effectiveness of post-fire stabilization, post-fuels-management for seeded or pre-treatment native plants, management to minimize adverse impacts of fire, if livestock exclosures also prevent wildlife grazing, areas receiving less than 12 inches annual precipitation, impacts attributed to livestock grazing and achieving 65 percent or more of Historical Climax Plant Community.

Commenters expressed concern that management of prescribed fire in ACECs was overly restrictive, indicating fire was an important tool in treating sagebrush, improving forage, controlling invasive species, and preventing catastrophic wildfires. Commenters asserted that impacts on greater sage-grouse from proposed fire management was not inadequately addressed, likely to harm greater sage-grouse in the long term, and indicated the analysis should be revised. Other commenters questioned allowing use of fire and mechanical treatments in ACECs, suggesting they were harmful to greater sage-grouse and their habitat, and indicated that prescriptions the use of fire should be strengthened.

Commenters were concerned over management that closed burned areas to livestock grazing for extended periods to allow vegetation to recover and meet greater sage-grouse habitat objectives. Specific concerns raised include: (1) impacts to livestock grazing, (2) the length of time needed for woody and herbaceous plants to meet the greater sage-grouse habitat objectives, (3) closing entire allotments and/or pastures if they could not be fenced from unburned areas, and (4) lack

of justification for this management. Commenters suggested that livestock grazing could assist in recovery by eliminating competitive plants and that proper livestock grazing management in sensitive areas is effective.

Commenters also submitted recommendations from other RMP amendments for incorporation in the Proposed RMP and Final EIS.

Summary Response:

The management of the greater sage-grouse ACECs under alternatives E and F represent approaches to managing these areas that were not considered in the Draft RMP and Draft EIS. As specific actions come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. Site-specific concerns and more detailed environmental descriptions will be addressed when project-level reviews are tiered to the analysis in this EIS (40 CFR 1502.20, 40 CFR 1508.28). In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for any site-specific actions. The BLM would conduct stabilization and rehabilitation consistent with BLM policy and guidance and in accordance with the FMP. There are no restrictions or limitations on stabilization and rehabilitation in specific areas under any of the alternatives.

Implementation of fuels management activities would be designed with consideration of the Required Design Features (RDFs) and BMPs for greater sage-grouse identified in Appendix L. If prescribed fire is to be used for vegetation treatments, the burn plan will clearly indicate how the Conservation Objectives Team (COT) objectives will be addressed and met by its use, and why alternative techniques were not selected. Additionally, a Risk Assessment will be completed for implementation of prescribed fire in relation to the greater sage-grouse goals and objectives.

The BLM drafted a monitoring framework that is included in the Proposed RMP as Appendix Y. The appendix describes the process that the BLM will use to monitor implementation and effectiveness of land use plan decisions. The monitoring framework includes monitoring at various scales specific to greater sage-grouse habitat, consistent indicators to measure and metric descriptions for each of the scales, analysis and reporting methods, and the incorporation of monitoring results into adaptive management. To accomplish effectiveness monitoring, the BLM will analyze the monitoring data to characterize the relationship among disturbance, implementation actions and habitat condition at the appropriate and applicable geographic scale or boundary.

During scoping, individuals and conservation groups submitted management direction recommendations for protection and conservation of greater sage-grouse and their habitat. The BLM reviewed the recommendations considering resource allocation

opportunities and internal sub-regional BLM input to develop the management direction for greater sage-grouse under alternatives E and F. Examples of conservation measures included in the alternatives would include a 3-percent cap on disturbance in priority habitat, RDFs, and ROW exclusion areas in priority habitat.

Greater Sage-Grouse

Summary Comment #3035_1: Commenters expressed concern over the management prescribed under the alternatives the BLM analyzed in the Supplement to meet their conservation goals and objectives for greater sage-grouse. As a result, commenters requested the BLM consider and analyze different alternatives such as a "no grazing" alternative, a "50 percent reduction in grazing" alternative, a BLM Manual 6840 alternative, a "Sage-Grouse Recovery" alternative, and a "sagebrush ecosystem" ACEC. Additionally, comments indicated the No Action Alternative analysis should quantify ongoing conservation efforts to protect greater sage-grouse and their habitat. Some commenters requested the BLM explain why current regulatory mechanisms are or are not effective in the sage-grouse conservation effort.

Commenters questioned the BLM's rationale for designating the Key Habitat Areas or PHMAs as ACECs indicating there was no justification or supporting data. Other commenters stated preference for Alternative E because of its strong conservation of sage-grouse habitat as an ACEC.

Several commenters requested the BLM's management actions be consistent with the Wyoming Governor's EO 2011-5 which has been deemed successful, citing the EO's measures were supported by the USFWS and BLM's own policies and guidance and thus should be adopted in the Proposed RMP. Commenters requested the BLM omit the use of Key Areas to stay consistent with EO 2011-5 as well as change or better define specific terms. Additionally, commenters asked BLM to ensure consistency with EO 2013-3.

Other commenters had concerns that the Wyoming Governor's EO 2011-5 and BLM policies and guidance (IM 2012-019 and the NTT Report) do not uphold BLM's obligation to prevent degradation of greater sage-grouse habitat or a decline in population, supporting designation of Key Habitat areas over Core Areas and suggesting modifications.

Commenters requested that the BLM make management prescriptions consistent with the NTT Report as specified by IM 2012-044, while others stated the BLM had not analyzed the measures in the NTT Report or they needed to be more protective. Commenters questioned the science behind the NTT conservation measures, stated they were not always appropriate or did not address the immediate threats, was not based on Manual 6840 or the ESA, and that other

conservation measures should be considered and implemented. Additionally, commenters requested the BLM provide their analysis of NTT conservations measures and consider other wildlife protections that would also be beneficial for greater sage-grouse.

Some commenters asked that habitat designations be consistent with the NTT Report. Other commenters called for the BLM to designate priority and general Habitat boundaries as well as other criteria that match the ESA efforts from USFWS. Commenters also requested that the TLS be changed to NSO to better protect greater sage-grouse and their habitat, while others questioned why a TLS was necessary if activities were precluded by NSO depending on the alternative.

Summary Response:

The management of the greater sage-grouse priority habitat ACECs in alternatives E and F represent approaches to managing these areas that were not considered in the Draft RMP and Draft EIS and was derived from recommendations in the NTT report as well as public comments. The BLM considered a reasonable range of alternatives during the greater sage-grouse planning process in full compliance with the NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM consider reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. While there are many possible alternatives or actions to manage public lands and greater sage-grouse in the Planning Area, the BLM fully considered the management opportunities presented in the Analysis of the Management Situation and the planning issues and criteria developed during the scoping process to determine a reasonable range of alternatives. As a result, two new alternatives were analyzed in detail in the Supplement that best addressed the issues and concerns identified by the affected public. The range of alternatives in the Supplement and Draft EIS represented a full spectrum of options including a no action alternative (current management, Alternative A, Draft EIS).

Nominations for greater sage-grouse-related ACECs were submitted by members of the public in response to the 2011 NOI for preparation of EISs and Supplemental EISs to Incorporate Greater Sage-grouse Conservation Measures into Land Use Plans and Land Management Plans (76 FR 77008, December 9, 2011). The BLM reviewed these nominations and found importance and relevance criteria to be met, warranting consideration in the Bighorn Basin RMP Revision Project. Although these ACEC nominations were submitted in response to the December 2011 NOI, ACEC nominations can be submitted by any individual or organization inside or outside of the BLM at any time during the development of a land use plan. Alternatives E and F each propose the designation of a greater sage-grouse-related ACEC that simultaneously responds to the needs to consider ACEC nominations submitted by the public and to thoroughly consider the conservation measures identified in the NTT report, as referenced in the BLM

National Greater Sage-Grouse Land Use Planning Strategy (IM 2012-044).

The BLM's Proposed RMP was modified to be consistent with the Wyoming Governor's EO 2011-5 that has been determined sufficient to conserve greater sage-grouse throughout Wyoming and WAFWA Management Zones I and II.

The range of alternatives is based upon analysis of public scoping comments as well as information provided in the NTT report, the U.S. Geological Survey's Baseline Environmental Report (BER), the COT report, and state management plans. The alternatives represent different degrees of and approaches to balancing resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. For example, alternatives E and F incorporate adjustments to the NTT report (NTT 2011) based on cooperating agency input to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. Anthropogenic surface disturbance would be managed not to exceed 3 percent in ecological sites that support sagebrush within Preliminary Priority Habitat (Figure 2-1, Ecological Sites Supporting Sagebrush in Preliminary Priority Habitat, in Appendix B, Figures).

Greater sage-grouse conservation measures in *A Report on National Greater Sage-grouse Conservation Measures* (NTT 2011) were used to form BLM management direction under alternatives E and F, which is consistent with the direction provided in BLM Washington Office IM 2012-044.

The habitat delineations were created by the BLM and USFWS in collaboration with state fish and wildlife agencies that are responsible for managing and monitoring greater sage-grouse populations. Based on the BER and in cooperation with the WGFD, the BLM created the Preliminary Priority Habitat and Preliminary General Habitat areas (Mainer et al. 2013). For the Supplement to the Bighorn Basin Draft RMP and Draft EIS, the BLM worked with the WGFD and presented the scientific information used to determine the PPH and PGH delineations and findings in the Supplement's Executive Summary. The alternatives analyzed in the Supplement identified two areas considered as priority habitat areas.

The BLM has identified Alternative D as its Proposed RMP, which is consistent with the Wyoming Governor's EO 2011-5. The stipulations (TLS and NSO) in management actions 4116, 4117, and 4118 have been revised accordingly.

Summary Comment #3035_2: Commenters felt the baseline information used by BLM in the Supplement's analysis was not supported by scientific facts to

conserve greater sage-grouse and suggested different sources be used instead. These sources were provided because of the recent information they could provide for the analysis. Commenters questioned the greater sage-grouse habitat thresholds established by BLM and at what scale they would be applied. Commenters questioned if the new information used in the development of alternatives E and F was used in the development of alternatives A through D, suggesting the newer information should be incorporated in alternatives presented in the Draft RMP and Draft EIS, which would improve those management alternatives.

Commenters also asked the BLM to acknowledge that the State of Wyoming has the sole authority to regulate greater sage-grouse as a game animal asserting BLM uses the terms habitat management or conservation as de facto authorization to manage the species.

Commenters requested a map and data be presented depicting the amount of land changed from sagebrush to agricultural land and that BLM be specific about where RDFs apply as well as provide exception criteria. Some commenters questioned if the management recommendations in the Supplement would measure up to the USFWS Policy for Evaluating Conservation Efforts criteria.

Commenters were concerned that the NTT Report was not the "best available science" to inform sage-grouse management in the Bighorn Basin. Commenters stated the BLM had not considered other more appropriate and effective sources such as those developed by USFWS and the USGS. Other commenters felt differently regarding the NTT report indicating that the NTT conservation measures for greater sage-grouse and their habitat were more appropriate, supportable, and more conservative than EO 2011-5.

Commenters asked the BLM to consider greater sage-grouse population trends suggested by hunting harvest data for projecting populations. Other commenters stated that population information presented in the Supplement is inaccurate, inadequate, unsupported, and questioned the sources used by BLM for their analysis. Commenters also questioned if the impacts to greater sage-grouse populations from oil and gas development were uniform across the planning area and disputed information in the Supplement that attributed population declines to oil and gas development.

Commenters were concerned that the NTT Report was not the "best available science" to inform greater sage-grouse management in the Bighorn Basin. Commenters stated the BLM had not considered other more appropriate and effective sources such as those developed by USFWS and the USGS. Other commenters felt differently regarding the NTT report indicating that the NTT conservation measures for greater sage-grouse and their habitat were more appropriate, supportable, and more conservative than EO 2011-5.

Commenters requested the BLM define occupied lek throughout the document and the process by which leks are deemed occupied or unoccupied asserting leks with no activity for 3 years be considered unoccupied. Commenters requested maps of winter concentration areas be made available as well as the acreage amount of the winter concentration areas.

Summary Response:

Before beginning the Supplement and throughout the planning effort, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the Bighorn Basin Planning Area are substantially different than the data needed to support site-specific analysis of projects. The requisite level of information necessary to make a reasoned choice among the alternatives in an EIS is based on the scope and nature of the proposed decision. The baseline data provided in Chapter 3 and various appendices in is sufficient to support, at the general land use planning-level of analysis and the environmental impact analysis (Chapter 4) resulting from management actions presented in the Supplement. The BLM used the most recent and best information available that was relevant to a land-use planning-level analysis including the U.S. Geological Survey's BER (BER; Manier et al. 2013). The U.S. Geological Survey's BER looked at each of the threats to greater sage-grouse identified in the USFWS's "warranted but precluded" finding for the species. For these threats, the report summarized the current scientific understanding, of various impacts to greater sage-grouse populations and habitats. The report also quantitatively measured the location, magnitude, and extent of each threat. These data were used in the planning process to describe threats at other levels, such as the sub-regional boundary and WAFWA Management Zone scale, to facilitate comparison between sub-regions. Additionally, the BLM consulted with, collected, and incorporated data from other agencies and sources, including but not limited to the USFWS and the WGFD. As a result of these actions, the BLM gathered the necessary data essential to make a reasoned choice among the alternatives analyzed in detail in the Supplement and Proposed RMP. Finally, the BLM has made a reasonable effort to collect and analyze all available data.

The WGFD manages wildlife within Wyoming, while the BLM focus is on managing habitat and the BLM will continue to work with the WGFD to meet state wildlife population objectives. While USFWS has responsibility for threatened and endangered species, the BLM manages a significant portion of greater sage-grouse habitat. Thus, although it is the USFWS's responsibility to administer the ESA, management of wildlife habitat is within the BLM's multiple-use mandate and is properly a resource to be managed in their planning decisions.

The BLM has identified Alternative D as its Proposed RMP, which is consistent with the Wyoming Governor's EO 2011-5.

The BLM updated the Chapter 3 greater sage-grouse section with recent trend data and recent information on hunting harvest rates. Definitions for occupied lek and unoccupied leks were added to glossary (from BLM IM 2012-019).

The BLM will continue to follow WGFD recommendations affording protections to occupied leks until they are determined to be unoccupied. Winter concentration areas are addressed in management actions 7186 and 7272 (Proposed RMP). Additionally, greater sage-grouse winter concentration areas were recently mapped by WGFD and BLM personnel and are shown on the special status species wildlife maps in the Proposed RMP.

Summary Comment #3035_3-1: Commenters suggested that the BLM focus on issues other than West Nile virus in regards to threats to greater sage-grouse. Other commenters offered suggestions or alternative methods to improve BMPs/RDFs. Commenters questioned certain BMPs/RDFs because they were too broad and vague, in particular noise shields and siting compressor stations. Commenters cited issues pertaining to these BMPs/RDFs including the different types and shapes of noise shields and engineering concerns when siting compressor stations outside priority habitat as well as proximity to other resources besides greater sage-grouse. Other commenters stated the measures did not address livestock grazing.

Commenters requested that BMPs be updated as more and new information becomes available. Commenters expressed concern that the BMPs/RDFs from the NTT Report were too restrictive and the BLM may not have the legal authority to implement them.

Summary Response: The BLM modified Appendix L to include language that acknowledges BMPs for greater sage-grouse protections is an evolving field and that the appendix will be supplemented as technology and understanding of greater sage-grouse advance. The RDFs in Appendix L are from BLM's Greater Sage-Grouse NTT. To provide Bureau-wide consistency the recommendations cannot be revised. However, during implementation the site-specific situation shall be considered including effectiveness of the design feature as well as technical and economic feasibility. The BMP and RDF lists are not exhaustive, other methods may also be appropriate.

The BLM may apply Conditions of Approval in conformance with Section 6 of the Standard Oil and Gas Lease terms and conditions while recognizing valid existing rights.

Summary Comment #3035_3-2: Commenters requested clarification on Table 4-9 in the Supplement regarding the acreage in key greater sage-grouse habitat areas. Another commenter asked for clarification on Management Action 71,

specifically why a TLS was need when activities were already precluded by the NSO stipulation.

Summary Response: The table in question includes acres both proposed and existing ACECs. The BLM complied with the NEPA by including a discussion of measures that may mitigate adverse environmental impacts of the alternatives in the Supplement. Taking certain actions is only one of many potential forms of mitigation. The BLM must include mitigation measures in an EIS pursuant to the NEPA; yet the BLM have full discretion in selecting which mitigation measures are most appropriate, including which forms of mitigation are inappropriate.

Summary Comment #3035_4: Commenters stated the BLM should be consistent with EO 2011-5 and implement the 5 percent disturbance cap. Other commenters supported the 3 percent disturbance cap but felt that the DDCT calculation is inaccurate and results in a higher surface disturbance number, suggesting modifications to limit disturbance or otherwise strengthen the prescription. Commenters remarked that the 3 percent disturbance cap was inconsistent with the EO 2011-5 and overly restrictive. Some commenters offered supporting information regarding what they thought the density of development and/or disturbance cap should be. Some commenters asked that all management prescriptions be consistent with EO 2011-5 because the EO recognizes existing rights and/or development. Commenters asserted the BLM did not specify the types of activities included in disturbance calculations and others suggested burned areas be included in the calculation.

Summary Response: The Supplement analyzed conservation measures for greater sage-grouse in alternatives E and F and the consequences of the constraints are evaluated to inform the decision. The BLM's Proposed RMP (Alternative D) in the Final EIS is consistent with EO 2011-5 with the 5 percent disturbance cap. Additionally, the BLM will utilize the most current greater sage-grouse density disturbance process or other state and/or federal agreed upon process for compliance evaluations.

Summary Comment #3035_5: Commenters expressed concern that the BLM implement the strongest conservation measures possible to support greater sage-grouse conservation and recovery. Commenters felt the BLM did not adequately comply with the NEPA's "hard look" requirement for impacts on greater sage-grouse and should provide a more robust impact analysis. Commenters asked the BLM to withdraw priority habitat from various mining development and to further analyze the effects of energy development on greater sage-grouse habitat. Another commenter suggested BLM consider the limited surface disturbance from locatable mining in their impact analysis.

Other commenters suggested the BLM expand the discussion regarding greater sage-grouse population declines as a result of predation, weather, and other threats including hunting, fences, and

various impacts or relationships (beneficial or adverse) of predators on greater sage-grouse and their habitat.

Commenters either supported or expressed concerns regarding noise BMPs in the RMP. Commenters objected to setting ambient noise level range of 20 to 24 dBA, stating it had not been proven to represent ambient noise levels on multiple-use lands and should be removed. Commenters suggested the BLM implement noise prescriptions consistent with EO 2011-5, while others thought it should be changed consistent the BLM Lander's Field Office measures. Other commenters suggested noise measures be strengthened including recommending BLM anticipate the need to change management to reduce impacts of noise on greater sage-grouse populations.

Summary Response:

Per the requirements of NEPA, the Supplement provided analysis of the effects of each alternative and provides an adequate discussion of the environmental consequences of the presented alternatives. While the BLM has used a consistent method for developing alternatives, the specifics of each sub-region necessitated modification of the range of alternatives to accommodate locality and population differences. Alternatives E and F provide the "hard look". Additionally, the BLM's National Operation Center conducted management zone and range-wide cumulative effects analyses, which is included in the Proposed RMP and Final EIS. As a multiple use agency, the BLM must consider the protection of greater sage-grouse and their habitats as well as the potential for mineral recovery.

Chapter 3 discusses trends and threats to greater sage-grouse and the BLM updated the section with recent information. Predator control was not included as a threat in the USFWS's listing decision for greater sage-grouse. The BLM will continue to work with agencies to address current predation of greater sage-grouse, and BLM-administered lands in the planning area will remain open to predator control under state laws. Additionally, the BLM will continue to work with the WGFD to meet state wildlife population objectives.

The BLM would work with proponents to limit project-related noise where it would be expected to reduce functionality of habitats that support PHMAs and Connectivity Habitat Area populations. Noise restrictions in the Proposed RMP and Final EIS are consistent with the Wyoming Governor's EO 2011-5. As additional research and information emerges, specific new limitations appropriate to the type of projects being considered would be evaluated and appropriate limitations would be implemented where necessary to minimize potential for noise impacts on sage-grouse PHMAs population behavioral cycles. As new research is completed, new specific limitations would be coordinated with the WGFD and partners.

Summary Comment #3035_6: Commenters provided specific recommendations for livestock grazing to protect greater sage-grouse habitat, including routing livestock drives to avoid greater sage-grouse leks, shifting on-off dates to coincide with nesting periods, determining triggers for allotment closures after fires, incorporating specific measures from BLMs National Sage-grouse Habitat Conservation Strategy, and closing riparian areas to livestock grazing. Commenters also requested that allotments in greater sage-grouse priority habitat be managed to meet or exceed Wyoming Standards for Healthy Rangelands while others suggested that meeting the standards does not benefit the greater sage-grouse indicating new standards should be considered. Other commenters recommended BLM implement procedures and actions for allotments in greater sage-grouse priority and general habitat and provided supporting references. Commenters also requested that the livestock grazing management from alternatives E and F be applied under the Preferred Alternative. Commenters continued by suggesting that the BLM coordinate with the BLM Pinedale Office regarding their success in developing effective mitigation measures for greater sage-grouse incorporating livestock management practices.

Several commenters felt supporting retirement of grazing permits would be beneficial to greater sage-grouse, while others felt the opposite. Other commenters asked the BLM to identify who would monitor effects of retiring grazing permits on greater sage-grouse.

Commenters also asked the BLM to acknowledge livestock grazing could have positive effects on sage-grouse habitat and others asked the BLM to provide supporting documentation for these beneficial effects. Commenters asserted that the BLM did not adequately address impacts of livestock grazing on sage-grouse, including threats of West Nile virus from water developments; a lack of adequate mechanisms for use authorizations, allotments assessments, and appropriate livestock grazing levels; and habitat degradation from herbivory.

Summary Response: The BLM considered a reasonable range of alternatives during the greater sage-grouse planning process in full compliance with the NEPA. The range of alternatives in the Supplement and Draft RMP and Draft EIS represented a full spectrum of options to adequately address the impacts. Alternative E reduced grazing and eliminated it from certain areas to resolve resource concerns and is within the range of alternatives analyzed in detail providing the "hard look". The elimination of livestock grazing from all BLM-administered lands in the Planning Area as a method for resolving range, watershed, and wildlife habitat-related planning issues was considered, but eliminated from detailed analysis. This alternative would not meet the purpose and need of the RMP revision. The Supplement contains only planning actions and does not include any implementation

actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions. The BLM considers impacts to sensitive species during site-specific analysis of grazing renewals. The Livestock Grazing Management Response #2017_1 addresses retirement of grazing permits.

The BLM methodology for determining rangeland health is based on the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management. In addition, the BLM will collaborate with appropriate Federal agencies, and the State of Wyoming as contemplated under the Governor's EO 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where greater sage-grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and greater sage-grouse conservation objectives; and 3) identify appropriate site-based action to achieve greater sage-grouse conservation objectives within the framework. Please see Appendix C for an overview of the Bighorn Basin Monitoring and Evaluation protocol.

The BLM modified the Chapter 3 Livestock Grazing Management and greater sage-grouse sections, incorporating additional information on current BLM practices for assessing rangeland health and potential adverse and beneficial impacts from livestock grazing with supporting references, respectively.

Summary Comment #3035_7: Commenters asked the BLM to implement mitigation measures such as water developments using solar power instead of windmills. Commenters also asked the BLM to state that all mitigation measures regarding greater sage-grouse would be evaluated on a case-by-case basis when referring to existing leases. Commenters offered new references or mitigation measures to better protect greater sage-grouse and others supported implementing measures in the COT Report.

Commenters asked the BLM to provide a detailed description of the seed mixtures that would be preferential for use. Commenters asked the BLM to provide specific mitigation and reclamation measures as well and asked if operators would receive credit for previous reclamation projects. Commenters also requested that reclaimed greater sage-grouse habitat not be counted as disturbed habitat. Commenters were opposed to the requirement for restoration versus

reclamation of greater sage-grouse habitat, indicating it was not consistent with BLM regulations and policies.

Commenters requested clarification on how the BLM's Interim Policy on Regional Mitigation Measures would be incorporated in the RMP and asked that a description of the CEQ's mitigation hierarchy also be included. Other commenters cited their own mitigation measures that they requested be used in the RMP. Commenters suggested the BLM should implement a compensatory mitigation program, and work with Avian Power Line Interaction Committee to develop more robust mitigation measures.

Commenters requested that BLM establish a database for monitoring data and make it available to other agencies, industry, and the public. Commenters asked the BLM to provide more detail in regards to the type of monitoring and others suggested monitoring objectives were only applicable to larger scale projects. Commenters also questioned the presentation of the data from WGFD that depicts differences in population between male and female greater sage-grouse and male greater sage-grouse alone. Commenter asked the BLM to collaborate with the WGFD and private landowners to increase the level of information gathered. Commenters expressed concern over not being able to review and comment on Appendix C, *Monitoring and Evaluation*, which does not comply with NEPA requirements and required preparation pf another supplemental document. Other commenters requested that BLM implement adaptive management to address future threats to greater sage-grouse.

Summary Response:

The BLM complied with the NEPA by including a discussion of measures that may mitigate adverse environmental impacts of the alternatives in the Supplement. See 40 CFR 1502.14(f), 1502.16(h). Potential forms of mitigation include: (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or (5) compensating for the impact by replacing or providing substitute resources or environments. 40 CFR 1508.20. Taking certain actions, such as compensatory mitigation or a detailed list of preferential seed mixtures, are only some of many potential forms of mitigation. The BLM must include mitigation measures in an EIS pursuant to the NEPA; yet the BLM has full discretion in selecting which mitigation measures are most appropriate, including which forms of mitigation are inappropriate.

The best available information pertinent to the decisions to be made was used in developing the RMP and EIS. The BLM made considerable effort to acquire resource data, which included the NTT, the BER,

state management plans, and COT report. Subsequent site-specific project-level analysis would provide the opportunity to collect and examine site-specific inventory data to determine appropriate application of planning guidance.

BLM's planning regulations, specifically 43 CFR 1610.4-9 require that land use plans establish intervals and standards for monitoring, based on the sensitivity of the resource decisions. Land use plan monitoring is the process of tracking the implementation of land use plan decisions (implementation monitoring) and collecting data/information necessary to evaluate the effectiveness of land use plan decisions (effectiveness monitoring). Appendix C provides an overview of the Bighorn Basin Monitoring and Evaluation protocol. Establishing monitoring protocols will follow BLM program specific policy. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known.

For those impacts that cannot be sufficiently avoided or minimized onsite, the BLM will implement effective measures to offset (or compensate for) such impacts. A mitigation strategy for BLM-administered lands will comply with BLM's Regional Mitigation Manual Section (MS) 1794.

BLM's Wyoming State Office worked with the State of Wyoming and the USFWS to develop a statewide greater sage-grouse adaptive management strategy, which is included in the Proposed RMP as Appendix Y.

The appendix describes the process that the BLM will use to monitor implementation and effectiveness of land use plan decisions. The monitoring framework includes monitoring at various scales specific to greater sage-grouse habitat, consistent indicators to measure and metric descriptions for each of the scales, analysis and reporting methods, and the incorporation of monitoring results into adaptive management. The need for fine and site-scale specific habitat monitoring (see Habitat Assessment Framework) will vary by area depending on existing conditions, habitat variability, threats, and land health. To accomplish effectiveness monitoring, the BLM will analyze the monitoring data to characterize the relationship among disturbance, implementation actions and habitat condition at the appropriate and applicable geographic scale or boundary.

Summary Comment #3035_8: Commenters offered various recommendations from other RMP amendments in Wyoming and surrounding states to aid in the development of the Bighorn Basin RMP.

Summary Response: While the BLM has used a consistent method for developing alternatives, the specifics of each sub-region necessitated

modification of the range of alternatives to accommodate locality and population differences.

In response to the greater sage-grouse management objectives described in the 2006 WAFWA *Greater Sage-grouse Comprehensive Conservation Strategy*, many reports have been prepared for the development of management recommendations, strategies, and regulatory guidelines. The NTT report (NTT 2011), Conservations Objectives Team (COT; USFWS 2013), and the Summary of Science, Activities, Programs and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse (also referred to as the BER; Manier et al. 2013) are the most widely used reports that have been incorporated in the BLM Supplement that addresses the effects of implementing greater sage-grouse conservation measures on public lands. Both documents helped planning teams identify issues within their planning area, determine the context within the management zone, prioritize habitats, and assist in creating a range of alternatives with management actions that can alleviate or mitigate threats to greater sage-grouse at an appropriate level. Both the NTT report and the COT report tier from the WAFWA *Greater Sage-grouse Comprehensive Conservation Strategy* (Stiver et al. 2006). Alternatives E and F are based on the NTT report per direction in IM 2012-044.

Summary Comment #3035_9: Commenters requested that greater sage-grouse priority habitat be withdrawn from future development and allow existing leases to lapse as they expire. Other commenters expressed opposition to closing the Greater Sage-Grouse Key Habitat Area ACEC (Alternative E) to future leasing. Commenters also stated that impacts to greater sage-grouse from oil and gas development will decrease as new technology for drilling and production is developed and provided supporting information. Commenters also noted the extra truck trips required when using closed loop systems and associated road upgrades could cause additional impacts and suggested fence installation was a better alternative. Commenters asserted that Alternative F's level of constraints on oil and gas leasing was major and not moderate as stated in the Supplement. Commenters requested the BLM clarify how requiring clustering of oil and gas facilities and operations outside priority habitat would work in the event wells are located in priority habitat areas.

Commenters asked the BLM to use specific language to remain compliant with EO-2011-5 regarding TLS. Other commenters felt buffers prescribed by EO-2011-5 were too small to adequately protect greater sage-grouse, suggesting buffers should be increased. Another commenter voiced opposition to OGMAs asserting establishing these areas conflicted with BLM's greater sage-grouse conservation efforts.

Commenters recommended the BLM include management that would provide for flexibility to update management as scientific information

on greater sage-grouse evolves and utilize specific buffers and restrictions based on provided justification.

Summary Response:

The BLM developed the Supplement with involvement from cooperating agencies, including WGFD, Wyoming Governor's office, USFWS, and local agencies/governments to ensure a balanced multiple-use management strategy addresses the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands. The BLM's Proposed RMP is consistent with the Wyoming Governor's EO 2011-5, which has been determined sufficient to conserve greater sage-grouse throughout Wyoming. The BMP and RDF lists are not exhaustive, other methods may also be appropriate and Appendix L will be supplemented as technology and understanding of greater sage-grouse advance. During implementation, the site-specific situation shall be considered including effectiveness of the design feature as well as technical and economic feasibility.

Major and moderate oil and gas constraints are defined in the Glossary and are consistent with BLM H-1601-1 — *Land Use Planning Handbook*. Where criteria applied to areas as major constraints those were utilized for analysis. Methods and assumptions for the impact analysis are presented at the beginning of each impact section in Chapter 4, which did consider the impacts of additional siting constraints, including the 3-percent density disturbance restrictions.

Before beginning the Supplement and throughout the planning effort, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the Bighorn Basin planning area are substantially different from the data needed to support site-specific analysis of projects. The information presented in map and table form is sufficient to support the broad scale analyses required for land use planning. As a result of these actions, the BLM gathered the necessary data essential to make a reasoned choice among the alternatives analyzed in detail in the Supplement, and provided an adequate analysis that led to an adequate disclosure of the potential environmental consequences of the alternatives (Chapter 4). A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive gathering and monitoring of baseline data. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the

opportunity to participate in the NEPA process for implementation actions.

The term “administratively unavailable” has been changed to “closed” throughout the document, based on guidance from the BLM Wyoming State Office.

Summary Comment #3035_10: Commenters recommended that greater sage-grouse Core Areas (as identified by Version 3 of Wyoming Governor’s EO 2011-5) located within WSAs be closed to motorized and mechanized vehicle use or at a minimum be limited to existing roads and trails with seasonal closures during breeding and nesting seasons. Commenters identified five WSAs containing these areas including Alkali Creek, Bobcat Draw, Cedar Mountain, Honeycombs, and Medicine Lodge.

Summary Response: The BLM complied with the NEPA by including a discussion of measures that may mitigate adverse environmental impacts of the alternatives in the Supplement. Taking certain actions, such as closing PHMAs to motor vehicle use, is only one of many potential forms of mitigation. The BLM must include mitigation measures in an EIS pursuant to the NEPA; yet the BLM has full discretion in selecting which mitigation measures are most appropriate, including which forms of mitigation are inappropriate. The Proposed RMP and Final EIS is consistent with the Wyoming Governor's EO 2011-5.

Invasive Species

Summary Comment #3014: Commenters requested the BLM clarify how the BMP requiring power washing of vehicles and equipment would be implemented and questioned if it was reasonable. In addition, commenters requested the BLM clarify that reclamation plans are required for all oil and gas development activities by Onshore Oil and Gas Order No. 1.

Commenters felt the management action restricting activities in greater sage-grouse habitat that facilitate spread of invasive plants was overly broad and could be misinterpreted to apply to any surface-disturbing activity, including oil and gas development activities. Commenters suggested the language should be modified to reflect the BLMs multiple use requirements.

Commenters were concerned over restrictions on the use of herbicides in Key or PHMAs sage-grouse habitats due to a lack of capacity for the BLM to manage invasive plants, suggesting the BLM should implement a pilot program allowing herbicide use where infestations total more than 5 acres in these areas. Another commenter suggested the herbicide “Plateau” could be applied manually in areas not being used by greater sage-grouse and heavily infested with cheatgrass.

Summary Response: The BLM’s FLPMA (Section 103(c)) defines ""multiple use"" as the management of the public lands and their various resource values so

that they are utilized in the combination that will best meet the present and future needs of the American people. Accordingly, the BLM is responsible for the complicated task of striking a balance among the many competing uses to which public lands can be put. The BLM's multiple-use mandate does not require that all uses be allowed on all areas of the public lands. The purpose of the mandate is to require the BLM to evaluate and choose an appropriate balance of resource uses which involves tradeoffs between competing uses. The Supplement is a targeted amendment specifically addressing goals, objectives, and conservation measures to conserve greater sage-grouse and respond to the potential of its being listed. The Supplement included alternatives that provide a greater and lesser degree of restrictions in various use programs, but would not eliminate or invalidate any valid existing development rights. Construction, stabilization, and reclamation plan(s) address the site-specific soil/site issues to mitigate and the degree of detail required. These details are in addition to other federal regulations.

Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The Supplement contains only planning actions and does not include any implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. Additionally, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

The RDFs in Appendix L are from BLM's Greater Sage-Grouse NTT and cannot be modified in order to provide Bureau-wide consistency. During implementation the site-specific situation shall be considered including effectiveness of the design feature as well as technical and economic feasibility.

Lands and Realty

Summary Comment #3016_1: Commenters were concerned that public lands would no longer be available for Desert Land Entry applications and stated that the BLM did not provide justification for this action. Commenters suggested that while these entries may be underutilized, they should remain available to the public, and that agricultural development of these lands would not be detrimental to greater sage-grouse.

Summary Response: The BLM would retain the 1,409 acres open for entry under the Desert Land Act in the Proposed RMP and consider Desert Land Entry applications for unclassified lands on a case-by-case basis consistent

with Desert Land Entry criteria and resource objectives. Only Alternative B proposes to revoke the 1,409 acres of classified Desert Land Entry lands, the other alternatives do not.

Summary Comment #3016_2: Commenters expressed opposition to acquisition of state or private lands for greater sage-grouse habitat management due to lack of adequate funding for managing and/or acquiring public lands. Instead, commenters suggested the BLM acknowledge valid existing rights and work with private landowners to develop appropriate programs for greater sage-grouse management.

Summary Response: The BLM may pursue the acquisition of lands under the FLMPA. Please refer to Appendix M, *Land Disposal and Acquisition* for details on criteria applied by the BLM in identifying lands for acquisition. As stated in the Supplement, the BLM prepared a land use plan revision applied to lands with greater sage-grouse habitat. This effort responds to the USFWS's March 2010 'warranted, but precluded' ESA listing petition decision. The Supplement focused on areas affected by threats to greater sage-grouse habitat identified by the USFWS in the March 2010 listing decision. The purpose and need provided the appropriate scope to allow the BLM to analyze a reasonable number of alternatives to cover the full spectrum of potential impacts, which includes considering acquiring lands for greater sage-grouse management.

Laws, Regulations, Guidance, Process

Summary Comment #3027_1: Commenters requested clarification on why a Supplement to the Draft RMP and Draft EIS was required. Commenters expressed concern that the Supplement was inconsistent with various laws, regulations, and policies including, but not limited to, FLPMA, the Property Clause of the United States Constitution, the General Mining Law of 1872, the Mining, Minerals and Policy Act, the Energy Policy Act, BLM Manual 6840, and the Wyoming Governor's EO 2011-5. Commenters felt that alternatives B, E, and F were far too restrictive on resource uses. Commenters also asserted that the Supplement did not meet the requirements of the NEPA process citing incomplete and inadequate analysis. In particular, commenters stated the BLM did not analyze a range of reasonable alternatives that could satisfy the USFWS requirements regarding greater sage-grouse. Commenters were unclear on which alternative was the BLM's Preferred Alternative, since the release of the Supplement with new alternatives E and F. Commenters also asked that the BLM continue to use the CX as an option when evaluating projects.

Commenters also offered that existing BLM policy is being jettisoned because of IM 2012-044 and the NTT Report, and that these new policies are leading to new regulations that have no explanations and are arbitrary in nature. Other commenters questioned the BLM's

reliance on the NTT report in developing the Supplement, citing recent information that it was biased and scientifically flawed. In addition, commenters suggested that the BLM use conservation measures worded as mandatory rather than discretionary.

Commenters called into question the BLM's authority to prescribe management actions that could affect existing rights. Commenters also stated that BLM is overstepping its statutory authority and did not comply with CEQ guidelines regarding resource management.

Summary Response:

The analysis in the Supplement, in combination with the analysis included in the Draft EIS, does comply with FLPMA, NEPA and other applicable laws. As stated in the Supplement, the BLM is preparing a land use plan revision and associated EIS for lands with greater sage-grouse habitat, in response to the USFWS's March 2010 'warranted, but precluded' ESA listing petition decision, and that existing regulatory mechanisms in BLM and the Forest Service land use plans was inadequate to protect the species and its habitat. The 15 plan amendments and revisions will focus on areas affected by threats to greater sage-grouse habitat identified by the USFWS in the March 2010 listing decision. The two primary threats to sagebrush habitat are infrastructure from energy development in the eastern portion of the species' range and conversion of sagebrush habitat to annual grasslands due to wildfires in the western portion of the species' range. To address the threats, BLM are considering a range of changes in management of greater sage-grouse habitats to avoid the continued decline of populations and habitats across BLM-administered lands. This purpose and need provides the appropriate scope to allow the BLM to analyze a reasonable number of alternatives to cover the full spectrum of potential impacts. The management of the greater sage-grouse priority habitat ACECs in alternatives E and F represent approaches to managing these areas that were not considered in the Draft RMP and Draft EIS. Valid existing development rights would not be eliminated or invalidated.

The BLM considered a reasonable range of alternatives during the greater sage-grouse planning process in full compliance with the NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM consider reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. While there are many possible alternatives or actions to manage public lands and greater sage-grouse in the planning area, the range of alternatives in the Supplement and Draft EIS represent a full spectrum of options including a no action alternative (current management, Alternative A in the Draft RMP and Draft EIS).

The BLM disclosed in the Supplement that Alternative D as presented in the Draft RMP and Draft EIS, remained the Agency Preferred Alternative and that the Proposed RMP and Final EIS would contain content from the Draft RMP and Draft EIS and the Supplement. The

BLM's Proposed RMP is consistent with EO 2011-5, as well as EO 2013-3.

A CX would be considered for actions that meet the associated requirements and that extraordinary circumstances do not preclude the use of the CX. If any extraordinary circumstances apply, an EA or EIS must be prepared.

Greater sage-grouse conservation measures in the NTT Report were used to form BLM management direction under alternatives E and F consistent with the direction provided in IM 2012-044 (the BLM must consider all applicable conservation measures developed by the NTT in at least one alternative in the land use planning process). The NTT report used the best current scientific knowledge to guide the BLM planning effort through management considerations to ameliorate threats, focused primarily on priority greater sage-grouse habitats on public lands but was not the sole source of information. In addition, the 2013 COT (COT; USFWS 2013) qualitatively identifies threats/issues that are important for individual populations across the range of greater sage-grouse, regardless of land ownership. The Summary of Science, Activities, Programs and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse (also referred to as the BER; Manier et al. 2013) then provides complimentary quantitative information to support and supplement the conclusions in the COT. Both documents helped planning teams identify issues within their planning area, determine the context within the management zone, prioritize habitats, and assist in creating a range of alternatives with management actions that can alleviate or mitigate threats to greater sage-grouse at an appropriate level. Both the NTT report and the COT report tier from the WAFWA *Greater Sage-grouse Comprehensive Conservation Strategy* (Stiver et al. 2006).

Summary Comment #3027_2: Commenters questioned if the BLM had adequately addressed local plans for counties in the Planning Area and if the impacts associated with the management objectives had been thoroughly analyzed. Commenters also stated that RMP does account for changing technology enough and thus the restrictions on development could be much higher. Commenters requested that EO 2011-5, EO 2013-3, and all individual county Land Use Plans be published in the Proposed RMP and Final EIS.

Summary Response: The BLM considered local plans during alternative development and management actions were developed with the assistance of the cooperating agencies, which included the counties, WGFD, Wyoming Governor's office, and the USFWS. The Reasonable Foreseeable Development addresses oil and gas development potential including updates in technologies.

Summary Comment #3027_3: Commenters requested that additional mitigation measures be considered, such as funding additional studies to better understand

factors affecting greater sage-grouse, industry incentives, mitigation banks, offsite mitigation, etc. Commenters questioned why the BLM did not reference the Avian Power Line Interaction Committee's new guidance manual.

Summary Response: The BLM's Proposed RMP is consistent with the Wyoming Governor's EO 2011-5 and EO 2011-5 seeks a cooperative effort to develop incentives for development outside of Core Areas. Additionally, the list of BMPs in Appendix L are not intended to encompass all potentially applicable BMPs. The BLM will examine BMPs, such as those in the Avian Power Line Interaction Committee's manual for incorporation during implementation of site-specific activities.

Leasable Minerals – Oil and Gas

Summary Comment #3023_1: Commenters asserted that some of the specific BMPs and/or RDFs included in Appendix L were not feasible or practical and may have unintended consequences. Some of the specific BMPs mentioned included requiring directional drilling wherever possible, remote monitoring, closed loop systems, facility location and placement, power-washing vehicles, and mesh nets over ponds. Commenters offered alternative language for BMPs pertaining to directional drilling or suggested BLM implement measures from other RMPs. Many commenters asserted that BMPs were not consistent with EO 2011-5 and/or BLM IM 2012-019. Several other commenters asked for flexibility in regards to many BMPs and RDFs requirements because each situation is unique.

Commenters questioned management actions and as BMPs and RDFs prescribed by BLM, specifically stating that the management contradicts current BLM regulations and guidance related to oil and gas development as well as violates existing rights. Commenters also asked that the BLM change the language regarding areas "administratively unavailable" to "closed" because it met the definition of a withdrawal. Other commenters asked BLM acknowledge in the RMP the rights of lessees. Commenters requested that BLM honor existing rights indicating proposed stipulations violated those rights. Other commenters added that conservation measures are an attempt by BLM to limit future oil and gas development and are not compliant with FLPMA. Commenters questioned how BLM intends to comply with the existing MOU with the State of Wyoming Oil and Gas Conservation Commission on well spacing based on information in Appendix T. Commenters asked the BLM to consider the effects of constraining development on the local communities and the national interest.

Commenters asked the BLM to clarify which alternative is now the Preferred Alternative and provide evidence for this decision. Other commenters offered that restrictions on oil and gas development

under alternatives E and F violates the BLM's multiple use mandate and are unreasonable. A commenter asked BLM to develop broad management goals and objectives and not waste resources analyzing site-specific impacts from oil and gas development. One commenter offered that BLM misinterpreted the purpose of unitization and Commenters felt that BLM concludes oil and gas development always negatively impacts wildlife and their habitat without providing supporting information. Other commenters indicated development density under Alternative E was supported by scientific information to protect greater sage-grouse while it was not under the other alternatives and that this alternative should be implemented. Commenters also recommended Alternative E buffers apply outside Key Habitat Areas. Some commenters indicated the Wyoming Core Area Strategy should be strengthened by closing these areas to future leasing as recommended in the NTT report. Another commenter suggested compensatory funds could not mitigate the loss of PHMAs.

Commenters suggested that EOR technology could be used to develop unconventional reservoirs in the Planning Area requesting the BLM consider the impacts of alternatives E and F to this type of development. Commenters also requested that lands with favorable EOR potential in developed fields not be included in areas designated as greater sage-grouse priority habitat.

Commenters also asked the BLM to consider a phased development alternative to help limit environmental impacts on sensitive resources or closure of areas to leasing in highly sensitive areas. Alternatively, other commenters opposed phased development because of delays in production and asserted it was not reasonable.

Commenters voiced concern over seasonal road closures noting that the BLM had not justified these closures and they should not be implemented.

Summary Response:

The BLM developed the Supplement to the Bighorn Basin Draft RMP and Draft EIS with involvement from cooperating agencies, including WGFD, Wyoming Governor's office, USFWS, and local agencies/governments to ensure that a balanced multiple-use management strategy to address the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands. The BMP and RDF lists are not exhaustive, other methods may also be appropriate and Appendix L will be supplemented as technology and understanding of greater sage-grouse advance. The RDFs in Appendix L are from BLM's Greater Sage-Grouse NTT and cannot be revised in order to provide Bureau-wide consistency. However, during implementation the site-specific situation shall be considered including effectiveness of the design feature as well as technical and economic feasibility. The BLM may apply Conditions of Approval in conformance with Section 6 of the

Standard Oil and Gas Lease terms and conditions while recognizing valid existing rights.

The BLM complied with its multiple-use mandate by evaluating an appropriate balance of resource uses, which involves tradeoffs between competing uses. The Supplement was targeted specifically to address goals, objectives, and conservation measures to conserve greater sage-grouse and to respond to the potential of its being listed (see Section 1.0, Purpose and Need). The Supplement included alternatives that provide a greater and lesser degree of restrictions in various use programs, but would not eliminate or invalidate any valid existing development rights. The BLM developed the Supplement with involvement from the agencies listed above to ensure a balanced multiple-use management strategy addresses the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands.

Before beginning the Supplement and throughout the planning effort, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the Bighorn Basin Planning Area are substantially different from the data needed to support site-specific analysis of projects. The requisite level of information necessary to make a reasoned choice among the alternatives in an EIS is based on the scope and nature of the proposed decision. The baseline data provided in Chapter 3 and various appendices is sufficient to support, at the general land use planning-level of analysis and the environmental impact analysis (Chapter 4) resulting from management actions presented in the Supplement.

The BLM used the most recent and best information available that was relevant to a land-use planning-level analysis including the BER (BER; Manier et al. 2013). The BER looked at each of the threats to greater sage-grouse identified in the USFWS's "warranted but precluded" finding for the species. For these threats, the report summarized the current scientific understanding, of various impacts to greater sage-grouse populations and habitats. The report also quantitatively measured the location, magnitude, and extent of each threat. These data were used in the planning process to describe threats at other levels, such as the sub-regional boundary and WAFWA Management Zone scale, to facilitate comparison between sub-regions. Additionally, the BLM consulted with, collected, and incorporated data from other agencies and sources, as noted above. As a result of these actions, the BLM gathered the necessary data essential to make a reasoned choice among the alternatives analyzed in detail in the Supplement and Proposed RMP. Finally, the BLM has made a reasonable effort to collect and analyze all available data.

The Supplement provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives. The Supplement provided sufficiently detailed information to aid in determining whether to proceed with the Preferred Alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1. Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The Supplement contains only planning actions and does not include any implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

The BLM's Proposed RMP is consistent with the Wyoming Governor's EO 2011-5 that has been determined sufficient to conserve greater sage-grouse throughout Wyoming and WAFWA Management Zones I and II.

The BLM changed the term “administratively unavailable” to “closed” throughout the document, based on guidance from the BLM Wyoming State Office. Additionally, stipulations provided in Alternative D (management actions 4116, 4117, and 4118) were updated in coordination with the State of Wyoming and WGFD consistent with EO 2011-5.

The purpose of unitization is described according to 30 U.S.C. Sec. 181 et seq, which includes “…for the purpose of more properly conserving the natural resources thereof whenever determined by the Secretary of the Interior to be necessary or advisable in the public interest;…”. Further, “…it is the purpose of the parties hereto to conserve natural resources, prevent waste, and secure other benefits obtainable through development and operation of the area subject to this agreement…” The Department has broad discretion in the interpretation of the term “conservation of natural resources” and it may include surface resources such as the greater sage-grouse and associated habitat.

Summary Comment #3023_4: Commenters asserted that there is very little to no surface disturbance from geophysical exploration and questioned why this type of exploration would be restricted in the Greater Sage-grouse Key Habitat ACEC under Alternative E. Others stated that restricting geophysical exploration is not an objective in BLM IM 2012-044 or the USFWS COT Report, violates existing rights, and that this management should be removed from the RMP. Some commenters said that

geophysical exploration should be encouraged instead of constrained. Commenters asked if the BLM has the authority to prohibit geophysical exploration and stated that this mitigation measure would not affect greater sage-grouse mitigation efforts. Some commenters recommended BLM approve geophysical exploration using CXs.

Summary Response: Areas open and/or closed to oil and gas leasing are open and/or closed to geophysical exploration unless noted otherwise. Geophysical exploration may be permitted on a case-by-case basis so long as the resource goals and objectives under which the area was closed are not compromised. The BLM will consider CXs for actions that meet the associated requirements and if extraordinary circumstances do not preclude the use of the CX. If any extraordinary circumstances apply, an EA or EIS must be prepared.

Summary Comment #3023_5: Commenters asserted the economic impacts were not adequately disclosed under alternatives E and F. Commenters asked the BLM to consider economic effects of constraints on oil and gas development and EOR under alternatives E and F. Commenters also emphasized that the socioeconomic impacts would be very detrimental to the local communities in the Bighorn Basin and urged the BLM to reject alternatives E and F.

Summary Response: The Supplement provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives. The Supplement provided sufficiently detailed information to aid in determining whether to proceed with the Preferred Alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1. Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The Supplement contains only planning actions and does not include any implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

Summary Comment #3023_6: Many commenters felt that requiring Master Development Plans rather than using the APD process on all but wildcat wells is inappropriate because of the greater likelihood of periodic drilling in the Bighorn Basin. Other commenters asked that BLM allow infill development within existing fields without a Master Development Plan. Commenters also supported enlarging OGMAs under Alternative D, similar to that under Alternative C.

Commenters had concerns about how BLM would apply leasing screens in areas with MLP areas. Other commenters supported application of MLPS and recommended BLM develop Resource Condition Objectives for each sensitive resource in MLP areas.

Summary Response: Comments specific to master development plans, OGMAs, and MLPs are outside the scope of the Supplement, which the BLM developed to ensure that a balanced multiple-use management strategy addresses the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands. The Proposed RMP and Final EIS addresses these issues and incorporates MLPs within the document.

The BLM has identified Alternative D as its Proposed RMP in the Final EIS, which does not require master development plans in lieu of APD-by-APD processing for all but wildcat wells.

Livestock Grazing Management

Summary Comment #3017_1: Several commenters requested the BLM add additional language to be consistent with the Wyoming Governor's EO 2013-3. Other commenters asked the BLM to add language regarding additional agency coordination between BLM and WDEQ. Commenters requested clarification on what actions contribute to surface-disturbing activities including those used in the surface disturbance cap, and whether or not BLM considers livestock grazing a surface-disturbing activity. Commenters requested the BLM update the definition of surface-disturbing activities in the Glossary.

Commenters asserted that the BLM's alternatives do not comply with BLM IM 2013-184 and requested that the BLM evaluate permanent retirement of AUMs that have been voluntarily waived. Other commenters stated allotment retirement was biased against livestock grazing, inappropriate, and should be removed from the document. Commenters also requested the BLM clarify the management under which allotment retirement would require a NEPA analysis and management categories of custodial, improve, and maintain.

Summary Response: The BLM incorporated language in the Proposed RMP consistent with the Wyoming Governor's EO 2013-3 and IM 2013-184, in Management Action 4122 and Goal LR:10-2, respectively. Additionally, the BLM added and/or clarified text as appropriate, including in the *Livestock Grazing Management* section, Appendix P, and definitions in the Glossary.

The Supplement included alternatives that provide a greater and lesser degree of restrictions in various use programs. In the event of retirement of a grazing allotment, the BLM would follow the grazing regulations (CFR 4100 - Grazing Administration) including preparation of an allotment specific document analyzing the potential impacts. All

of Subpart 4160 - Administrative Remedies, including protest and appeals would be applicable. The Proposed RMP does not include this management prescription.

Summary Comment #3017_2: Commenters requested the BLM analyze a no grazing alternative. Other commenters said that livestock forage consumption had increased since the definition of AUM was originally developed, which should be accounted for in the analysis.

Summary Response: Alternative E in the Supplement reduced grazing and eliminated it from certain areas to resolve resource concerns, which is within the range of alternatives analyzed in detail. The elimination of livestock grazing from all BLM-administered lands in the Planning Area as a method for resolving range, watershed, and wildlife habitat-related planning issues was considered, but eliminated from detailed analysis. This alternative would not meet the purpose and need of the RMP revision. Addressing changes in livestock forage consumption is outside the scope of the Supplement and Proposed RMP.

Summary Comment #3017_3: Commenters requested that the impacts to livestock grazing be reassessed asserting that the alternatives analyzed in the Supplement did not adequately assess impacts to livestock grazing, specifically actions that affect AUMs. Commenters also stated that the BLM did not adequately account for effects of livestock grazing on greater sage-grouse habitat. Comments asserted the Supplement incorrectly blamed increased juniper encroachment on livestock grazing. A commenter also asked that natural springs be fenced off to limit impacts from livestock grazing.

Commenters also asserted that the impacts to greater sage-grouse priority habitat were not accurate and stated that livestock grazing can have positive impacts on greater sage-grouse habitat. Other commenters said some allotments did not meet rangeland standards and had a negative impact on greater sage-grouse. Many commenters did not support the closure of priority greater sage-grouse habitat to livestock grazing under alternatives E and/or F, stating this management did not meet BLMs multiple use mandate.

Summary Response: The Supplement included alternatives that provide a greater and lesser degree of restrictions in various use programs including livestock grazing and conservation measures for greater sage-grouse. In accordance with BLM's multiple use mandate the BLM must find the balance among the many competing uses to which public lands can be put. The BLM’s multiple-use mandate does not require that all uses be allowed on all areas of the public lands. The Supplement provided sufficiently detailed information to aid in determining whether to proceed with the Preferred Alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental

consequences associated with the alternatives, in accordance with 40 CFR 1502.1.

The Supplement contains only planning actions and does not include any implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

The BLM considers impacts to sensitive species during site-specific analysis of grazing renewals. Regarding juniper encroachment, the text in question referenced threats to greater sage-grouse habitat identified in the USFWS COT report and was not specific to the Planning Area. The BLM revised the greater sage-grouse discussion in Chapter 3 to acknowledge livestock grazing can be compatible with, or even beneficial to, greater sage-grouse habitat under certain circumstances.

Summary Comment #3017_4: Commenters stated that various types of vegetation management, like hand cutting, flash burning, and other treatments for invasive species, would be too difficult to be successful and are burdensome. Other commenters asked the BLM to clarify how vegetation recovery would be determined, details on pretreatment data, and if grazing would be deferred while pretreatment data is collected.

Summary Response: The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under Governor's EO 2013-3, to: (1) develop appropriate conservation objectives; (2) define a framework for evaluating situations where greater sage-grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between proper grazing (by wildlife or wild horses or livestock) and greater sage-grouse conservation objectives; and (3) identify appropriate site-based action to achieve greater sage-grouse conservation objectives within the framework.

The BLM drafted a monitoring framework that is included in the Proposed RMP as Appendix Y. The appendix describes the process that the BLM will use to monitor implementation and effectiveness of land use plan decisions.

Summary Comment #3017_5: Commenters requested BLM include further detail regarding socioeconomic impacts from restrictions on livestock grazing in the Supplement, including explanations as to why some alternatives would have similar impacts.

Summary Response: The BLM revised the Chapter 4 Economic section to include additional explanation. The differences that are present between the

alternatives are reflected in the revised analysis and the quantitative data available.

Locatable Minerals

Summary Comment #3020_1: Commenters requested the BLM provide further rationale for the impacts to mineral development. Additionally, commenters asserted that the cumulative impacts analysis did not adequately address the impacts to the mining industry as a result of mineral withdrawals and surface-use restrictions.

Commenters offered that the RMP does not comply with some mining laws, regulations, the Mining and Mineral Policy Act, and FLPMA, and BLM has an obligation to comply with mining laws and regulations. Commenters also requested that BLM respect existing mining claims. Commenters also requested that validity testing for mining claims be applied uniformly in compliance with the General Mining Law of 1872. Commenters also requested that validity testing not be used to delay mineral development and BLM should state where, when, and how validity examinations will affect authorizations. Some commenters noted that additional validity testing would be burdensome without any identified ecological or economic benefit.

Other commenters requested that EAs be required rather than EISs for mining authorization because they are more economical and yield similar results to an EIS. Commenters offered concerns regarding the RMP's ability to supersede individual mining claims and development. Commenters requested that exploratory drilling for bentonite require a plan of operations level-structure rather than a notice level. Other commenters asserted that management prescribed under Alternative E would increase the surface disturbance footprint from bentonite mining, an industry that already has successful mitigation and reclamation procedures in place. Commenters also offered that conservation measures for greater sage-grouse should be proportionate to the threat from locatable mineral development.

Commenters asserted that BLM did not include locatable mineral development in the socioeconomic analysis. Commenters also requested the BLM analyze the socioeconomics effects of closures and/or restrictions on mining companies under alternatives B, E, and F. Commenters requested additional quantitative data regarding the benefits to greater sage-grouse from restrictions on mining. Commenters requested more analysis on impacts to mining from greater sage-grouse management be presented in alternatives E and F instead of referring the reader to the Draft RMP and Draft EIS.

Summary Response: The BLM's FLPMA (Section 103(c)) defines ""multiple use"" as the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. Accordingly, the

BLM is responsible for the complicated task of striking a balance among the many competing uses to which public lands can be put. The BLM's multiple-use mandate does not require that all uses be allowed on all areas of the public lands. The purpose of the mandate is to require the BLM to evaluate and choose an appropriate balance of resource uses which involves tradeoffs between competing uses. The Supplement is a targeted amendment specifically addressing goals, objectives, and conservation measures to conserve greater sage-grouse and respond to the potential of its being listed and the alternatives provide a greater and lesser degree of restrictions in various use programs, but would not eliminate or invalidate any valid existing development rights. The BLM manages a significant portion of greater sage-grouse habitat and management of wildlife habitat is within the BLM's multiple-use mandate and is properly a resource to be managed in their planning decisions. Further, the BLM developed the Supplement with involvement from cooperating agencies, including WGFD, Wyoming Governor's office, USFWS, and local agencies/governments to ensure that a balanced multiple-use management strategy to address the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands.

Regarding validity examinations, as stated in Management Action 68 in the Supplement, minerals exploration would be subjected to a validity examination in Key Habitat Areas under Alternative E. Additionally, the requirements and/or criterion are published and available to the public in BLM Handbook 3890-3, Validity Mineral Reports. The BLM has identified Alternative D as its Proposed RMP in the Final EIS. Alternative D does not designate greater sage-grouse key habitat as an ACEC.

The Supplement provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives. The Supplement provided sufficiently detailed information to aid in determining whether to proceed with the Preferred Alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1. Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The Supplement contains only planning actions and does not include any implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. In addition, as required by NEPA, the

public will be offered the opportunity to participate in the NEPA process for implementation actions.

During preparation of the Proposed RMP and Final EIS, the BLM integrated the information and alternatives from the Supplement with the Draft RMP and Draft EIS.

Minerals - General

Summary Comment #3019_1: Commenters asked the BLM to recognize the importance of energy and/or mineral development as well as greater sage-grouse habitat conservation in compliance with FLMPA. Other commenters offered ideas on how to protect greater sage-grouse habitat. Commenters recommended specific language for modifying Record 71 to be consistent with EO 2011-5 and Record 72 to encourage instead of require unitization.

Commenters asked the BLM to add specific language to clarify that existing rights will not be violated by the implementation of management actions related to greater sage-grouse habitat conservation. Some commenters noted that specific management actions were inconsistent with EO 2011-5, which recognizes existing rights and recommended the management actions be removed from the RMP and EIS.

Commenters requested that BLM provide specific language about the right of private landowners regarding mineral development. Commenters also voiced concerns over management actions that could limit or eliminate mineral development on split estate lands. Commenters also urged BLM to work with operators and the state to implement a reasonable monitoring program.

Summary Response: The BLM complied with its multiple-use mandate by evaluating an appropriate balance of resource uses, which involves tradeoffs between competing uses. The Supplement was targeted specifically to address goals, objectives, and conservation measures to conserve greater sage-grouse and to respond to the potential of its being listed (see Section 1.0, Purpose and Need). The Supplement included alternatives that provide a greater and lesser degree of restrictions in various use programs, but would not eliminate or invalidate any valid existing development rights. The BLM developed the Supplement with involvement from cooperating agencies, including the WGFD, Wyoming Governor's office, USFWS, and local agencies/governments to ensure that a balanced multiple-use management strategy to address the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands. Management actions 71 and 72 were not modified, however, stipulations provided under Alternative D (management actions 4116, 4117, and 4118) were updated in coordination with the State of Wyoming and WGFD consistent with EO 2011-5.

Paleontological Resources

Summary Comment #3028: Commenters suggested the BLM should not unreasonably restrict oil and gas development since it may lead to the discovery of new paleontological resources.

Summary Response: The BLM developed the Supplement to ensure that a balanced multiple-use management strategy addresses the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands.

Recreation

Summary Comment #3030: Commenters asked whether or not special recreation permits required in greater sage-grouse priority habitat areas apply to hunting and trapping.

Summary Response: Special Recreation Permits are authorizations which allow specified recreational uses and are issued as a means to manage visitor use, protect natural and cultural resources, and provide a mechanism to accommodate commercial recreational uses. If the actions described in the comment are subject to a Special Recreation Permit then yes, under alternatives E and F a permit would be required and mitigation may be applied to reduce impacts to greater sage-grouse.

Renewable Energy

Summary Comment #3032: Commenters provided multiple recommendations for renewable energy development to minimize impacts to greater sage-grouse, as well as other birds and raptors. Specific recommendations included installing bird deterrent devices on all guy wires, avoid siting temporary meteorological towers near leks or greater sage-grouse habitat, and siting wind energy development outside key habitat areas at least 5 miles from active leks, and 4 miles from the perimeter of greater sage-grouse winter habitat. Commenters urged the BLM to exclude wind energy development in key habitat areas under the Preferred Alternative. Commenters also suggested excluding development in raptor concentration areas.

Commenters recommended the BLM recognize the value of wind energy to the American public and reconsider how some of the adverse impacts to wind energy are characterized. Commenters noted how wind energy projects can be designed to reduce surface disturbance and construction scheduled to limit disturbances to wildlife and their habitat. Commenters suggested not all viewers consider wind turbines as having a negative effect on the landscape.

Summary Response: The BLM complied with the NEPA by including a discussion of measures that may mitigate adverse environmental impacts of the alternatives in the Supplement. Taking certain actions such as those

suggested by commenters, are only some of many potential forms of mitigation. The BLM must include mitigation measures in an EIS pursuant to the NEPA; yet the BLM has full discretion in selecting which mitigation measures are most appropriate and those that are not. The BLM has reviewed the suggested reports, data, articles, and recommendations to determine if they are substantially different than the information cited in the Supplement. The commenters' additional information was found to provide the findings as already noted in the Supplement, therefore inclusion and consideration would not substantially alter the conclusions or analysis. Therefore, they were not incorporated into the Proposed RMP and Final EIS.

The BLM considers wind to be a valuable energy source however; the purpose of the Supplement is to specifically address the goals, objectives, and measures for conservation of greater sage-grouse and their habitat. All ROW applications, including wind energy will be reviewed on a case-by-case basis, to balance protection of resources with America's wind energy needs.

Rights-of-Way and Corridors

Summary Comment #3033_1: Commenters voiced concerns regarding BMPs and/or RDFs, specifically co-location of transmission lines and use of perch discouragers. Commenters also recommended the BLM obtain additional information on BMPs from the Avian Power Line Interaction Committee (APLIC) and USFWS regarding greater sage-grouse for incorporation in the RMP. Commenters also expressed concern over BMPs that have not been peer reviewed or that may not always be feasible. In general, commenters asked the BLM to be flexible when prescribing measures during implementation.

Commenters rejected the BLM proposed ACEC designation for sage-grouse habitat because it violates access to existing rights, requesting that existing and pending access to ROWs and existing facilities be excluded from ACEC designation. Commenters suggested ROW and corridor management should be consistent with EO 2011-5. Other commenters supported management prescriptions for ROWs and corridors to protect greater sage-grouse habitat under either Alternative E or Alternative F. Commenters also suggested removing ROW avoidance and mitigation areas from OGMAs, separating the analysis for ROW avoidance and mitigation areas to clarify the areas to be avoided or that require mitigation, and that there was a lack of analysis presented of restrictions on ROWs.

Commenters offered new information for BLM to consider regarding the interaction between transmission lines and sage-grouse such as the APLIC studies. Commenters also supplied information disputing the effectiveness of perch discouragers preventing predation of greater sage-grouse, suggesting the BLM employ alternative

measures. Commenters noted there was a lack of information on the effects of tall structures on greater sage-grouse, requesting the BLM work with the industry to better understand decision-related impacts on the species as well as industry. Other commenters requested distribution lines be buried in the greater sage-grouse priority habitat areas and encouraged the use of perch discouragers on above-ground lines.

Summary Response:

The BLM developed the Supplement with involvement from cooperating agencies, including WGFD, Wyoming Governor's office, USFWS, and local agencies/governments to ensure a balanced multiple-use management strategy addresses the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands. The BMP and RDF lists are not exhaustive, other methods may also be appropriate and the BLM will review additional BMPs such as those from APLIC documents. In addition, Appendix L will be supplemented as technology and understanding of greater sage-grouse advance. The RDFs in Appendix L are from BLM's Greater Sage-Grouse NTT and cannot be revised in order to provide Bureau-wide consistency. However, during implementation the site-specific situation shall be considered including effectiveness of the design feature as well as technical and economic feasibility. The BLM's Proposed RMP is consistent with EO 2011-5.

The BLM complied with its multiple-use mandate by evaluating an appropriate balance of resource uses, which involves tradeoffs between competing uses. The Supplement was targeted specifically to address goals, objectives, and conservation measures to conserve greater sage-grouse and to respond to the potential of its being listed (see Section 1.0, Purpose and Need). The Supplement included alternatives that provide a greater and lesser degree of restrictions in various use programs, but would not eliminate or invalidate any valid existing development rights.

Before beginning the Supplement and throughout the planning effort, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the Bighorn Basin Planning Area are substantially different from the data needed to support site-specific analysis of projects. The information presented in map and table form is sufficient to support the broad scale analyses required for land use planning. As a result of these actions, the BLM gathered the necessary data essential to make a reasoned choice among the alternatives analyzed in detail in the Supplement, and provided an adequate analysis that led to an adequate disclosure of the potential environmental consequences of the alternatives (Chapter 4). A land use planning-level decision is broad in scope and, therefore, does not

require an exhaustive gathering and monitoring of baseline data. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

The Supplement provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives. The Supplement provided sufficiently detailed information to aid in determining whether to proceed with the Preferred Alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1. Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The Supplement contains only planning actions and does not include any implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions. Finally, the BLM's National Operation Center conducted management zone and range-wide cumulative effects analyses and is included in the Proposed RMP and Final EIS.

Summary Comment #3033_2: Commenters questioned the management to bury multiple pipelines of different operators within greater sage-grouse priority habitat areas and the legal implications.

Commenters do no support limitation on new ROWs corridors within the project area, requesting that BLM identify ROW exclusion and avoidance areas as major constraints for oil and gas development.

Commenters were concerned about management that would require burying transmission lines in greater sage-grouse habitat as realistic because it may not be feasible for several reasons including economics, engineering, and environmental, and violated existing rights. Commenters also stated that ROWs for buried transmission lines would likely be wider than those of above-ground transmission lines, leading to more surface and habitat disturbance during construction as well as maintenance. Commenters also had concerns

about co-locating powerlines within existing ROWs, which conflicts with requirements, policies and guidelines defined by the North American Electric Reliability Corporation and the Federal Regulatory Energy Commission.

Commenters noted that certain existing transmissions lines did not appear on the Supplement's maps and requested they be included in the current ROW corridor designations.

Summary Response:

Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The Supplement contains only planning actions and does not include any implementation actions. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

The ROW and corridors maps have been updated since the release of the Draft RMP and Draft EIS. The maps show designated ROW corridors under each alternative, as proposed in management action 6033. Corridors are the preferred locations for the placement of new ROW. Existing ROWs may or may not be located within these corridors and are not displayed on the maps. Additionally, the BLM revised as requested, Management Action 9 (renumbered as 7186 in the Proposed RMP and Final EIS) as well as Management Action 6033 (number did not change).

Riparian-Wetland

Summary Comment #3034:

Commenters submitted recommendations from other RMP amendments for incorporation in the Proposed RMP and Final EIS for riparian-wetland management. A commenter further suggested adding additional measures such as prohibiting new range improvement projects within 0.5 mile of water and riparian-wetland areas to avoid perching locations for raptors to prevent predation of greater sage-grouse and controlling invasive species.

Commenters indicated the impact analysis for riparian-wetland areas was flawed asserting proper functioning condition was rarely achieved, a minimal standard, and did not respond to fisheries or wildlife habitat needs. In addition, commenters suggested management prescriptions be strengthened to protect those riparian areas that do meet proper functioning condition.

Commenters provided scientific citations supporting livestock grazing impacts on wetland-riparian areas, specifically that grazing affects efforts to maintain proper functioning condition and monitoring should focus on riparian areas, and that BLM should not rely on placing salt blocks in upland areas to draw livestock away from riparian-wetland areas.

Summary Response: The Supplement only included management actions related to the Key Habitat Areas and PHMAs ACECs. The Draft RMP and Draft EIS included management actions specific to riparian/wetland resources, as does the Proposed RMP and Final EIS.

While the BLM used a consistent method for developing alternatives, the specifics of each sub-region necessitated modification of the range of alternatives to accommodate locality and population differences. In response to the greater sage-grouse management objectives described in the 2006 WAFWA *Greater Sage-grouse Comprehensive Conservation Strategy*, many reports have been prepared for the development of management recommendations, strategies, and regulatory guidelines. The 2011 NTT report, the 2013 Conservations Objectives Team (COT; USFWS 2013), and the 2013 Summary of Science, Activities, Programs and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse (also referred to as BER; Manier et al. 2013) are the most widely used reports that were incorporated in the Supplement to address the effects of implementing greater sage-grouse conservation measures on public lands.

Socioeconomic Resources

Summary Comment #3036_1: Commenters expressed concern regarding the socioeconomic impacts as a result of ACEC designation on multiple land uses under alternatives E and F, in particular voicing concern that the economic impacts were not accurately portrayed. Commenters also felt that the BLM tried to align alternatives D and F but cannot do so because of the differences in management prescriptions between the alternatives. Commenters requested BLM conduct additional analysis comparing alternatives, update information, incorporate supplied data, and provide supporting information for conclusions. Commenters requested the BLM also address socioeconomic impacts of management to and from land uses including oil and gas development, bentonite mining, livestock grazing, locatable minerals, and EOR development. Other commenters requested that the BLM include economic information and studies on the impacts of hunting, fishing, and the outdoor industry to the local economies in the Bighorn Basin. The commenters added that IMPLAN does not offer the most comprehensive impact analysis and that proposed management was inconsistent with EO 2011-5.

Commenters also pointed out that requiring validity exams in withdrawn or segregated lands could adversely impact small businesses since the ACECs overlap areas with high to moderate locatable mineral potential, which was not addressed, and could put the Proposed RMP at risk of invalidation.

Commenters also requested the BLM conduct further analysis regarding the socioeconomic cumulative impacts to the Bighorn Basin based on restrictions on land uses, in particular, loss of revenue from mineral development and closing public lands to livestock grazing. Other commenters raised issues regarding livestock grazing and how designation of ACECs will affect current and future livestock grazing management. Other commenters asked how the BLM would place an economic value on the social impact of restrictions on livestock grazing.

Commenters also voiced support for management included in the Supplement related to livestock grazing, asserting the value of public lands is often overestimated, not accounted for or could present opportunities for administrative cost savings for BLM.

Summary Response:

The BLM has provided an adequate analysis of potential economic impacts with the RMP; see Chapter 3 and 4, and Appendix Q. The changes suggested by some commenters (e.g., high social impacts in Alt E and F) are driven by the supposition of substantial economic impacts in bentonite, oil/gas, and grazing in Alternatives E and F. The quantitative data provided by BLM do not indicate there would be substantial differences between Alternative E and B, or between Alternative F and D. The differences that are present are reflected in the revised analysis.

The Supplement provides an adequate discussion of the environmental consequences, including the cumulative impacts, of the presented alternatives. As required by 40 CFR 1502.16, the Supplement provides a discussion of the environmental impacts of the alternatives including the proposed action, any adverse environmental effects that cannot be avoided should the alternatives be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. The Supplement provided sufficiently detailed information to aid in determining whether to proceed with the Preferred Alternative or make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.1.

Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use

Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The EIS contains only planning actions and does not include any implementation actions. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

Summary Comment #3036_2: Commenters were concerned that the BLM did not adequately reflect the socioeconomic impacts to local communities from limiting land uses such as oil and gas development and livestock grazing. Commenters remarked that revenue from oil and gas activities, mining, employment, property taxes, recreation, etc., could not be replaced from other revenue streams. Commenters requested BLM conduct additional analysis regarding the loss of tax royalties paid by oil and gas companies and associated impacts on the local communities. Commenters recommended the BLM develop and include a monitoring and mitigation plan in the Record of Decision, due to the anticipated socioeconomic impacts, especially smaller communities in the Planning Area.

Summary Response: Land use plan-level analyses are typically broad and qualitative rather than quantitative or focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The Supplement contains only planning actions and does not include any implementation actions. A more quantified or detailed and specific analysis would be required only if the scope of the decision included implementation actions.

As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The site-specific analyses will tier to the plan-level analysis and expand the environmental analysis when more specific information is known. In addition, as required by NEPA, the public will be offered the opportunity to participate in the NEPA process for implementation actions.

Special Status Species

Summary Comment #3038: Commenters requested active raptor nests be defined to include nests that have been active within the past seven years and winter roost sites. Commenters also requested the Proposed RMP and Final EIS address golden eagle populations and use in the planning area, as

well as prohibit surface-disturbing activities with 1 mile of golden eagle nests.

Summary Response: Thank you for your comment. The comment is outside the scope of the Supplement to the Bighorn Basin Draft RMP, a targeted analysis specifically addressing goals, objectives, and conservation measures to conserve greater sage-grouse and to respond to the potential of its being listed. Analysis for raptor protections are in compliance with the United States Fish and Wildlife Service recommend spatial and seasonal buffer zones to avoid or minimize disturbance and the risk of take.

Trails and Travel Management

Summary Comment #3039_1: Commenters had concerns about seasonally closing roads in greater sage-grouse priority habitats because it could present safety concerns for existing facilities and that eliminating access would violate existing rights. In addition, commenters requested that the BLM allow seasonal access for emergency repairs and maintenance. Commenters stated travel management prescriptions were inconsistent with EO 2011-5 and should be eliminated or modified consistent with the EO.

Commenters discouraged management prohibiting new roads within 1.9 miles from active leks, indicating it could negatively impact utility response, delivery, and maintenance requesting BLM provide for exceptions. Commenters also requested BLM provide citations supporting the buffers required for road construction. Commenters recommended limiting motorized use to existing roads and trails pending travel management planning. Commenters recommended tertiary roads be located further than 0.6 mile from active leks and other important greater sage-grouse habitat. Commenters expressed support for closing unnecessary routes and trails utilizing reclamation practices to benefit wildlife habitat.

Summary Response: The BLM has identified Alternative D as its Proposed RMP, which is consistent with the Wyoming Governor's EO 2011-5. EO 2011-5 has been determined sufficient to conserve greater sage-grouse throughout Wyoming and WAFWA Management Zones I and II.

Before beginning the Supplement to the Bighorn Basin Draft RMP and Draft EIS and throughout the planning effort, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the Bighorn Basin Planning Area are substantially different from the data needed to support site-specific analysis of projects. The Supplement data and information is presented in map and table form and is sufficient to support the broad scale analyses required for land use planning.

The BLM used the most recent and best information available that was relevant to a land-use planning-level analysis including the BER (BER; Manier et al. 2013). The BER assisted the BLM in summarizing the effect of the planning efforts at a range-wide scale, particularly in the affected environment and cumulative impacts sections. The BER looked at each of the threats to greater sage-grouse identified in the USFWS's "warranted but precluded" finding for the species. For these threats, the report summarized the current scientific understanding, as of report publication date (June 2013), of various impacts to greater sage-grouse populations and habitats. The report also quantitatively measured the location, magnitude, and extent of each threat. These data were used in the planning process to describe threats at other levels, such as the sub-regional boundary and WAFWA Management Zone scale, to facilitate comparison between sub-regions. The BER provided data and information to show how management under different alternatives may meet specific plans, goals, and objectives.

Summary Comment #3039_2: Commenters voiced concern about BMPs and/or RDFs in Appendix L, in particular those that require heliportable seismic exploration, when seasonal restrictions would suffice and have less impact. Commenters indicated that BLM defer decisions regarding road locations on split estate lands to the private landowner. Other commenters stated that telemetry or remote monitoring alone was not sufficient in all cases and recommended BLM consider operational and economic factors before implementation of this RDF.

Summary Response: The BLM developed the Supplement to the Bighorn Basin Draft RMP and Draft EIS with involvement from cooperating agencies, including WGFD, Wyoming Governor's office, USFWS, and local agencies/governments to ensure that a balanced multiple-use management strategy addresses the protection of greater sage-grouse while allowing for utilization of renewable and nonrenewable resources on the public lands. The RDFs in Appendix L are from BLM's Greater Sage-Grouse NTT. To provide Bureau-wide consistency the recommendations cannot be revised. However, during implementation the site-specific situation shall be considered including effectiveness of the design feature as well as technical and economic feasibility. The BLM's Proposed RMP is consistent with the Wyoming Governor's EO 2011-5 that has been determined sufficient to conserve greater sage-grouse throughout Wyoming and WAFWA Management Zones I and II.

Vegetation

Summary Comment #3042: Commenters provided justification and scientific data supporting the use of Ecological Site Descriptions instead of Historical Climax Plant Community, for restoration and habitat management. Commenters felt Ecological Site Descriptions provided a better assessment of

change over time and response following disturbance, and standardized data collection and analysis for addressing ecosystem health.

Commenters expressed opposition to language used for managing thatch, indicating it reflected negatively on livestock grazing management. Commenters suggested revisions and/or requested the management not be included in the Proposed RMP and Final EIS. Commenters recommended removing text in the impact analysis, stating it was redundant because the BLM is already required to determine if rangeland health standards are being met. Commenters identified technical edits to BMPs in Appendix L, including requests to use alternative language and corrections to technical terms.

Commenters questioned if vegetation treatments proposed to improve greater sage-grouse habitat were beneficial to the recovery of the species or a threat. Specifically, commenters suggested further evaluation and testing was necessary to substantiate the impacts, whether adverse or beneficial. Commenters further advised prohibiting vegetation treatments with 3 miles of lek sites and including one alternative that targets a 10.2-inch residual summer height during nesting season.

Summary Response:

Vegetation management is conducted using Ecological Site Descriptions developed by the Natural Resources Conservation Service, and the concept of Historic Climax Plant Community is an integral part of the Ecological Site Description in the state and transition model. The BLM revised Management Action 4030 in the Proposed RMP to reference plant community state or phases based on Ecological Site Descriptions.

The Supplement provided analysis of the effects of each alternative as required by NEPA and provides an adequate discussion of the environmental consequences of the presented alternatives. The Supplement contains only planning actions and does not include any implementation actions. As specific actions that may affect the area come under consideration, the BLM will conduct subsequent NEPA analyses that include site-specific project and implementation-level actions. The public will be offered the opportunity to participate in the NEPA process for implementation actions. The BLM considers impacts to sensitive species during site-specific analysis of grazing renewals and Standard 4 of Standards for Healthy Rangelands and Guidelines for Livestock Grazing applies to special status species habitat.

See the Wyoming Governor's EO 2011-5 for clarification on sagebrush treatments and their relation to disturbance. The BLM has identified Alternative D as its Proposed RMP in the Final EIS, which is consistent with EO 2011-5. Further, the BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under

the Governor's EO 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where greater sage-grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and greater sage-grouse conservation objectives; and 3) identify appropriate site-based action to achieve greater sage-grouse conservation objectives within the framework.

The RDFs in Appendix L are from BLM's Greater Sage-Grouse NTT and to provide Bureau-wide consistency the recommendations cannot be revised. During implementation the site-specific situation will be considered on a project specific basis.

Visual Resource Management

Summary Comment #3043: Commenters requested the BLM correct the Alternative F VRM Class II boundary for the Sheep Mountain Anticline ACEC to provide an additional 0.25-mile buffer from the adjacent VRM Class IV area so it includes all the bentonite potential areas depicted in the BLM's bentonite potential GIS file.

Summary Response: Thank you for your comment. The comment is outside the scope of the Supplement to the Bighorn Basin Draft RMP and Draft EIS, a targeted analysis specifically addressing goals, objectives, and conservation measures to conserve greater sage-grouse and to respond to the respond to the potential of its being listed.

All GIS maps, data, and information have been updated for the Proposed RMP and Final EIS.

Water

Summary Comment #3044: Commenters questioned NTT RDFs related to water impoundments and management of produced water, noting the RDFs were duplicative of programs under the jurisdiction of state agencies. Commenters expressed concern that removal or reinjection of produced water would result in loss of habitat and water sources for greater sage-grouse. Commenters asked for clarification on how RDFs will interface with NSO and CSU requirements, where the RDFs apply (in greater sage-grouse priority habitat only or both priority and general habitats), and if there will be a process for granting waivers, exceptions or modifications.

Summary Response: The NTT report (or BER, or COT) is not the sole source of management decisions for the range of alternatives. The NTT was formed as an independent, science-based team to ensure that the best information about how to manage the greater sage-grouse is reviewed, evaluated, and provided to the BLM in the planning process. The group produced a report in December 2011 that identified science-based

management considerations to promote sustainable greater sage-grouse populations. The NTT is staying involved as the BLM work through the strategy to make sure that relevant science is considered, reasonably interpreted, and accurately presented; and that uncertainties and risks are acknowledged and documented.

A baseline environmental report, titled *Summary of Science, Activities, Programs, and Policies That Influence the Rangewide Conservation of Greater Sage-grouse (Centrocercus urophasianus)* (referred to as the BER), was released on June 3, 2013, by the U.S. Geological Survey. The peer-reviewed report summarizes the current scientific understanding about the various impacts to greater sage-grouse populations and habitats and addresses the location, magnitude, and extent of each threat. The BER does not provide management options. The report is being used by the BLM in our efforts to develop regulatory mechanisms and improve our conservation efforts of the greater sage-grouse and its habitat to reduce the potential for listing it under the ESA. The data for this report were gathered from BLM, and other sources and were the "best available" at the range-wide scale at the time collected. The report provides a framework for considering potential implications and management options, and demonstrates a regional context and perspective needed for local planning and decision-making.

In March 2012, the USFWS initiated a collaborative approach to develop range-wide conservation objectives for the greater sage-grouse to inform the 2015 decision about the need to list the species and to inform the collective conservation efforts of the many partners working to conserve the species. In March 2013, this team of State and USFWS representatives, released the COT report based upon the best scientific and commercial data available at the time that identifies key areas for greater sage-grouse conservation, key threats in those areas, and the extent to which they need to be reduced for the species to be conserved. The report serves as guidance to federal land management agencies, State greater sage-grouse teams, and others in focusing efforts to achieve effective conservation for this species.

The range of alternatives is based upon analysis of public scoping comments as well as information provided in the NTT report, the BER, the COT report, and State management plans. The alternatives represent different degrees of and approaches to balancing resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. For example, Alternatives E and F incorporates adjustments to the NTT report (NTT 2011) based on cooperating agency input to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet

ongoing programs and land uses. Anthropogenic surface disturbance would be managed not to exceed 3 percent in ecological sites that support sagebrush within Preliminary Priority Habitat (Figure 2-1, Ecological Sites Supporting Sagebrush in Preliminary Priority Habitat, in Appendix B, Figures).

Greater sage-grouse conservation measures in *A Report on National Greater Sage-grouse Conservation Measures* (NTT 2011) were used to form BLM management direction under alternatives E and F, which is consistent with the direction provided in BLM Washington Office IM 2012-044.

Wild Horses

Summary Comment #3045: Commenters expressed concern that management for greater sage-grouse habitat objectives in HMAs should include managing wild horses at minimum population levels to address impacts on range conditions from wild horses. Further, commenters suggested revising HMA management within Key and Priority habitats to prioritize evaluation of Appropriate Management Levels.

Commenters asked that language in the Supplement acknowledging the impacts of wild ungulates (including wild or feral horses) on the quality and composition of key forage species be incorporated in the *Fish and Wildlife Resources – Wildlife* section of the Proposed RMP and Final EIS.

Summary Response: Management Action 4145 was revised to require inclusion of greater sage-grouse objectives in HMA plan updates. In addition, language was revised to acknowledge that management challenges for big game species include poor habitat conditions, fire management, drought, increased development and urbanization, habitat fragmentation, invasive species, motorized vehicle misuse, disease, hunter access, and the impacts of livestock, wildlife, and ungulate grazing and browsing on the frequency, quality, and composition of key forage species.

Wilderness Characteristics

Summary Comment #3046: Commenters expressed concern over designation of lands with wilderness characteristics indicating the inventory was inadequate and should be updated. Commenters noted that some proposed lands with wilderness characteristics do not have wilderness characteristics because the viewshed requirements are not being met and they contain roads and other man-made structures. Commenters asked for clarification regarding the "scale" of analysis of lands with wilderness characteristics and requested that the BLM only use one scale for the analysis. Commenters felt management that called for restoration of roads and trails in greater sage-grouse priority habitat

would lead to "rewilding" of areas that no longer contain or are not being managed for wilderness characteristics, stating this management did not comply with the BLM's multiple use mandate.

Commenters requested special management prescriptions for greater sage-grouse PHMAs located within lands with wilderness characteristics and areas recommended in the Citizens' Wilderness Proposal, to protect greater sage-grouse and wilderness character. Commenters identified 22 lands with wilderness characteristics and 6 Citizens' Wilderness Proposals that contain greater sage-grouse PHMAs and recommended stipulations for motorized and mechanized vehicle use, VRM, mineral and oil and gas leasing, geophysical exploration, mineral materials disposal, ROWs, and renewable energy. Commenters presented supporting information for implementing the special restrictions to protect greater sage-grouse, citing several technical documents. Commenters also submitted additional information for the BLM to consider about the Citizens' Wilderness Proposal areas.

Summary Response: Thank you for your comment. The comment is outside the scope of the Supplement to the Bighorn Basin Draft RMP, a targeted analysis specifically addressing goals, objectives, and conservation measures to conserve greater sage-grouse and to respond to the respond to the potential of its being listed.

The BLM has identified Alternative D as the Proposed RMP in the Final EIS, which does not designate Key Habitat Areas or PHMA ACECs, nor does it manage lands to maintain wilderness characteristics; these areas would be managed consistent with management for other resources and resource uses. Alternative D is consistent with the Wyoming Governor's EO 2011-5.

Wildlife

Summary Comment #3049: Commenters requested that BLM consider multiple published articles and guidance regarding wildlife and greater gage-grouse, noting several relevant articles on greater gage-grouse were not cited.

Commenters identified seven important bird areas for inclusion in the RMP, providing information about the areas and noting that several overlap greater sage-grouse PHMAs, emphasizing the ecological importance of these areas for greater sage-grouse and critical avian habitat.

Commenters were confused by restrictions on locatable minerals due to closure of big game crucial winter range, questioning the BLM's authority to manage game species and discretion to restrict development in big game habitat.

Commenters suggested the BLM clarify what "closed" meant, recognize WGFD's responsibility for game management, and support cooperative management where wildlife concerns exist.

Commenters indicated impacts on greater gage-grouse were overstated, asserting recent studies confirmed this assertion, suggesting ROW restrictions were not necessary, and that restrictions and/or mitigation should be specific to greater gage-grouse and based on valid science.

Summary Response:

BLM reviewed the suggested reports/data/articles to determine if they are substantially different from the information cited in the Supplement. The commenters' additional information was found to provide the general findings as already noted in the Supplement, therefore inclusion and consideration would not substantially alter the conclusions or analysis. Therefore, they were not incorporated into the Proposed RMP and Final EIS.

The BLM acknowledges that WGFD manages wildlife within Wyoming, while the BLM focus is on managing habitat. The BLM will continue to work with the WGFD to meet state wildlife population objectives.

The BLM complied with the NEPA by including a discussion of measures that may mitigate adverse environmental impacts of the alternatives in the RMP and EIS. See 40 CFR 1502.14(f), 1502.16(h). Potential forms of mitigation include: (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or (5) compensating for the impact by replacing or providing substitute resources or environments. (40 CFR 1508.20)

Taking certain actions are only some of many potential forms of mitigation. The BLM must include mitigation measures in an EIS pursuant to the NEPA; yet the BLM has full discretion in selecting which mitigation measures are most appropriate, including which forms of mitigation are inappropriate.

4.3. Non-Substantive Comments

In addition to the substantive comments summarized and responded to above, the BLM received numerous non-substantive comments during the comment period. In accordance with the BLM NEPA Handbook (H-1790-1), a formal response to non-substantive comments is not required; however, the BLM has reviewed and acknowledges all received comments. Non-substantive comments generally included:

- Comments in favor of or against management alternatives and allocations without reasoning that meet the criteria for substantive comments (such as: we disagree with the Preferred Alternative and believe the BLM should select Alternative C);
- Comments that only agreed or disagreed with BLM policy or resource decisions without justification or supporting data that meet the criteria for substantive comments (such as: the BLM needs to better manage oil and gas development in the Planning Area);
- Comments that did not pertain to the Bighorn Basin Planning Area;
- Comments that were outside the scope of analysis for the RMP and EIS (such as comments related to revision and update of laws, policies, and regulations);
- Comments that take took form of vague, open-ended questions or statements that did not meet the criteria for substantive comments; and
- Comments submitted during the comment period for the Supplement that focused on the Draft RMP and Draft EIS rather than the supplement.

5.0 CONCLUSION

The BLM integrated the content of the Supplement into the Draft RMP and Draft EIS, revised the combined document, and prepared the Proposed RMP and Final EIS in response to substantive comments received during both comment periods. The BLM will continue to consider public, agency, and other stakeholder comments through completion of the Bighorn Basin RMP Revision Project, as appropriate.

Proposed Resource Management Plan and
Final Environmental Impact Statement

Comment Analysis Report

Attachment A

Draft Resource Management Plan and
Draft Environmental Impact Statement

Commenter Response Index

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Attachment A – Draft Resource Management Plan and Draft Environmental Impact Statement
Commenter Response Index

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Attachment A – Draft Resource Management Plan and Draft Environmental Impact Statement Commenter Response Index

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ATTACHMENT A

COMMENTER RESPONSE INDEX

1.0 INTRODUCTION

The tables presented in Attachments A and B are provided to assist commenters in finding their submitted comments and identifying the associated BLM comment summary and response in the Comment Analysis Report. Table A-1 provides a list of first and last names of commenters, the commenter's affiliation (if applicable), and the commenter's comment document number. PDF copies of all received comment documents are located on the BLM website: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html. Within Attachment B, also located at the above website, Table B-1 includes all individual substantive comments and identifies the BLM summary comment and response number associated with individual comments, organized by comment document number.

To use these tables:

1. Locate your name and associated comment document number in Table A-1.
2. Using the comment document numbers from Table A-1, go to Attachment B on the BLM website address provided above and find your identified individual comment(s), comment text, and BLM summary comment and response numbers in Table B-1.
3. The BLM summary comment/response numbers match those provided in Section 4.2.1 of the Comment Analysis Report.

With this information (comment document number, comment number, and summary comment and response number) commenters can locate a copy of their original comment document on the BLM website, their individual comments in Attachment B, and BLM summary comments and responses in Section 4.2.1 of the Comment Analysis Report.

Table A-1. Index of Commenters

Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Abell	Stanton J.	Unaffiliated Individual	10105
Abell	Linda K.	Unaffiliated Individual	10106
Ackerly	Elaine	Unaffiliated Individual	10325
Admidin	Gene	Unaffiliated Individual	10559
Ahalt	Susan	Ironside Bird Rescue, Inc.	10022
Akin	Allen	Unaffiliated Individual	10526
Alameda	Glen	Wyoming State Grazing Board Central Committee	10216
Allard	Bret	Unaffiliated Individual	10042
Anderson	Clarence	Unaffiliated Individual	10343
Anderson	Lance	Unaffiliated Individual	10491
Anderson	Colleen	Unaffiliated Individual	10036
Anderson, MD	Richard	Unaffiliated Individual	10063

Attachment A – Draft Resource Management Plan and Draft Environmental Impact Statement
Commenter Response Index

Table A-1. Index of Commenters (Continued)

Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Andrews	Bonnie	Unaffiliated Individual	10444
Andromidas	Jorge	Unaffiliated Individual	10049
Andrus	Melanie	Unaffiliated Individual	10460
Anonymous		Unaffiliated Individual	10533
Babcock	Nancy	Unaffiliated Individual	10571
Baird	John	Unaffiliated Individual	10298
Baker	Mary	Unaffiliated Individual	10245
Baker	LeAnn	Washakie Development Association	10285
Baker	Mike	Hot Springs County Commission	10404
Bales	Shirley	Unaffiliated Individual	10124
Ball	Gene	Unaffiliated Individual	10149
Ballinger	Garry	J&R Well Service	10509
Ballwanz	Gerri	Unaffiliated Individual	10451
Balyo	Scott	Cody Country Chamber of Commerce	10386
Bannon	Joy	Wyoming Wildlife Federation	10283
Barski	Joe	Unaffiliated Individual	10046
Bassett	Tom	MOC	10102
Beatty	Brenda	Unaffiliated Individual	10355
Bebout	Eli	State Of Wyoming Legislature	10030
Bebout	Eli and Rep. Tom Lockhart	Joint Minerals, Business and Economic Development Interim Committee of the Wyoming Legislature	10278
Berryman	Carl	City of Powell	10029
Betters	Kathleen	Unaffiliated Individual	10453
Betters	Anthony	J&R Well Service	10550
Bighorn Basin Local Government Cooperating Agencies		Bighorn Basin Local Government Cooperating Agencies	10262
Bishop	Norman A.	Unaffiliated Individual	10173
Black	Joshua	Phoenix Production Company	10056
Blackburn	Kenneth G.	Unaffiliated Individual	10578
Blake	Nancy	Unaffiliated Individual	10442
Blakesley	Marvin	Gene R George and Associates Inc.	10059
Blakesley	Marvin	Unaffiliated Individual	10369
Blymer	Mike	Unaffiliated Individual	10214
Bohan	Suzanne	EPA Region 8	10261
Bolbol	Deniz	American Wild Horse Preservation Campaign	10479
Bolles	Randy	Devon Energy Corporation	10286
Booher	Sam	Unaffiliated Individual	10459
Boreen	Phil	Boreen Hay & Cattle Co. LLC	10402
Bowers	Carla	Unaffiliated Individual	10271
Branch	Colby	Unaffiliated Individual	10230
Braten	R. Gene and Judy	Unaffiliated Individual	10238
Brooks	John	Unaffiliated Individual	10182

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Brouillette	John and Louise	Unaffiliated Individual	10406
Brown	Rob	Unaffiliated Individual	10004
Brown	Matt and Teresa	Unaffiliated Individual	10275
Brown	Teresa	Unaffiliated Individual	10276
Brutger	Steve	Trout Unlimited	10281
Buck	Dina	Unaffiliated Individual	10336
Buller	Tom	Unaffiliated Individual	10557
Burke	Dave	Park County	10273
Burken	Allan	Unaffiliated Individual	10007
Butts	Gary	City of Powell	10579
Byrne	Brenda	Unaffiliated Individual	10161
Caines	Philip	Unaffiliated Individual	10377
Caldwell	David	Unaffiliated Individual	10127
Campbell	Scott	Unaffiliated Individual	10345
Canapp	Justin	Unaffiliated Individual	10504
Capozelli	J	Unaffiliated Individual	10290
Capron	Bob	Unaffiliated Individual	10323
Carlson	Jim	Unaffiliated Individual	10062
Carney	Mike and Karen	Unaffiliated Individual	10489
Carter	Yancy	Unaffiliated Individual	10556
Chapman	Diane	Unaffiliated Individual	10417
Cheatham	Kelly	J and R Well Service	10539
Class	Lonnie	Unaffiliated Individual	10496
Clifford	Adam	Unaffiliated Individual	10575
Cline	Shawn	Unaffiliated Individual	10473
Close	Dan	Unaffiliated Individual	10180
Clouse	John	Unaffiliated Individual	10316
Coggins	Sawyer	Cooley's Welding	10075
Conner	Seth	Cooley's Welding	10079
Cooley	Jim	Cooley's Welding	10082
Corkran	Dave and Char	Unaffiliated Individual	10234
Corra	John	Wyoming Department of Environmental Quality	10200
Corra	John	Wyoming Department of Environmental Quality	10225
Cowan	Kimberly	Unaffiliated Individual	10353
Cox	Trenton B.	Unaffiliated Individual	10146
Cozzens	Dee	Institute of Water Resources (IWR)	10031
Cozzens	R. Dee	Unaffiliated Individual	10095
Crawford	Gordon	Unaffiliated Individual	10132
Crumrine	Max	Unaffiliated Individual	10416
Cruz	Rosando	Cooley's Welding	10081
Cruz	Rosando	Cooley's Welding	10516
Culver	Nada	The Wilderness Society	10389
Curtis	Chad	Weatherford Completion Systems	10555

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Dale	Daniel	Unaffiliated Individual	10410
Dalin	Lisa	Unaffiliated Individual	10111
Darling	Kelly	Unaffiliated Individual	10485
Darlington	Toddi	NRPC (Natural Resource Planning Committee)	10032
Darlington	Toddi	Unaffiliated Individual	10329
Davis	Chad and Mary Jo	Unaffiliated Individual	10405
Deiss	Allory	Wyoming State Geological Survey	10280
Dellinger	Betty	Unaffiliated Individual	10472
Deromedi	Monica	Bighorn Basin Resource Alliance	10057
Deromedi	Shelley	Unaffiliated Individual	10120
Deromedi	Anthony and Monica	Unaffiliated Individual	10381
DeVries	Mark	JadeCo Electric	10544
Dewar	Pat	Unaffiliated Individual	10327
Dickinson	Marion	Unaffiliated Individual	10347
Dickson	Brian	Unaffiliated Individual	10109
Dillon	John	Unaffiliated Individual	10335
Dirks	Jewel	Unaffiliated Individual	10318
Dockery	Carl	H.S.C Farm Bureau and Family Farm-Ranch	10497
Doll	Thomas	Wyoming Oil and Gas Conservation Commission	10227
Dollard	Jerry	Unaffiliated Individual	10140
Dominick	Marshall	Unaffiliated Individual	10217
Dominick	Bettye	Unaffiliated Individual	10568
Donato	Scot	Bill Barrett Corporation	10375
Donham	Craig	Marathon Oil	10519
Douthett	Deborah	Unaffiliated Individual	10457
Dragon	Cynthia	Unaffiliated Individual	10116
Durney	Mike	J&R Well Service	10553
Eisen	Terry and John	Unaffiliated Individual	10148
Elias	Francisco	Unaffiliated Individual	10083
Ely	Pat and Johnna	Unaffiliated Individual	10317
Emmerich	John	Wyoming Game and Fish Department	10264
Emmett	Kim and Darwin	Unaffiliated Individual	10178
Entel	John	J and R Well Service	10541
Evans	Dinda	Unaffiliated Individual	10308
Evenson	Marilyn	Unaffiliated Individual	10160
Ewen	Jerold	Bighorn County Commissioners	10058
Ewen	Jerry	Big Horn County Commissioner	10384
Ewing	David	Ewing Exploration Company	10024
Fabia	Lisa Rose	Unaffiliated Individual	10470
Fader	Judith	Unaffiliated Individual	10206
Fauth	Paula	Unaffiliated Individual	10088
Fearneyhough	Jason	Wyoming Department of Agriculture	10481

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Feick	Duane	Wyoming BLM	10358
Ferlisi	Tony	Wyoming Wilderness Association	10268
Field	Patricia	Unaffiliated Individual	10324
Fink	Richard	Unaffiliated Individual	10101
Fisher	Mark	Unaffiliated Individual	10218
Fitzsimmons	Doneen	Unaffiliated Individual	10006
Fletner	Mary	Unaffiliated Individual	10035
Flitner	David	Flitner Ranch and Hideout Adventures	10409
Flowers	James	Unaffiliated Individual	10537
Frey	Travis	Marathon Oil Company	10003
Frick	Douglas	Unaffiliated Individual	10306
Frost	Sandra	Unaffiliated Individual	10210
Fry	Margaret	Unaffiliated Individual	10212
Galyan	Ellen	Unaffiliated Individual	10548
Garbin	Paul	Unaffiliated Individual	10247
Garrett	Rick	Unaffiliated Individual	10341
Garvey	Lydia	Unaffiliated Individual	10188
Garvey	Lydia	Unaffiliated Individual	10314
Gay	Susan	Unaffiliated Individual	10443
Gifford	Tom	Gifford Ranch LLC	10125
Gilbert	Bryce	Champion Technologies	10551
Gilmore	Rickey	J&R Well Service	10554
Gindice	Gary	Unaffiliated Individual	10099
Goldstein	Carol Ann	Unaffiliated Individual	10158
Good	Brian	Unaffiliated Individual	10322
Good	Mike	Unaffiliated Individual	10503
Greer	Julie	Unaffiliated Individual	10407
Greer	William	Unaffiliated Individual	10411
Griffith	Johnny	Unaffiliated Individual	10536
Grimes	Daphne	Unaffiliated Individual	10066
Groves	Linda	Unaffiliated Individual	10248
Grubbs	Kathy and David	Unaffiliated Individual	10310
Guynup	Sharon	Unaffiliated Individual	10438
Guzzi	Sherry and Ted	Unaffiliated Individual	10243
Haeseley	Ryan	Unaffiliated Individual	10092
Hale	Sharon	Unaffiliated Individual	10256
Halloran	Georgia	Unaffiliated Individual	10415
Hamilton	Wesley	Unaffiliated Individual	10122
Hamilton	Eleanor	Unaffiliated Individual	10211
Hamilton	Keith and Linda	Hamilton Ranch, INC	10387
Hamlin	Chris	Smith Oilfield	10499
Hammer	Douglas	Unaffiliated Individual	10257
Handelsman	Robert	Unaffiliated Individual	10018

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Hankee	Bill	Unaffiliated Individual	10187
Hanson	Vincent	Unaffiliated Individual	10315
Harvey	Ron	Washakie County Commissioners	10053
Harvey	Ron	Washakie County Commissioners	10482
Hassan	Helen	91 Ranch, A Wyoming Corporation	10089
Haubrich	Martin and Barbara	Unaffiliated Individual	10475
Hawthorne	Brian	Blue Ribbon Coalition	10370
Hay	Anne	Unaffiliated Individual	10071
Haywood	Evan	J&R Well Services	10494
Haywood	Heath	J & R Well Service	10524
Hecht	Scott	Unaffiliated Individual	10301
Heinze	Kendi	Unaffiliated Individual	10194
Heinze	Kendi	Thermopolis-Hot Springs County Economic Development Company (EDC)	10197
Henley	Bob	Unaffiliated Individual	10038
Henrichsen	Katherine	Unaffiliated Individual	10272
Henze	Fritz	Marathon Oil (BAR-T Electric)	10564
Herd	David	J&R Well Service	10510
Herman	Robert L.	Unaffiliated Individual	10026
Hessenthaler	Paul	Unaffiliated Individual	10121
Heyward	E	Unaffiliated Individual	10023
Heyward	Joslin	Unaffiliated Individual	10190
Hill	Eric	Unaffiliated Individual	10141
Hill	William Lee	Unaffiliated Individual	10179
Hill	William Lee	Unaffiliated Individual	10488
Hillberry	James	Unaffiliated Individual	10565
Hinckley	Ann	Unaffiliated Individual	10573
Hinebaugh	Josh	Cooley's Welding	10087
Holdsworth	Scott	Unaffiliated Individual	10535
Hooper	Jacob	Rochards Construction Contracting for MOC in Oregon Basin	10530
Hopkins	Elaine	Unaffiliated Individual	10462
Hopkins	Mary	Wyoming State Historic Preservation Office	10490
House	Glen	Unaffiliated Individual	10153
Hurt	Luc	Unaffiliated Individual	10478
Icenogle	Joseph	Fidelity Exploration and Production Company	10051
Inberg	Judy	Unaffiliated Individual	10192
Inman	Kate	Unaffiliated Individual	10309
Irelan	Shirley	Unaffiliated Individual	10228
Iverson	Taunya	Unaffiliated Individual	10342
Jachowski	Kathleen	Guardians of the Range	10383
Jacobsen	Andrew	Unaffiliated Individual	10436

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Jacobson	Harold and Agnes	Unaffiliated Individual	10039
Jeffries	Brian	Wyoming Pipeline Authority	10265
Jensen	Robert	Unaffiliated Individual	10114
Johansson	Isla	Unaffiliated Individual	10351
Johansson Murray	Ester	Unaffiliated Individual	10232
John	Murphy	Unaffiliated Individual	10138
John	Gallagher	Park County Pedalers Board of Directors	10577
Johnsey	Billy	Hoodoo Ranch	10449
Johnson	Bettie	ZE Ranch Co.	10143
Johnson	Jack	Unaffiliated Individual	10240
Johnson	Ruth Clare	V Ranch	10292
Johnson	Kim	Unaffiliated Individual	10304
Johnson	Ruth Clare	Unaffiliated Individual	10498
Jolley	Jacob	Unaffiliated Individual	10513
Jolovich	Anthony	Unaffiliated Individual	10244
Jolovich	Rudy	Unaffiliated Individual	10520
Jones	Joeann	Kirby Creek Ranch	10299
Jones	Steve	Meeteetse Conservation District	10371
Jordan	Judy	Unaffiliated Individual	10169
Joyce	Nancy	Unaffiliated Individual	10372
Kane	Stephen	Unaffiliated Individual	10382
Kane	Stephen	Unaffiliated Individual	10413
Kania	Amy	Town of Basin	10303
Kastel	Diane	Greater Yellowstone Coalition - Cody	10060
Kastel	Diane M.	Unaffiliated Individual	10156
Kathrens	Ginger	The Cloud Foundation	10376
Kattenhorn	Trever	Unaffiliated Individual	10562
Kavanaugh	Frank D.	Unaffiliated Individual	10151
Kawano	Evan	Unaffiliated Individual	10532
Kelso	George	Unaffiliated Individual	10401
Kenyon	Kris	Unaffiliated Individual	10441
Kerns	Ken	Unaffiliated Individual	10366
Kersten	Becky	Unaffiliated Individual	10269
Kesselheim	Donn and Chelsea	Unaffiliated Individual	10112
Kessler	Mark	Unaffiliated Individual	10507
Kidston	Justin	Unaffiliated Individual	10014
Kimes	Doug	Smith Oilfield	10500
Kimm	Taylor	Cooley's Welding	10084
Kinkol	Karen	Unaffiliated Individual	10171
Kirsch	James D.	Unaffiliated Individual	10186
Kirsch	James	Unaffiliated Individual	10313
Kisner	Al	Unaffiliated Individual	10456
Klimek	Tom	Unaffiliated Individual	10027

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Klym	David	Unaffiliated Individual	10235
Kolacny	Colt	Cooley's Welding	10078
Koval	Dave	Fidelity Exploration and Production Company	10177
Koval	Dave	Fidelity Exploration and Production Company	10487
Kress	Joseph	Unaffiliated Individual	10421
Krisjansons	Brigita	Unaffiliated Individual	10354
Kroehler	Corbett	Unaffiliated Individual	10175
Kroger	Richard	Worland BLM Retired Employees Coalition for Responsible Public Land	10388
Kunkle	Adam	Marathon Oil	10518
La Budda	Hilary	Unaffiliated Individual	10098
La Point	Peggy	Unaffiliated Individual	10242
LaCognata	Dale	Unaffiliated Individual	10159
Laieski	Caleb	Unaffiliated Individual	10166
Lance	Ryan M.	Office of State Lands and Investments	10203
Lansford	Jamie	Unaffiliated Individual	10279
LaPrade	Becky	Unaffiliated Individual	10452
Lawrence	Charley	J and R Well Service	10543
Lawson	Matt	Unaffiliated Individual	10073
Lee	Mary Ellen	Unaffiliated Individual	10184
Lee	Bryon	Unaffiliated Individual	10430
Lee	Beth	Unaffiliated Individual	10469
Lefler	Susan	Unaffiliated Individual	10468
Lesher	Stacy	Prime Power	10542
Lichtendahl	Ken	Unaffiliated Individual	10196
Lindstrom	Loren	Unaffiliated Individual	10300
Lindstrom	Alison	Unaffiliated Individual	10463
Lindstrom	Loren	Marathon Oil Company	10493
Linebaugh	Josh	Unaffiliated Individual	10515
Little	Deb	Unaffiliated Individual	10380
Livingston	Ed	Unaffiliated Individual	10446
Loos	Karl	Smith Oil Field	10517
Lopez	Joe	Unaffiliated Individual	10511
Lout	Robert	Unaffiliated Individual	10241
Love	Jeanie	Unaffiliated Individual	10567
Lovell	Brandy	Unaffiliated Individual	10344
Lowery	Jeff	Cooley's Welding	10086
Lowry	Jeff	Cooley's Welding	10501
Loyning	Doug	Unaffiliated Individual	10433
Lumley	John	Hot Springs County Commissioners/ Park County Commissioners	10054
Lumley	John	Hot Springs County Commissioners	10363

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Luskin	Richard	Black Diamond, Inc.	10021
Macauley	Greg	Unaffiliated Individual	10154
MacDonald	Mary Lou	Unaffiliated Individual	10064
Magagna	Jim	Wyoming Stock Growers Association	10215
Magdanz	Susan	Unaffiliated Individual	10576
Magstadt	Rick	Wyo-Ben	10205
Magstadt	Rick	Unaffiliated Individual	10274
Mahoney	Kevin	Unaffiliated Individual	10357
Mangold	Scott	Powell, WY	10282
Martin	Steve	Unaffiliated Individual	10191
Martin	Lisa	Unaffiliated Individual	10331
Matteson	Kip	Unaffiliated Individual	10529
May	Jordan	Cooley's Welding	10074
May	Gerald	Unaffiliated Individual	10512
McArtor	Nancy	Unaffiliated Individual	10566
McCall	Carla	Unaffiliated Individual	10183
McColl	John	Unaffiliated Individual	10531
McCoy	Grace	Unaffiliated Individual	10013
McDonald	Jazmyn	Unaffiliated Individual	10431
McGee	Scott	Unaffiliated Individual	10137
McKee	Jan	US Fish and Wildlife Service	10574
McNair	Robert L.	Unaffiliated Individual	10163
Meabon	R.P.	Marathon Oil Company	10055
Meabon	Randy	Unaffiliated Individual	10249
Meabon	Dennis	Marathon Oil Co.	10558
Mead	Matthew	Office of the Governor	10139
Mead	Matthew	State of Wyoming	10364
Mechels	Sally	Unaffiliated Individual	10065
Menzel	Ben	Unaffiliated Individual	10117
Mesick	Kathleen	Unaffiliated Individual	10471
Metcalf	Peter	Black Diamond Equipment	10048
Meyer	Patricia	Greater Yellowstone Coalition - Cody	10067
Milek	Dorothy	Unaffiliated Individual	10378
Miller	Neil and Jennifer	Unaffiliated Individual	10414
Minemyer	Nick	Prime Power	10540
Mock	Kathy	Unaffiliated Individual	10538
Moeller	Susann	Unaffiliated Individual	10461
Monk	Sherie	Unaffiliated Individual	10425

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Monk	David	Unaffiliated Individual	10426
Moore	Sherry L.	Unaffiliated Individual	10167
Moore	Tom	Unaffiliated Individual	10204
Morrison	Bruce	Town of Lovell	10570
Mosely	Claire	Public Lands Advocacy	10263
Murphy	Warren	Unaffiliated Individual	10091
Myers	Rex	Unaffiliated Individual	10025
Myric	Matt	Richards Construction Inc.	10534
Naples	Jean Marie	Unaffiliated Individual	10157
Naumann	Chris	Unaffiliated Individual	10195
Neal	Chuck	Unaffiliated Individual	10113
Negus	Kevin	Unaffiliated Individual	10349
Nelson	Peter	Defenders of Wildlife	10379
Nelson	Jeff	Orchard Ranch	10439
Nelson	April	Orchard Ranch	10440
Neves	Kay	Unaffiliated Individual	10219
Neves	Dave	Unaffiliated Individual	10224
Neves	Mike	Unaffiliated Individual	10445
Nicholson	Jack	Unaffiliated Individual	10016
Nickola	Robert	Unaffiliated Individual	10246
Nielson	Glenn A.	Y-Tex Corporation	10164
Nistico	Leslie	Unaffiliated Individual	10450
Nordberg	Ronald	Unaffiliated Individual	10020
Norman	Bruce B	Unaffiliated Individual	10189
Norsworthy	Billie Jo and Jason	Unaffiliated Individual	10250
Norwick	Tom	Unaffiliated Individual	10011
Norwick	Tom	Unaffiliated Individual	10012
Nuttall	Rob	Unaffiliated Individual	10424
Nuttall	Dale	Unaffiliated Individual	10428
Olenik	Bryan	Unaffiliated Individual	10522
Olin	John	Unaffiliated Individual	10033
O'Mara	Kevin	Unaffiliated Individual	10107
Orchard	Robert	Orchard Ranch LTD	10231
Orme	Diane	Unaffiliated Individual	10287
Orr	Diane	Utah Rock Art Research Association	10135
Osborne	Sharon	Unaffiliated Individual	10185
Osgood	John	Unaffiliated Individual	10147

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Ozcan	John	Unaffiliated Individual	10288
Parker	William Harwar	Unaffiliated Individual	10291
Patla	Debra	Unaffiliated Individual	10435
Patrick	Nic	Unaffiliated Individual	10239
Patrick	Joyce	Unaffiliated Individual	10352
Patten	Leslie	Unaffiliated Individual	10045
Patterson	Cynthia	Unaffiliated Individual	10447
Pearson	Mark	Unaffiliated Individual	10340
Pedersen	Ryan	Unaffiliated Individual	10312
Peel	Deborah	Unaffiliated Individual	10455
Peirce	Susan	Unaffiliated Individual	10307
Pendry	Bruce	Greater Yellowstone Coalition/Wyoming Outdoor Council/The Wilderness Society	10152
Pensinger	LuRilla	Unaffiliated Individual	10226
Perry	Sean	Unaffiliated Individual	10080
Pfrangle	Louis	Unaffiliated Individual	10546
Phillips	Stuart	Unaffiliated Individual	10126
Phillips	Mandy	Unaffiliated Individual	10162
Powick	Kolin	Unaffiliated Individual	10043
Preator	Ryan	Cooley's Welding	10076
Pring	Jodee	Wyoming State Engineer's Office	10259
Quarberg	DeLoyd	Bighorn Ranch	10486
Radzicki	Dottie	Unaffiliated Individual	10350
Rageth	Marvin Brent and Sherri L.	Unaffiliated Individual	10110
Ralph	Elizabeth	Unaffiliated Individual	10437
Ratner	Jonathan	Unaffiliated Individual	10181
Ray	Chris	Unaffiliated Individual	10348
Raynolds	Linda	Unaffiliated Individual	10222
Reed	Linda	Unaffiliated Individual	10213
Reed	Kyle	J&R Well Service	10514
Reiswig	Barry	Unaffiliated Individual	10072
Reiter	Lee Ann	Unaffiliated Individual	10144
Renner	Rori	Unaffiliated Individual	10346
Rhodes	Donna	Unaffiliated Individual	10448
Rice	Dan	Unaffiliated Individual	10220
Rice	Dan	Washakie County Conservation District	10266
Richards	Susan	Unaffiliated Individual	10070
Ridgway	Richard	Elk Creek Ranch	10129
Robertson	Bill	Unaffiliated Individual	10118

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Robertson	Gene and Kris	Unaffiliated Individual	10484
Robinson	Janet	Unaffiliated Individual	10474
Rodgers	Lyle	Unaffiliated Individual	10254
Rosencranse	Jennifer	City of Cody	10260
S	Anne	Unaffiliated Individual	10429
Sackett	Dale	Unaffiliated Individual	10423
Sander	Dana	Unaffiliated Individual	10128
Sander	Dana	Unaffiliated Individual	10270
Sanders	Judith	Unaffiliated Individual	10476
Saylor	Marc	Fidelity Exploration and Production Company	10069
Schatz	Lynda	Unaffiliated Individual	10068
Scheffel	Phil and Sandy	Unaffiliated Individual	10193
Schilling	Bill	Wyoming Business Alliance - Wyoming Heritage Foundation	10047
Schmidtmann	Ed	Unaffiliated Individual	10432
Schwartz	Louise	Unaffiliated Individual	10155
Scott	Warren	Bentonite Performance Minerals, LLC	10385
Scott	Melvin	Unaffiliated Individual	10061
Scott	Warren	Lovell Mine - Bentonite Performance Minerals, LLC	10165
Scott	Mary	Unaffiliated Individual	10170
Secord	Reed	Unaffiliated Individual	10134
Shaffer	Raymond	Unaffiliated Individual	10221
Shaffer	Doug	Unaffiliated Individual	10320
Shea	Nancy	Unaffiliated Individual	10005
Shear	Kerry	Unaffiliated Individual	10465
Sheehan	Sean	Unaffiliated Individual	10420
Sheffield	Tim	Unaffiliated Individual	10508
Sheldon	Pam and Jack	Unaffiliated Individual	10302
Sherwood	Vance R.	Unaffiliated Individual	10174
Showalter	Dave	Unaffiliated Individual	10199
Showalter	Jason	Northstat Corp.	10549
Simmons	Patricia	Unaffiliated Individual	10545
Simpson	Ann	Unaffiliated Individual	10145
Sindelar	Mona L.	Unaffiliated Individual	10168
Siska Hjelmgren	Janice	Unaffiliated Individual	10467
Slover	David	Unaffiliated Individual	10097
Smith	Blake	Unaffiliated Individual	10131
Smith	Dallen	Livestock Systems	10207
Smith	Jack	Unaffiliated Individual	10208
Smith	Steven	Unaffiliated Individual	10297
Smith	Douglas	J&R Well Service	10506
Smith	Thor	Marathon Oil	10528
Soderberg	Nathan	Unaffiliated Individual	10523

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Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Solberg	Lisa	BLM, Wyoming State Office - Stationed at Pinedale Field Office	10359
Soldier Wolf	Mark	Northern Arapahoe Preservation Society (NAPS)	10233
Spomer	Skyler	Unaffiliated Individual	10505
Spomer	Greg	Unaffiliated Individual	10552
Staffanson	Robert	Unaffiliated Individual	10236
Stafford	John	Unaffiliated Individual	10237
Standridge	Rebecca	Unaffiliated Individual	10223
Starbuck	Jamie	Starbuck Ranch	10150
Steilen	Aaron	Unaffiliated Individual	10251
Steilen	Geordie	Unaffiliated Individual	10252
Steilen	Sherri	Unaffiliated Individual	10295
Steinmetz	Matthew	Unaffiliated Individual	10008
Steve	Brock	Shoshone Back Country Horsemen	10136
Stewart	Mara	Unaffiliated Individual	10289
Stockman	Olivia	Unaffiliated Individual	10130
Story		Unaffiliated Individual	10569
Stroh	Helen	Unaffiliated Individual	10009
Stroh	Gerald	Unaffiliated Individual	10010
Stuart	Pat	Unaffiliated Individual	10418
Stufflebeam	Judy	Unaffiliated Individual	10454
Stumpf	CJ	Unaffiliated Individual	10328
Sullivan	Roberta	Unaffiliated Individual	10115
Sunderland	Douglas	Unaffiliated Individual	10326
Sylvester	Joseph	Unaffiliated Individual	10572
Szewczyk	Les and Pat	Unaffiliated Individual	10108
Tarazon	Bill	Richards Construction	10527
Taylor	Wendy	Unaffiliated Individual	10094
Thagard	Neil	Theodore Roosevelt Conservation Partnership	10198
Thomas	Deb	Powder River Basin Resource Council	10373
Thomas	Carla	Unaffiliated Individual	10434
Thompson	Brad	Cooley's Welding	10085
Thompson	Brad	Cooleys Welding Inc.	10560
Tokash	Joe	Unaffiliated Individual	10001
Tollman	Vicki	Unaffiliated Individual	10253
Tom	Paul	Marathon Oil	10123
Tonn	Matt	Progressive Construction, Inc.	10017
Torrey	Steve	Unaffiliated Individual	10483
Trask	Megan	Cirque Resources LP	10052
Turiano	Thomas	Unaffiliated Individual	10305
Turick	Pam	Unaffiliated Individual	10464
Ullman	Dee	Unaffiliated Individual	10296
Ulrich	Wallace	Wyoming State Geological Survey	10362

Attachment A – Draft Resource Management Plan and Draft Environmental Impact Statement
Commenter Response Index

Table A-1. Index of Commenters (Continued)

Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Urban	Dee	Unaffiliated Individual	10319
Urbonas	Wayne	Unaffiliated Individual	10356
Van Antwerp	Clay	Unaffiliated Individual	10330
Versloot	G.J.C.	Unaffiliated Individual	10477
Vezza	Matthew	Marathon Oil Company	10277
Vezza	Matthew	Marathon Oil	10333
Wagner	John	Wyoming Department of Environmental Quality	10400
Wahler	Randy	Natural Resource Planning Committee	10294
Wainscott	Michael	Unaffiliated Individual	10561
Walker	Carol	Unaffiliated Individual	10367
Waller	Breean	Unaffiliated Individual	10034
Waller	Jim	Bighorn County Mapping and Planning	10258
Walsh	Danny	Unaffiliated Individual	10050
Walsh	Ken	Marathon Oil Company	10492
Walter	Alison	Unaffiliated Individual	10427
Walz	Barbara	Tri-state generation and transmission association	10361
Wantulok	Owen	Unaffiliated Individual	10019
Wantulok	Owen	Unaffiliated Individual	10100
Wantulok	Janice	Unaffiliated Individual	10103
Ward	Paul	Hot Springs County Farm Bureau	10338
Ward	Ginger	Unaffiliated Individual	10339
Washburn	Natalie	Unaffiliated Individual	10321
Watson	Elaine	Unaffiliated Individual	10458
Wattle	Kathleen	Unaffiliated Individual	10403
Webb	John C.	Unaffiliated Individual	10255
Webber	Steven	DOE-Western Area Power Administration	10332
Weeter	Bruce and Georgia	Double H Ranch	10176
Welke	Margaret	Unaffiliated Individual	10090
Welsh	Philip	Unaffiliated Individual	10133
Wilbert	Connie	Sierra Club, WY Chapter	10040
Wilbert	Connie and Bonnie	Wyoming Chapter Sierra Club	10374
Willett	Loni	Cooley's Welding	10077
Willett	Loni	Cooley's Welding	10502
Williams	Ted	Rocky Mountain Power	10368
Williams	Michael	Unaffiliated Individual	10408
Williams	Kraig	Unaffiliated Individual	10521
Wilson	Mona	Unaffiliated Individual	10201
Wilson	Robert M.	Unaffiliated Individual	10202
Wilson	Willard and Maycle	Unaffiliated Individual	10229
Wilson	Jim	Unaffiliated Individual	10293
Winkler	Debra	Unaffiliated Individual	10041
Winkler	Joe	Unaffiliated Individual	10142

Table A-1. Index of Commenters (Continued)

Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Winsor	John	J&R Well Services	10563
Winters	Chris	J&R Well Services	10495
Wold	Peter	Enhanced Oil Recovery Commission	10044
Wolf	James	Unaffiliated Individual	10547
Wolfe	Lawrence	Holland and Hart, CLP	10267
Wood	M R	Unaffiliated Individual	10422
Woodiwiss	Kimberly	Unaffiliated Individual	10419
Woods	Spencer	Unaffiliated Individual	10037
Woods	Susan J.	Unaffiliated Individual	10096
Woodwell	Caroline	Unaffiliated Individual	10172
Wozniak	Thomas	Unaffiliated Individual	10311
Wychgram	Daniel	Unaffiliated Individual	10334
Yaple	Henry M.	Unaffiliated Individual	10209
Young	Gary	Unaffiliated Individual	10119
Zaydee		Unaffiliated Individual	10466
Zeller	Frank	Unaffiliated Individual	10525
Zolnikov	Daniel	Families for Outdoor Recreation	10412
-	-	Anonymous	10002
-	-	Environmental Quality External Review Team National Park Service Intermountain Region (AZ, CO, NM, MT, OK, TX, UT, WY)	10093
-	-	MC Land and Cattle, LLC	10104
-	-	U.S. Fish and Wildlife Service	10480

Attachment A – Draft Resource Management Plan and Draft Environmental Impact Statement Commenter Response Index

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Comment Analysis Report

Attachment B

Draft Resource Management Plan and
Draft Environmental Impact Statement

Individual Comments and Index to Summary Comments and Summary Responses

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Attachment B – Draft Resource Management Plan and Draft Environmental Impact Statement
Individual Comments and Index to Summary Comments and Summary Responses

ATTACHMENT B

Table B-1 includes all individual substantive comments and identifies the BLM summary comment and response number associated with individual comments. The table is organized by comment document number. Please refer to Attachment A, Table A-1 within the Comment Analysis Report for the Bighorn Basin Resource Management Plan Revision Project to locate your name and associated comment document number.

Table B-1. Individual Comments and BLM Response Index

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10004	10004-1	You do not list all of the existing roads, is it your plan to block off any that are not listed.	2034
10024	10024-5	Comment on Pages 4-60, Figure 4-3: In Figure 4-3, there is no justification for having more Moderate Constraints in Alternative A than in either Alternative A or D. Alternative A should be designed to offer encouragement to further exploration.	2047
10024	10024-6	Recommendation #1: To accommodate and encourage additional exploration along the Absaroka Front, it is strongly recommended that Alternative C be chosen by the BLM. Concurrent with and as a part of this recommendation, there should be a reduction in the 90,000 acres presently classified as Moderate Constraints under Alternative A, Figure Y-4 by reclassifying them as Standard Restrictions. The recommended reduction would eliminate many of the Stipulations presently impeding exploration, and should stimulate oil industry activity in one of the few prospective structural areas remaining in the Bighorn Basin. The acres recommended for reclassification to Standard Restrictions are contained within the following described townships:T44N-R99W through R101W;T47N-R101W through R104W;T45N-R99W through R101W;T48N-R102W through R104W;T46N-R100W through R102W;T49N-R102W through R104W.	2047
10024	10024-7	Comment on Impacts Common to all Alternatives, Page 4-62: To obtain valid geophysical data under approved exploration leases requires that the ends of the lines, which would be stopped against the edges of NGE leases, be extended onto the NGE leases to obtain structural data under all of the approved or issued leases. When conducting seismic work, the tail-end of lines are routinely extended beyond the limits of the acreage being mapped to obtain data under 100% of the leases.	2016
10042	10042-1	Several statements in the RMP Executive Summary are very questionable. For example, on page 5, it states: "Goals are broad statements of desired outcomes that are usually not quantifiable." In business, "Best Management Practices" define goals as providing definable programmatic direction focusing on the desired end result. That is why they are called goals and not some unquantifiable vague ideology. True, objectives provide more precise measurement and steps to achieve the goal. Another example is also on page 5. Allowable uses identify uses that "are allowed, restricted, or excluded on BLM-administered surface lands and federal mineral estate." According to a BLM specialist, this statement means that allowable uses are those uses allowed, restricted, or not allowed. I was also told that this is the BLM definition of "allowable uses." How can an allowable use be not allowed?	2054

Attachment B – Draft Resource Management Plan and Draft Environmental Impact Statement
Individual Comments and Index to Summary Comments and Summary Responses

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10042	10042-2	Include milestone points in the plan to revisit certain land uses to adjust the process as required for the good of the area and the country. When I questioned one of the BLM specialists, I was told that the BLM's intent is to make specific reviews throughout the life of a particular regulation. This should be clearly communicated to the public together with the associated review criteria to include what triggers these periodic reviews.	2054
10042	10042-3	Some of the assumptions in the RMP are flawed. For example, with respect to the McCullough Peak wild horse range, the executive summary states: "Expansion of the McCullough Peaks HMA under alternatives B and D would result in beneficial impacts to wild horses by adjusting the HMA boundary to more accurately correspond to the range the resident herd uses, rather than continued attempts to recapture and move horses." Does the BLM really think that expanding the area will keep the herd from naturally growing and ultimately overpopulating the new area without further management of the herd size? If this the wildlife management science applied by the BLM in this case, it is terribly wrong.	2054
10042	10042-4	There are no real definable buffer limits when inferring "visual resource" protections. Depending on the topography along some areas along the trails, the exclusion could be more that 15 to 20 miles wide. What purpose is served by these egregiously applied buffers? Preserve the antiquity value of the trail, yes, but not necessarily from horizon to horizon. This concept of visual horizons needs to be re-thought. What purpose will the "preservation of a visual resource" serve other than to close a large portion of the Big Horn Basin from any activity except to serve a few purists while significantly impacting beneficial use of the land for the greater good of the public?	2032
10044	10044-1	It has come to our attention that there is little or no consideration of enhanced oil recovery technologies and the associated development needs in the draft Bighorn Basin RMP.	2051
10047	10047-1	The BLM, to its credit, lists socioeconomic as an analysis portrait, but the Wyoming Business Alliance observes this section doesn't address the advent of new technology and how this has shaped the energy landscape in Wyoming over the last decade---i.e., without new technology there would be no Jonah and Pinedale anti-cline in Sublette County, CBM in Campbell County, natural gas development in Sweetwater County, and the most recent activity regarding the Niobrara Oil play. Because these counties have progressed in terms of direct energy job creation, it should be understood that each of these jobs accounts for 3.65 jobs total--a fact which is important to consider if new energy development were to occur in the Bighorn Basin.	2046
10047	10047-2	In the Alternative C there should be an analysis of technology and how energy development in the future could expand (based on technology) in the Bighorn Basin and why this would be foreclosed in Alternative D, the agency's Preferred Alternative.	2054
10051	10051-1	Public participation in this RMP is very important and many of the people affected will have a lot to learn in order to fully understand, process and compare the alternatives set forth by BLM and provide appropriate, educated comments. Adding this 60 day extension would allow comments to be of greater assistance to BLM when preparing the Final RMP.	2007
10051	10052-1	An additional 90 days would provide better opportunities for a more comprehensive review of the documents by all interested parties. We believe it	2007

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		is imperative that all interested parties have the opportunity to participate in the BHB planning process and we believe this is one of BLM's primary planning goals. Therefore, we urge that you grant a 90-day extension to facilitate review and comment by all interested parties.	
10053	10053-1	The Commissioners of Bighorn, Hot Springs, Park and Washakie Counties would like to formally request that the Bureau of Land Management extend the current public review period for the Draft Bighorn Basin Resource Management Plan and Draft Environmental Statement from 90 days to 120 days	2007
10054	10054-1	The Commissioners of Hot Springs, Park and Washakie Counties would like to formally request that the Bureau of Land Management extend the current public review period for the Draft Bighorn Basin Resource Management Plan and Draft Environmental Statement from 90 days to 120 days.	2007
10055	10055-1	Marathon Oil Company respectfully requests a 90-day extension of the comment public period for the Draft Bighorn Basin RMP/EIS due to the broad public interest in BLM's proposed management of the nearly 6 million acres in the Bighorn Basin.	2007
10056	10056-1	Phoenix Production respectfully requests a 90-day extension of the comment public period for the Draft Bighorn Basin RMP/EIS.	2007
10057	10057-1	The Bighorn Basin Resource Alliance respectfully requests a 90-day extension of the comment public period for the Draft Bighorn Basin RMP/EIS.	2007
10059	10059-1	I would like to request a 60 day extension of the public comment period for the Draft 8ighorn Basin RMP/EIS. Due to both the size and complexity of the document, it will be difficult for the general public and other interested stake holders, to digest the document and provide substantive comments before the current90 day comment period expires on July 20, 2011.	2007
10060	10060-2	Finally, I feel that BLM should institute stricter standards to protect the Yellowstone grizzly bear. In order to keep bears away from unnatural food sources the BLM should implement a food storage order for all BLM lands within occupied grizzly bear habitat. In addition, the BLM should not allow black bear baiting in occupied grizzly habitat. This practice leads to increases in grizzly conflicts by attracting grizzly bears to areas where they are more likely to come into conflict with humans. Protecting grizzly habitat is yet another reason to designate the Absaroka Front Management Area as off-limits to oil and gas leasing. BLM lands along the Absaroka-Beartooth Front provide increasingly important habitat for bears, particularly in the spring and fall. Development of roads and other infrastructure in this area will undoubtedly impact bears' ability to thrive on this landscape. Therefore, I want to emphasize that the BLM should designate the Absaroka Front Management Area as off-limits to future oil and gas leasing, and institute a no-net-gain policy for roads and other forms of development within occupied grizzly habitat along the Absaroka-Beartooth Front (Record #4117).	2039
10060	10060-3	To keep bears away from unnatural food sources, the BLM should implement a food storage order for all BLM lands within occupied grizzly bear habitat. The BLM is proposing that they would require bear-proof food storage for permittees and within developed recreational sites, but this does not go far enough. The vast majority of grizzly-occupied BLM lands fall outside of developed recreational sites and most of the people using these lands are not commercial outfitters or livestock producers. Therefore, it would be most effective if BLM were to require that everybody work to keep bears wild and	2042

Attachment B – Draft Resource Management Plan and Draft Environmental Impact Statement
Individual Comments and Index to Summary Comments and Summary Responses

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		safe through the simple act of food storage.	
10067	10067-1	Grizzlies are a keystone species and their presence is key to the survival of these wild lands. The issue of black bear baiting is one I was not aware of and I would welcome a statement of the reasoning for this	2042
10091	10091-1	May I also point out that according to my own personal research, you may have missed a trail? A significant Native American corridor went from Ten Sleep Pass, through what is now Medicine Lodge State Park and then along the western base of the Big Horns until it went back up the mountains to the Medicine Wheel. Much of this is on what are now BLM public lands.	2010
10091	10091-2	Wyoming is one area of the country that has not experienced the full effect of the recession. Oil and gas jobs will mostly come from outside the region and they were not considered under socioeconomic impacts.	2046
10118	10118-1	The Greater Sage Grouse core areas 2008 designation in the Bear Creek area and in the area north of Hyattville better reflects actual distributions and areas of concern than does the 2010 version.	2069
10118	10118-2	Big game winter range does not include Core areas not designated as such in an area west of the Alkali Road and South of the Red Gulch Road. This area is crucial for wintering elk and mule deer.	2022
10121	10121-1	I would like to see the public discussion of the RMP be extended by at least 3 months so people that live in the Bighorn Basin have time to adequately discuss and comment on the new RMP plan.	2007
10124	10124-1	Wildlife is described based only on perceptions, without qualitative and quantitative data. This is supposed to be a document based on science and facts, not opinion. EXAMPLE: Mule Deer discussion provides no support for the statement (pg. 3-97): (b) because of seasonal dependence on woody plant communities, mule deer are generally declining in numbers due to a decline in habitat quality and quantity. How can you make a statement like this without providing evidence to back it up? No acres, no changes over time are substantiated. Nothing.	2025
10124	10124-2	ECONOMIC WORKSHOPS - these were not conducted throughout this NEPA process-not real economic workshops. This was pointed out to the agency on more than one occasion, but ignored. This is legally challengeable and no doubt will be.	2046
10124	10124-3	+ LIVESTOCK AUMS: Unsubstantiated reductions in animal unit months (AUMs) are called for. There are, however, no numbers, data, or quantitative information to justify such reductions. The document refers to surface disturbances, yet ties nothing to livestock grazing as causing or warranting the restrictions of surface disturbances. There are no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations.	2011
10124	10124-4	TABLE 2 - 5 (RMP/EIS p. 2-160-162) state that management must be consistent with “other resource objectives” but the document does not disclose which resource objectives are being referred to---nor how livestock grazing might be negatively affecting “other resource objective.” Just to say it does not make it so!	2011
10128	10128-1	I would like to propose the inclusion of three OHV Riding Parks into the BLM RMP process as described in the attached document. Please let me know how I need to proceed and I will follow up with a list of petitions and names for this project.	2034

Attachment B – Draft Resource Management Plan and Draft Environmental Impact Statement
Individual Comments and Index to Summary Comments and Summary Responses

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10128	10128-2	Proposal for a BLM OHV Riding Park located in North Oregon Basin area T52N - R100W and R101W which utilizes the current trails and roads as shown in the Maps proceeding.	2034
10133	10133-1	Recommendations should be made to congress to extend the "Wild and Scenic" designation from the Shoshone National Forest downstream at least to Wyoming Rt. 120. This area is, by my own observation, heavily used habitat for Golden Eagles, Ospreys, and Elk. Numerous Elk cows and calves are frequently seen in the thickets along the river where feed and cover are abundant. Both Mule and White Tailed deer also use the area. I strongly recommend that "No Surface Occupancy" management be employed on the BLM lands abutting the river.	2018
10133	10133-2	I live on that section of land that straddles County Rd. 8VC, also known as Canyon Rd., and Road 8UD running north from it in Clark. My property abuts a BLM plot on the west side. Here too, I would like to see "No Surface Occupancy" management employed for the following reasons. 1) This plot provides the only public BLM access to Little Rocky Creek in the Clark area. 2) The aquifer that lies beneath Little Rocky is severely defined and provides all the drinking water for the Clark community.	2034
10133	10133-2	I live on that section of land that straddles County Rd. 8VC, also known as Canyon Rd., and Road 8UD running north from it in Clark. My property abuts a BLM plot on the west side. Here too, I would like to see "No Surface Occupancy" management employed for the following reasons. 1) This plot provides the only public BLM access to Little Rocky Creek in the Clark area. 2) The aquifer that lies beneath Little Rocky is severely defined and provides all the drinking water for the Clark community.	2031
10135	10135-5	Rock art is damaged by animals rubbing the rock surface. Livestock trails leave a permanent coat of dust on panels. Grazing permits should provide significant buffer zones between sites and livestock.	2004
10139	10139-1	In light of the requests by Cooperating Agencies and the public for an extension of time to submit their comments and in order to provide my office sufficient time to thoroughly review the Draft Bighorn Basin BLM RMP and EIS, I advise that the State supports and requests a 45 day extension of the comment period through August 26, 2011.	2007
10140	10140-1	This letter is in reference to the BLM's draft Resource Management Plan: It is my opinion and request that the 120 extension be granted.	2007
10152	10152-11	In addition, the Clarks Fork River receives Wild and Scenic River protections as it traverses the Shoshone National Forest. Recreationalists enjoy and treasure the BLM portion of this river as well. We feel that managing to protect its Wild and Scenic qualities is justified not only when BLM lands are considered in isolation, but even more so when the river is considered as a whole, such that management would not change across jurisdictional boundaries.	2018
10152	10152-12	Perhaps the most significant addition relative to the special management areas that is found in chapter 2 of the Draft EIS is that unlike in Maps 60 and 62, names are provided for the special recreation management areas, recreation management zones, and extensive recreation management areas. See Draft EIS at 2-13 to -125 (presenting the names of the special recreation management areas). We think this is a valuable addition and these names should also be provided on the maps. The names of these areas provide a great deal of information and "color" regarding these areas that is lacking without the names	2057

Attachment B – Draft Resource Management Plan and Draft Environmental Impact Statement
Individual Comments and Index to Summary Comments and Summary Responses

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		being provided on the maps. The Badlands Special Recreation Management Area, Absaroka Foothills Area, Tour de Badlands Area, Wild Badlands area, Tatman Mountain Area-these are poignant reminders of why these areas are important and valuable and we ask the BLM to keep these names in mind as it makes its management decisions, and to apply these names on the maps when the Final EIS is released.	
10152	10152-13	However, we admit to some confusion regarding the West Slope Special Recreation Management Area. In Table 4-15 in the Draft EIS it is indicated that under alternative D this area would be 318,385 acres, whereas under alternative B it would be only 126,914 acres. Draft EIS at 4-337. Yet when we look at Maps 60 and 62 it is not apparent that there is such a large differential in the acreage of the West Slope Special Recreation Management Area. In fact, the special recreation management area under alternative B would appear to be larger because under alternative D a fairly large portion of this area-in the southern Bighorns-would be designated an extensive recreation management area.	2057
10152	10152-14	Research has shown that a variety of wildlife taxa are adversely affected by artificial night lighting. And night lighting is very disturbing to recreationists and other public lands users. BLM should strive to minimize the impacts of light pollution	2032
10152	10152-16	The WGFD has developed an important document relative to mitigation of impacts to wildlife in the face of oil and gas development. This document is entitled "Recommendations for Development of Oil and Gas Resources Within Important Wildlife Habitats." It is available at http://gf.state.wv.us/downloads/pdflog.pdf. The Wyoming Game and Fish Department also has developed a similar document with regard to wind energy development: "Wildlife Protection Recommendations for Wind Energy Development in Wyoming." It is available at http://gf.state.wy.us/downloads/pdf/ Final%20WGFC%20Approved%20Wind%20Recommendations%2011-17-1 O.pdf. The BLM should recognize these important guidance documents in the RMP and adopt their provisions as a component of the RMP.	2025
10152	10152-18	We are concerned by alternative D's counterpart provision that would only apply a CSU stipulation or prohibit or restrict surface-disturbing activities or surface occupancy within 0.25 miles of occupied or undetermined sage-grouse leks outside KHAs. Research has shown that this 0.25 mile buffer, widely used by the BLM in coalbed natural gas (CBNG) development areas, has been inadequate in preventing local sage-grouse populations from declining in energy fields. 19 In the Powder River Basin, 98 percent CBNG development within two miles of leks was projected to reduce the average probability of lek persistence from 87 percent to 5percent.20	2036
10152	10152-19	We prefer the TLS in alternative B, which would "avoid surface-disturbing and disruptive activities in greater sage-grouse nesting and early brood-rearing habitat within 3 miles of occupied greater sage-grouse leks ... or in identified nesting and early brood-rearing outside the 3-mile lek buffer. .. from February I to July 31." Alternative D instead applies a TLS in suitable sage-grouse habitat within KHAs from March I to June 30. We are concerned that the earlier June 30 end date for the TLS in alternative D will fail to protect female grouse that have re-nested after losing their first nest to predators, inclement weather, or other causes. Female grouse that make second or third nest attempts may hatch their	2068

Attachment B – Draft Resource Management Plan and Draft Environmental Impact Statement
Individual Comments and Index to Summary Comments and Summary Responses

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		eggs as late as early-to-mid-July. Therefore, we believe that a compromise between alternative B and D's TLS dates, such as March I - July 15, might be most appropriate to maximize grouse productivity while allowing the maximum possible time for development activities.	
10152	10152-2	The 15-Mile Basin remains largely un-leased for oil and gas development. This presents BLM with an important opportunity to protect a landscape where real protection can still be had. Making this area unavailable for leasing could help link together the three WSAs and provide a large, un-fragmented area for citizens to hunt, explore, and find solitude free of industrial intrusion. This would help protect the wilderness values that dominate in this area, and protect the solitude people seek in this area, as well as its wildlife. Therefore this area should be made unavailable for oil and gas leasing. And because there is an increasing problem with unauthorized roads in this area, this area should be designated as an area where vehicular travel is only authorized on designated routes.	2019
10152	10152-20	Alternative D provides only a half-mile buffer for active golden eagle nests, for example. The USFWS recently published its "Draft Eagle Conservation Plan Guidance" because of its concern over the adverse impact of wind energy development on golden eagles in particular. Given that golden eagle nesting territories can extend over five miles from their nests2 and given the vulnerability of golden eagles to collisions with wind turbines and their sensitivity to anthropogenic disturbances, we believe that a half mile TLS for nesting golden eagles is inadequate.	2071
10152	10152-21	If wind energy development is permitted along the Absaroka-Beartooth Front, BLM should be in a position to strongly regulate it. As currently shown in the Draft EIS, BLM only plans to use the mitigation measures provided in the Record of Decision for Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments (BLM 2005c) and BLM Instruction Memorandum 2009-43. Draft EIS at 2-110. We ask the BLM to incorporate, at a minimum, wind energy development guidance from the USFWS and the WGFD whenever it permits wind development, particularly along the Absoraka-Beartooth Front, and to make provision for the application of these guidelines in the RMP30	2065
10152	10152-22	However, under both alternatives B and D there would be a communications site designated in T53N R90W, in the Bighorn Front area. Maps 52 and 54. We ask the BLM to reconsider designating this communications site. For one, under either alternative B or alternative D, this communications site would be located in a rights of- way avoidance and mitigation area, so BLM should start to avoid right now the placement of rights-of-way in this area by not designating this area for a potential communication site. Moreover, under alternative B this communication site would be located immediately adjacent to a rights-of-way exclusion area, so designating this site is an inherent conflict with this management direction. Cell phone towers, which is probably what "communications sites" refers to, are anathema to the important environmental values in the Priority Conservation Areas. Among other things, communication towers kill millions of birds each year. Where BLM does permit communication towers, it should require best management practices such as appropriate lighting that doesn't attract birds (e.g., no solid red lights) and bird diverters that highlight guy wires to reduce bird collision fatalities. 33	2020
10152	10152-23	Under alternatives A, C, and D 5,171 acres would be closed to livestock grazing.	2011

Attachment B – Draft Resource Management Plan and Draft Environmental Impact Statement
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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		Draft EIS at 2-19. This represents less than 0.2 percent of the 3,189,743 BLM surface acres in the Bighorn Basin. Then, under alternative B, 1,988,927 acres would be closed to livestock grazing, or 62 percent of the BLM lands in the Bighorn Basin. Id This is a radically disproportionate approach to livestock grazing management. The area of closure under alternative B is 385 times the area of closure under any of the other alternatives. And there is nothing in between. This does not represent a reasonable range of alternatives. All we are given to consider is closing almost nothing to grazing or closing well over half of the planning area. That is not a balanced range of alternatives, and therefore defeats informed public and agency involvement and comment on this process, bedrock principles of National Environmental Policy Act (NEPA) law and process. Because of this imbalance, we ask the BLM to develop one or more proposals for grazing management that would close an intermediate portion of the planning area to grazing relative to the options that are currently presented.	
10152	10152-24	Furthermore, in the MLP Evaluation report, the state office said, "[t]o preserve decision space, oil and gas leasing will be deferred in key areas identified [in an accompanying figure] until at a minimum the release of the draft EIS and proposed plan." MLP Evaluation at un-numbered page 30. It is not apparent that this decision has factored into the MLP analysis presented in the Draft EIS and Draft RMP. Will deferral of leasing continue past the release of this Draft EIS? We do not know the answer to that question from what is presented in the draft EIS. The BLM should clarify the timeline over which leasing deferral will continue, and as has been said a number of times at a minimum the lease deferral decision should continue beyond just the release of this draft EIS, and in fact be made permanent in the Priority Conservation Areas.	2014
10152	10152-25	However, on June 23, 2011 the BLM, EPA, and the Forest Service entered into a memorandum of understanding regarding air quality analyses. This memorandum raises the possibility that a more in-depth analysis of air quality issues needs to be prepared for the Bighorn Basin RMP. We ask the BLM to carefully consider this possibility. In particular, it is crucial that visibility in nearby Class I areas-the Teton, Washakie, and North Absaroka Wilderness Areas-be adequately evaluated and protected.	2009_1
10152	10152-5	As shown in Draft EIS Map 7, the level of existing leasing in the Absaroka-Beartooth Front, 15-Mile Basin, and Bighorn Front is generally quite low. That is, by not leasing in these areas in the future, as we request, there would be little impact on oil and gas development in the basin. It is reasonable and practical to not engage in future leasing in these three iconic areas.	2077
10152	10152-6	As we noted above, if our leasing availability approach-which is largely reflected in the provisions of alternative B-were adopted in the RMP only 46.3 percent of the mineral estate in the planning area would be closed to leasing and the remainder would be available for leasing. The fraction of the planning area in the Priority Conservation Areas is even smaller. We note that in the Pinedale RMP the BLM designated 49 percent of the BLM surface estate as unavailable for future leasing. So there is precedent for closing areas to leasing of this magnitude. The Cody and Worland Field Offices would be following in the steps of the Pinedale Field Office if 46.3 percent of these Field Offices was made unavailable for future leasing in the RMP, and they should do so.	2013
10152	10152-7	While there are 137 named fields in the Bighorn Basin, there are only eight major producing oil fields (by volume) and six major producing gas fields. Draft EIS at 3-51. Consequently, we believe the BLM should carefully consider the	2050

Table B-1. Individual Comments and BLM Response Index (Continued)

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		designated oil and gas management areas that would be established under alternatives C and D and determine whether the number of recognized fields can be scaled back with little or no impact on oil and gas production. The purpose of recognizing these fields is to promote oil and gas production, so if there is little reason to expect much production from many of these fields, they should not be recognized as oil and gas management areas.	
10152	10152-8	Consequently, under the provisions of the Federal Land Policy and Management Act (FLPMA) BLM must give "priority" to the "designation" of these ACECs, a requirement which alternative B clearly meets and which the other alternatives do not.	2068
10152	10152-9	In several maps the Absaroka Front Management Area is recognized. See, e.g., Maps 30 and 68. We strongly support creation and recognition of this management area because it corresponds closely with the Absaroka-Beartooth Front management area specified in our maps in the enclosed CD. As shown in Record # 4080 in the Draft EIS, this area would be recognized under alternatives B, C, and D. Draft EIS at 2-77. After considering the management prescriptions that are presented, we would support protection of the acreages presented for alternative D (130,895 acres of BLM surface estate and 253,159 acres of mineral estate); however, we believe that the management prescriptions presented for alternative B should be applied.	2055
10165	10165-1	In the plan it states: The six mines in the Bighorn Basin employ 132 persons, and another 360 persons are employed at the milling processing facilities at six different mills (one in the Worland area, two near Greybull, and three near Lovell, Wyoming). The stated number of employed people in the bighorn basin from the bentonite industry is a lot more than the number in the plan. My mine alone has four full-time contractors (stripping overburden, hauling bentonite, drilling/blasting and conducting environmental activities) totaling over 60 employees. The number stated in the plan is the number of employees who work "in-house" for the bentonite companies, i.e. not contractors. Please state there is substantially more people employed as contractors from the bentonite industry in the Bighorn basin. My guess is the number of workers in the bentonite industry is 10X more than what the RMP states.	2049
10165	10165-2	Page 3-42 in Management Challenges Approximately 30,000 acres of land has been disturbed in the Bighorn Basin due to bentonite mining, along with approximately 4,000 acres of road and haul-road disturbance (BLM 2008c). The approximate of 4000 acres of road disturbance from bentonite activities cannot be accurate. Assuming 30 linear feet of width per road, this equates to 1100 miles of roads from bentonite activity. Unless the other bentonite mines have substantially more roads than my mine, the 4000 acres of road disturbance stated in the RMP should be reviewed for accuracy.	2015
10165	10165-3	Map 54 Land Resources Rights-of-Way and Corridors Alternative D Why is the area east of the Big Horn River and SE of Lovell mostly classified as Right-of-Way Avoidance/Mitigation Area? This area is a major active bentonite mining region in the Bighorn basin. Won't this designation hurt the bentonite industry when we need to obtain a ROW to access new mining areas in the future?	2077
10165	10165-4	Page 3-169 in Lands with Wilderness Characteristics The BLM performed an inventory of lands in the Planning Area to determine if any BLM-administered lands had wilderness characteristics. Wilderness characteristics are resource values that include naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Areas	2028

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		evaluated for wilderness characteristics generally occur in undeveloped locations of sufficient size (usually at least 5,000 acres) to be practical to manage for these characteristics. Smaller areas are considered if they are contiguous with designated Wilderness or WSAs or are of a manageable size. Map 63 Land Resource. In the Township T55N R93W there is a Wilderness designated area to the east of our patented mining claims which is actively being mined day and night. Based on the Wilderness characteristics listed above in the RMP, this area should not be classified as a WSA because the area is certainly not in solitude with the dozers, scrapers and blasting operating daily nor is it an unconfined recreation area either for the same reason.	
10165	10165-4	Page 3-169 in Lands with Wilderness Characteristics The BLM performed an inventory of lands in the Planning Area to determine if any BLM-administered lands had wilderness characteristics. Wilderness characteristics are resource values that include naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Areas evaluated for wilderness characteristics generally occur in undeveloped locations of sufficient size (usually at least 5,000 acres) to be practical to manage for these characteristics. Smaller areas are considered if they are contiguous with designated Wilderness or WSAs or are of a manageable size. Map 63 Land Resource. In the Township T55N R93W there is a Wilderness designated area to the east of our patented mining claims which is actively being mined day and night. Based on the Wilderness characteristics listed above in the RMP, this area should not be classified as a WSA because the area is certainly not in solitude with the dozers, scrapers and blasting operating daily nor is it an unconfined recreation area either for the same reason.	2027
10168	10168-1	The BLM has failed to address the "Big Picture" of the Big Horn Basin. When the 5.6 million acres of the RMP study area (3.1 million BLM surface acres and 4.2 million mineral acres) is referenced, it is not stated that the RMP study area is already surrounded by 9>13 million acres of U.S. Forest Service, Wilderness Areas and National Parks. It is somewhat deceiving to the reader of the document that the surrounding areas already exist and are protected from numerous effects that are being addressed in the Big Horn Basin RMP. The question of why more acreage needs to be restricted or closed needs to be addressed as well and the economic impact to the basin if lands are removed from leasing.	2047
10177	10177-1	the current controlled surface use stipulations are protective of resource values while allowing a prudent method to conduct future exploration to meet the domestic energy demands. We cannot predict exactly where the new accumulations of Oil and Gas will be, but we know we need public lands access to test our exploration concepts with seismic and drilling operations.	2047
10178	10178-3	the agricultural community has become greatly dependent on the surface discharge from oil and gas development. It has become a vital water source for many ranchers and provides perennial fresh-water sources. Additionally, the water creates hundreds of miles of riparian zones and thousands of acres of wetlands. The draft never mentions this.	2031
10178	10178-5	the increased buffer zones around special designation areas are not based on science. New research shows that when grouse are in danger, the grouse move closer to oil and gas development and any human activity to get away from their predators. Due to this fact, buffer zones are inadequate.	2071
10178	10178-6	The BLM needs to look at more locally available data in regards to our economic	2046

Table B-1. Individual Comments and BLM Response Index (Continued)

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		viability (for instance the research done by Bighorn Basin Resource Alliance). This data clearly shows how important oil and gas is to our communities and in 2,000 pages the BLM doesn't clearly represent how important it is. For instance, all four of the counties in the Bighorn Basin received 54 percent of their property taxes directly from oil and gas development. By including this information, it will inform citizens of the current economics.	
10178	10178-7	The BLM fails to include reasonably foreseeable development in the next 20 years. Horizontal and directional drilling is happening in neighboring communities. I heard a presentation by the Bighorn Basin Resource Alliance (quoting the USGS statistics), showing that an additional 3 trillion barrels of oil equivalent are yet to be produced in the Basin through enhanced oil recovery techniques that are happening near Riverton and Casper (Sand Draw). Why weren't these considered in the BLM's RFD? This section is extremely incomplete and needs to be recompleted before the record of decision is issued.	2061
10181	10181-1	Include in all RMP alternatives measurable (i.e. quantifiable) standards for livestock grazing including maximum upland and riparian utilization of 30% on any herbaceous graminoids; maximum bank or wetland trampling annually not to exceed 10% of hydric and mesic soils areas; maximum use of woody browse by all sources not to exceed 15% of new leader growth annually. Such obvious requirements, based on current range science, have not been included	2011
10181	10181-10	We provide in C_Grazing Capacity Info Proposed Outline, a scientifically and legally defensible methodology for determining capability and suitability of BLM lands for livestock grazing. We request the BLM incorporate this process into the RMP as well as the EIS alternatives.	2011
10181	10181-11	Frequently, the DEIS uses such terminology as "maintain or improve" but this is often inappropriate in most of the contexts it is used. For instance, an objective for riparian areas may say maintain or improve riparian condition but this is inappropriate as areas below objective must be improved not merely maintained. Similarly, for special status species by definition maintaining habitat is insufficient because by their very definition special status species are declining.	2054
10181	10181-12	2-12: The document states that the BLM will "include the use of best management practices to preserve the air, soil, cave and karst, and water resources" but the BLM fails to provide exactly what these BMP's actually are, when they will be required, how their effectiveness will be monitored and even more importantly research regarding their effectiveness.	2054
10181	10181-13	2-20: We see that all alternatives contain nearly identical acres of WSAs despite the submission of citizens proposed WSAs which appear to have been ignored.	2019
10181	10181-14	2-42: As an example of the deficiencies in the proposed RMP one merely has to look at the 2nd "management action" where the lack of a timeframe for this to be required by renders it worthless. 1003 is similar in that it fails to provide any timeframe for implementation and takes up space with such worthless actions as "and work cooperatively to encourage industry and other permittees to adopt measures to reduce emissions".	2054
10181	10181-15	2-44: "use BMPs to reduce runoff, soil erosion and sediment yield and to retain water on the landscape". Again, this is worthless from an implementation perspective. What these BMPs are, when and how they will be required, or even how effective they are is not provided for within the RMP direction. In	2054

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		other words, these various "actions" in the proposed RMP completely lack the level of detail necessary for implementation and enforcement.	
10181	10181-16	2-47: 1026 provides an extremely general "protect watershed resources through the application of watershed conservation practices and BMPs". This is again completely worthless from an implementation standpoint because it fails to provide any specificity as to what these practices are, when they will be required, how their effectiveness will be monitored or other such critical details.	2054
10181	10181-17	2-48: Not only do springs need to be fenced but the responsibility for fence maintenance must be placed on the permittees since there would be no reason to fence Springs and reservoirs if it were not for their permitted livestock. The proposed RMP contains no requirements to meet fisheries habitat needs. The habitat needs for trout and other aquatic species are well researched and need to be required by the RMP.	2025
10181	10181-18	2-58: There needs to be clear requirements for re-analyzing the appropriateness of leasing expired or expiring leases.	2013
10181	10181-19	2-59: Goal FM2 states "restore natural fire regimes and frequencies to the landscape and utilize fire in vegetation treatments to accomplish DPC objectives". The document provides no analysis or research on what "natural fire regimes" are for the different land areas within the assessment area. This is, of course, a critical issue because without understanding the current science regarding what natural fire regimes are the BLM has no way to manage to achieve those. In addition, DPC objectives are not laid out in any fashion that would allow for their implementation. Additionally, this section is entirely lacking direction regarding cheatgrass and other invasives. For instance areas with the potential for cheatgrass should have no prescribed fire allowed.	2008
10181	10181-2	In addition to analyzing current management, suitable alternatives to analyze would include eliminating livestock grazing from all sensitive areas such as Wilderness, ACEC, cultural resources, and important wildlife habitat; reducing grazing from the 99.9% of the resource area to 40% of the resource area; and a no grazing alternative along with reduced utilization rates for uplands and riparian areas.	2055
10181	10181-20	4030 does not require any monitoring and given the history of an almost complete lack of data collection over last 25 years by the BLM such a requirement is critical. This item requires a "substantial shift in both the timing and level of production" in order to trigger the undefined "actions". What is substantial? So what is this shift in "timing" that has to be there in addition to a substantial change in productivity? The combination of these 2 leads to the result that even the vague direction in this section will never be triggered.	2054
10181	10181-21	2-68: This section only requires the management of repairing areas to meet PFC despite the fact that PFC is only the minimal physical functioning required to withstand twenty-year flood events and is well below the habitat needs for fish and wildlife. Therefore such an objective is inappropriate. This section does not define what "priority riparian wetland areas" are nor what the "desired future conditions" for these are. Without this being done in the RMP itself, the result will be a meaningless objective.	2033
10181	10181-22	2-72: Again, this section conflates "conserve, recover and maintain". The requirements for species recovery such as ESA or BLM listed sensitive species needs to apply all such species habitats. "Maintaining" is not appropriate for the management of these species because by definition they are in decline.	2042

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10181	10181-23	4076 needs to include public access into the upper Owl Creek drainage as a condition for reassurance of grazing permits. This section provides no requirements to restrict livestock utilization rates within winter range or crucial winter range which is a critical consideration.	2011
10181	10181-24	2-80: Again, the RMP wrongly states that it is appropriate to merely "maintain" habitat for special status species. This is completely inappropriate and does not comply with the sensitive species manual.	2042
10181	10181-25	4099 seeks to "maintain" instead of improve conditions in undefined "crucial seasonal greater sage grouse habitats". Without defining these habitats the direction is not implementable.	2042
10181	10181-27	6281 fails to include the Interested Public as required in the regulations. This section lacks a wide range of obvious requirements such as utilization rates, seasons of use issues, riparian impacts such as alteration, etc.	2054
10181	10181-29	2-221: the BLM somehow concludes that no violations of water quality standards would occur under any of the alternatives. This is unsupported by the research or experience. We have collected water quality data throughout BLM lands in Wyoming for over half a decade and we have never collected a single sample that met state water quality standards in any allotment where livestock were present. Exceedance of the E. coli standard generally ranges from 10 to 30 times the state standard.	2031
10181	10181-30	3-29: The document discusses the sensitive nature of the soil throughout most of the planning area but fails to discuss any of the research regarding the impacts of livestock grazing on sensitive soils. We provide a number of papers as attachments including the famous paired watershed study done by the BLM in the 1970s on similar soils to those found within the planning area. Despite the fact that most of the planning area contains the sensitive soils there are insufficient requirements and limitations in the proposed RMP to address these issues.	2045
10181	10181-31	3-33: this section lists various impaired water bodies due to degraded watershed conditions yet the RMP fails to provide any requirements or limitations to deal with this issue.	2031
10181	10181-32	3-80: Despite the admission of the failure of current invasive species management the proposed RMP provides no further significant management requirements or limitations to deal with this issue.	2033
10181	10181-33	3-81: This section discusses the impact of soil loss but fails to provide any information regarding how many acres within the planning area have already crossed this threshold as well as those areas mirroring the threshold, which of course would be clear management priorities.	2045
10181	10181-34	3-87: Again, this section clearly indicates current efforts regarding invasive species is woefully inadequate yet the proposed RMP continues virtually the same actions as are in place now. Clearly, the effectiveness of current actions must be reviewed and further actions taken. The document mentions that approximately 10% of the basin has been inventoried for cheatgrass infestations and have documented 57,000 acres.	2033
10181	10181-35	3-98: The outcome of the Working Group has no bearing upon the legal responsibilities of the BLM regarding wildlife management. The document needs to map big horn sheep habitat throughout the planning area and overlay domestic sheep allotments or trailing that occur within 10 miles of these habitats and then implement specific requirements and limitations regarding	2022

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		domestic sheep permitting to allow for recovery of big horn sheep. Again, this section provides details regarding "management challenges" but the RMP provides no limitations or requirements to address these issues.	
10181	10181-36	3-102: the BLM admits declining habitat conditions for reptiles and amphibians and that their populations are "generally on a downward trend" but again the proposed RMP fails to implement requirements or limitations to address these issues.	2025
10181	10181-37	3-107: This section likewise discusses various "management challenges" to various sensitive species but the proposed RMP fails to implement specific requirements or limitations to deal with these issues. In the sage grouse section we see a concern for "fragmentation and degradation" but again the RMP fails to implement specific requirements or limitations to deal with this issue. The nongame amphibians section has a similar list of "management challenges" but fails to deal with them.	2042
10181	10181-38	3-178: the BLM is required to conduct rangeland health assessments on all allotments over a 10 year schedule. In the 15 years since the implementation of Rangeland Reform, these 2 field offices have only conducted standards assessments on 40% of the allotments, instead of 150%. The RMP needs to provide specific direction for the completion of standards assessments on the remaining 60% of allotments as well as a schedule and resource allocation to complete 100% in 10 years.	2054
10181	10181-39	4-32: The BLM states that "special designations, such as ACECs , would restrict surface disturbing activities and resource uses that may adversely impact water quality and quantity", but as we've discussed previously proposed RMP allows livestock grazing regardless of its impacts to the resources for which the ACEC was designated. So the above statement is misleading at best. Carefully review the proposed RMP and see how such "resource uses that may adversely impact water quality" are restricted within ACECs.	2054
10181	10181-4	The EIS should disclose the type, location, and number of the various “range improvements” (fencing, water developments, water pipelines, access roads, and so forth) that currently exist on the public lands that will be managed under the direction of the RMP revision. What cumulative impacts have these “improvements” had on vegetation, wildlife habitat, water quality, riparian areas, soils, and habitat fragmentation? What changes/impacts to upland vegetation, water quality, habitat values, and other resources near these developments have occurred as a result of these “improvements?” Have these management activities been successful at accomplishing the goals for which they were implemented? These questions must be answered.	2005
10181	10181-40	4-108: The BLM correctly states that livestock "contribute to the introduction and spread of invasive species" but again the RMP fails to implement requirements and limitations to deal with this issue.	2054
10181	10181-41	4-228: the proposed RMP fails to implement the "long-term management to promote desirable plant communities" or the "annual management of the standing crop to provide cover for the greater sage grouse". Despite the fact that the cover requirements for sage grouse are well researched the proposed RMP fails to implement any requirements or limitations that would provide the "standing crop to provide cover for the greater sage grouse". Likewise the document says "monitoring is important to ensure grazing intensity and duration does not remove required herbaceous cover and litter important for maintaining greater sage grouse habitats. Not only does the proposed RMP not	2042

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		require any monitoring it does not require any herbaceous cover.	
10181	10181-42	the BLM falsely states that "more beneficial impacts to greater sage grouse" would occur by allowing livestock grazing. This ignores the vast body of sage grouse research including the BLM's own literature reviews regarding the impacts of livestock grazing on sage grouse which we provide as attachments.	2042
10181	10181-5	Additionally, the EIS should document how domestic grazing activities on allotments has affected habitat for threatened, endangered, and sensitive species in the project area. How has vegetation changed as a result of a century of livestock grazing?	2011
10181	10181-6	BLM should address how it will handle the buy-out of grazing permits by conservation and other organizations, and should identify how it will retire such permits through the planning process. BLM should work with permittees to identify those who are interested in retiring their permits or being relocated to prevent resource damage or other impacts such as disease transmission from domestic sheep to bighorn sheep.	2011
10181	10181-7	Those areas that are to continue being grazed by livestock must be stocked and managed in accordance with the condition of the land and its vegetation. This needs to be done not just in an alternative the BLM well knows it will never choose. In areas to be grazed by livestock, the amount of forage produced must be determined and allocations of forage to watershed protection (50%), wildlife (25%) and livestock (25%) be made as recommended by Holechek et al (1998)1. Field data collection will be necessary to accomplish this.	2076
10181	10181-8	The BLM cannot just assume that an AUM is 800 lbs of forage consumption per month. The RMP/EIS must analyze the current and potentially available forage to satisfy the forage consumption by the number of livestock it currently permits or proposes to permit. It cannot assume that the forage capacity determined 20-40 years ago is applicable today	2074
10181	10181-9	The current RMP authorizes a certain number of AUMs. However, that is based on an AUM equivalent to 800 lbs of forage per month. The most current information, reviewed above shows that number to be 1368 lbs/month per AUM. Therefore, if sufficient forage were available to satisfy all needs, the numbers of livestock grazed should be reduced to account for the increases in weight and correct the erroneous assumption that 800 lbs/month is an accurate consumption figure. Using the ratio between the current RMP's forage amount per AUM divided by the correct figure above, gives a needed reduction in permitted numbers and/or seasons of use of 42% to account for the RMP's understated forage consumption, without accounting for wildlife, plant and watershed needs	2074
10186	10186-1	The BLM fails to look at the big picture of Big Horn Basin land management. Although the planning area contains 4.2 million mineral acres and 3.1 million surface acres (5.6 million acres of RMP study area) is included, the BLM doesn't explain that the Basin is already surrounded by 91.3 million acres of U.S. Forest Service, Wilderness Areas and National Parks. These areas are already being protected to the highest degree and none or little leasing has taken place. Why do more acres need to be closed to leasing?	2014
10189	10189-12	Because a reduced regulatory climate enhances true multiple use, which is the BLM's original mandate, the text should be amended to include a fifth alternative - Alternative E-which is a compilation of the least-restrictive elements of both Alternative A and Alternative C.	2055

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10189	10189-5	Although Secretarial Order 3310 has been rescinded, the Areas of Wildland Designation have not been removed from the maps and text of the draft RMP. This is unacceptable, as the draft document is now in violation of Department of the Interior policy. Our fears of the decision being reversed at some future, more convenient time are reinforced by the retention of the\ maps and text, which include these proto-wilderness study areas. The several areas designated as Wildlands must be removed from the text of the draft document, and from every map and table in the draft document, before the review process can continue	2027
10189	10189-6	At present, there are almost 1.5 million acres of oil and gas leases within the Bighorn Basin, yet the Agency Preferred Alternative (D) calls for less than 570,000 acres of Oil & Gas Management Areas. I am unclear how the Bureau can consider planning for less exploration, development, and production than it has already leased land for	2050
10194	10194-1	The BLM does not fully support the reason WHY a new resource management plan is needed, other than "the plans must be revised every 20 years".	2054
10194	10194-2	The current 'buffer zones' are not reasonable, in any scenario, as no real science was used to develop these 'buffer zones'. For instance, new science shows that when sage grouse are in danger they move closer to human activity (i,e. ranching and oil and gas development) This fact makes 'buffer zones' useless. Buffer zones also take out a huge chunk of land that could very well be used for 'multiple use'.	2071
10194	10194-3	Alternative D, the preferred alternative, lists 85% more 'standard' restrictions as 'moderate' for oil and gas companies, This slows down the ability of producers to do their job and decreases our ability to produce domestic energy for our country. Yet the BLM fails to ever explain (with science) the reason those restrictions have increased so drastically.	2047
10194	10194-4	The BLM doesn't fully explain how important oil and gas is to our Basin especially in Hot Springs where over 70% of our property tax revenue comes directly from oil and gas.	2046
10194	10194-5	The BLM also lists much more acres (nearly double) for Big Game Crucial Winter Range than the Wyoming Game and Fish. Why is that?	2022
10197	10197-1	With the exception of government enterprises, mining (oil and gas) is the strongest sector of income in Hot Springs County. Data provided by BIGHORN BASIN RESOURCE ALLIANCE ECONOMIC REVENUE REPORT depicts that importance of oil and gas exploration, development and production. The BLM doesn't provide enough detail, such as this report, to help guide the public to the best decision. For this reason, the report is incomplete. Moreover, the IMPLAN regional modeling doesn't fit our needs as well as local modeling and research would, throwing off the analysis	2054
10197	10197-2	The Draft RMP doesn't properly explain how the Bighorn Basin and the communities benefit from oil and gas production and instead, tries to discriminate against oil and gas.	2046
10197	10197-3	Alternative D increases 85 percent of "standard" regulations to "moderate" and doesn't explain why	2047
10197	10197-5	with Enhanced Oil Recovery, both of which the BLM left out of their analysis and alternatives. The BLM should prepare a more detailed and factual document to present to the public. This potential should be considered in the Reasonable Foreseeable Development.	2051

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10200	10200-1	The Draft BB RMP currently includes disclosure of specific ambient air quality monitoring data that are used to characterize the existing environment, and a quantitative emissions inventory estimate, but lacks any air quality modeling to estimate potential impacts of planning decisions on the air quality resource.	2054
10202	10202-1	The RMP designates large areas of surface estate as "moderate" constraints for oil and gas leasing. Why is it necessary to increase from the "standard" regulations when there has never been a sight of a lack of regulation in the basin?	2054
10202	10202-4	The BLM has also overlooked or neglected to consider and include reasonably foreseeable development in the next 20 years. Horizontal and directional drilling is happening in neighboring communities. A presentation by the Bighorn Basing Resource Alliance (quoting USGS statistics) showed that an additional 3 trillion barrels of oil equivalent are yet to be produced in the Basing through enhanced oil recovery techniques that are already occurring near Riverton and Casper. Why weren't these facts considered in the BLM RFD? This section's is extremely incomplete and lacking. It needs to be recompleted before the ROD is issued	2054
10203	10203-1	Because my office and the Board of Land Commissioners are charged with managing the trust assets for the short- and long-term return to the beneficiaries, our paramount concern revolves around the adequacy of the plan in terms of its provisions related to enhanced oil recovery. Given the potential for CO2 flood and enhanced oil recovery opportunities within developed fields, all of which contain state minerals, it would appear that the document must be altered to better accommodate and facilitate enhanced oil recovery. There are approximately 21,862.43 acres of trust mineral estate that lie within the potential Bighorn Basin CO2 Residual Oil Zone (ROZ) site boundaries	2054
10203	10203-2	In view of the above projections, OSLI requests that the BLM include the following provisions specifically related to enhanced oil recovery:1) The reasonably foreseeable development scenario for oil and gas will not be a threshold for analysis; acreage will be the only analysis point to compare alternatives as long as such disturbance occurs in oil and gas management areas (see 2 below).2) The existing oil and gas management areas must be expanded to include the entire ROZ area. In other words, all federal surface and minerals within ROZs will be oil and gas management areas plus 28,000 acres (over Alternative C). In addition, while not part of the BLM's allocation under the RMP, the State of Wyoming and trust beneficiaries will benefit by virtue of enlarged boundaries and the production that accrues from the expanded areas.3) The description of the oil and gas management areas will be modified in a way that will not trigger re-analysis as long as development remains within existing spacing levels; similar to the Pinedale RMP, a ROZ may expand if development within it remains within the spacing limits of the existing field.4) The definition of right of way corridor will be modified to state that as long as the new pipeline is built adjacent to existing lines, the new pipeline will be considered "in the corridor" regardless of the actual width.5) CO2 sequestration will be an allowed use for purposes of the RMP in all properties used for enhanced oil recovery.6) A comprehensive description of enhanced oil recovery is incorporated in the document, including a state enhanced oil recovery production projection. OSLI would strongly encourage the BLM to work in partnership with the State to establish a state-wide CO2 network to produce and deliver CO2 across Wyoming and if necessary, amend other existing	2054

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		Resource Management Plans to facilitate enhanced oil recovery throughout Wyoming	
10205	10205-1	BLM has attempted to characterize bentonite mining over the last 60 or so years. Its analysis is out-of-date/low on employment, pg. 3-41. Wyo-Ben would estimate direct milling and mining employment from bentonite in the Bighorn Basin at well over 600, and perhaps as many as 700. BLM should conduct a more thorough investigation on employment, as these numbers directly-affect socioeconomic impacts discussed later in the RMP.	2054
10205	10205-10	On pg 4-266, on Alternative A (and by reference Alternative D), BLM states that dust and vibration from mineral development activities can cause degradation to rock art. Wyo-Ben has inquired previously about the body of evidence or studies to indicate the challenges with rock art degradation from dust and vibration. BLM has failed to produce this data. Since no scientific reference exists in the proposed RMP, we must assume there is no technical data to support BLM's position, and ask that this language be removed.	2055
10205	10205-11	On page 4-274 the RMP states, "Rock art and other prehistoric and historic sites and districts are managed for scientific, public and sociocultural use, and research and preservation study and use. Known important cultural sites are protected from surface-disturbing activities. For resources where setting is important to the site's integrity, the site's foreground is to be avoided with buffers that may be up to 3 miles wide." BLM has given no scientific or legal justification for limiting activities with their arbitrary three mile buffers, BLM does not have authority to limit non-discretionary activities such as locatable minerals for virtual or intangible reasons	2054
10205	10205-2	On pg. 3-42 describing "management challenges," BLM assigns disturbance of 30,000 acres to bentonite mining in the Bighorn Basin. Most of the acreage is on private lands, with inference of an impact to the federal estate. BLM should clarify the acreage by differentiating the private from federal land.	2055
10205	10205-3	Wyo-Ben supports the preservation of cultural resources. On page 3-122 the RMP states, "Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community/or scientific, traditional, religious, or other purposes. Cultural resources include archeological resources, historic architectural and engineering resources, traditional resources ... ... Traditional resources can include archeological resources, structures, topographic features, habitats, plants, wildlife, and minerals that Native Americans or other groups consider essential to the preservation of traditional culture. .. The definition of traditional resources is being expanded to topographic features and structures. Our bentonite mining operation exists in topographic features located in the Frontier, Mowry-Shale and Thermopolis Shale formations. The RMP does not specifically-mention any topographic feature or place, yet plans to regulate activities with these features. The RMP should specify BLM's intent and effect on other uses.	2054
10205	10205-4	On pg. 3-126,127, the RMP mentions several trails including unnamed trails but provides no details on location or management. Failure to disclose the locations eliminates the possibility of a predictable regulatory landscape. Other multiple use and development costs that could be avoided will be uselessly spent on areas with a high potential for conflict	2054
10205	10205-5	On page 3-133, the RMP states, "As shown in Map 37. approximately 50 percent of the Planning Area is classified as Class 4 or 5 geologic formations. indicating a	2057

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		"High" or "Very High" potential for vertebrate or scientifically important paleontological resources." In reviewing Map 37, the PFYC 4 has been merged into PFYC 3. We cannot identify the 50 percent that Class 4 and 5 encompass. Also from Map 37, over 80% of the area is considered PFYC 3 or greater requiring an on the ground survey for any ground disturbing activity.	
10205	10205-6	On pg 3-133, BLM states that outcrops of Mowry and Thcrmopolis Shale produce the fossil bones of marine reptiles, yet no citation for this claim exists	2055
10205	10205-7	In Table 3-34, BLM elaborates that the Frontier and Cody Shales also produce marine reptiles. These formations are the commercially-viable bentonite-producing formations. Of the hundreds of thousands of tons mined here, Wyo-Ben is unaware of any scientifically-important find of marine reptiles in the bentonite-bearing geologic units in the Bighorn Basin. This erroneously conveys the impression that expensive surveys are a reasonable, proactive conservation tool for subsurface-disturbing activity such as bentonite mining. BLM should correct this error or provide scientific proof otherwise	2054
10205	10205-8	Page 2-84 (Table 2-5) regarding sage grouse, Alternative D, unlike alternative A, does not distinguish between discretionary and non-discretionary activity when stating sage grouse protection stipulations within Key Habitat areas.	2071
10205	10205-9	On pg. 4-43, BLM mentions the Endangered Species Act without commenting on the 1872 Mining Law. We recognize these laws may conflict, but compliance is required on both counts. There can be no assumption of one law trumping the other.	2054
10208	10208-1	The plan reports approximately 3.2 million acres of public lands in the planning area. Current BLM Wilderness Study Areas total 140,924 acres, or 4.4%, of the public lands in the basin. The plan reports that a total of 960,000 acres of federal mineral estate had been leased through June 1998. The release of this planning document (Scoping Report in March 2009) could have easily incorporated the acreages from the expanded leasing that occurred during the final months of the Bush Administration to come up with a more accurate acreage value. Information I was able to attain from the BLM's oil and gas leasing website indicated an additional 45,636.31 acres of oil and gas leasing in Big Horn, Hot Springs, Park, and Washakie Counties occurred with the August 1998 auction and an additional 32,951.49 acres in these four counties leased during the October 1998 auction. This April 2011 document could have easily shown the leasing acreage to be well over 1 million acres instead of the 960,000 figure. All told, additional oil and gas leasing from August 1998 through August 2011 has added 141,455.64 acres to the basin's leasing total; 531 more acres leased in this 3 year period alone than the total acreage contained in all of the basin's WSAs. The total acreage to-date of oil and gas leases in the planning area is now approximately 1,101,500 acres. The plan reports a total of 4,219,790 acres of federal mineral estate in the planning area. The current leased amount would therefore be 26.1% of the total federal mineral estate in the basin.	2013
10208	10208-2	BLM may have used language on the Travel Management Maps that may unnecessarily alarm certain readers. The stop-light red notation for areas closed to motorized vehicle use is simply labeled as "closed." This could give the impression that these lands are completely closed to all entry. This label should clearly denote these areas are "closed to motorized vehicle use." Travel into these areas by foot or on horseback is certainly not curtailed.	2054

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10211	10211-1	We believe that livestock grazing has shown itself to be a sustainable use of the resource. The DEIS discusses the in Appendix W that livestock grazing is to be considered a surface disturbing activity. I feel this is stretching the concept of a surface disturbing activity to almost beyond the breaking point. All of the areas encompassed by the RMP have had grazing activity on them for thousands of years. The plant species have all evolved with grazing and a sizable body of evidence exists to document the importance grazing is to these species. To then move those activities into the realm of a surface disturbance similar in nature to road building or mining is not logical and I believe such categorization of this activity should be taken out of the final document.	2011
10211	10211-2	Furthermore I strongly disagree with the designations of lands with wilderness characteristics. The DEIS has identified 56 areas totaling 571,000 acres. However, within these acres there are approximately 600 miles of road; over 400 reservoirs; close to 300 miles of fences. In addition there are over 150 range improvements; 17 water wells and 10 miles of water pipelines. All of these argue against wilderness characteristic. Designation of areas as wilderness or lands with wilderness characteristics has significant economic impacts on ranching operations. These additional costs contribute to further difficulties in maintaining a viable ranching unit. Efforts should be made by the BLM to reduce the economic burdens on the ranching community.	2027
10211	10211-3	The RMP/DEIS establishes some 1.8 million acres for sage grouse protection in the management area. The document is not clear on what the BLM anticipates towards grazing in sage grouse areas. Grazing could be adversely impacted depending on the restrictions put in place to protect sage grouse.	2071
10214	10214-2	Oil and gas stipulations should incorporate wording to prohibit surface-disturbing activities within ¼ mile of or within riparian/wetland areas as shown in alternative B (record #4037).	2033
10214	10214-4	Oil and gas leasing on Federal lands is critical to both the Nation and to the local economy. It also has the potential to significantly impact and degrade the Big Horn Basin. To better plan for and manage these leases the BLM needs to consider spacing requirements for all new leases. The spacing requirements should be made on a watershed/geographic basis and include a minimum 2-mile buffer from all identified sage grouse leks and nesting areas. Geographic areas for well/facility spacing should be mapped (delineated) and include classifications such as "heavy industrial" (5-acre or less pad/facility spacing); "industrial" (40-acre pad/facility spacing); "light industrial" (160-acre pad/facility spacing) as an example.	2049
10214	10214-5	Best management practices should be required and not just recommended as a lease stipulation on all new leases. In particular, all evaporation ponds, skim pits, and reserve pits need to be netted, at a minimum, to prevent accidental mortality of migratory birds. In conjunction with required netting the BLM needs to implement comprehensive monitoring of existing oil production facilities. Monitoring needs to be intensive enough to insure that netting is adequately maintained, and that all spilled oil is promptly cleaned up and the site remediated to prevent entrapment or contamination of birds and other wildlife.	2025
10214	10214-6	Noxious weeds have deleterious impacts to riparian systems, wildlife habitat and livestock grazing. Consequently, the RMP needs more emphasis/resources applied to their management. Emerging problems such as the invasion of riparian areas by Russian knapweed should be met aggressively and on a	2012

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		priority basis while the problem can still be realistically addressed. The BLM must work cooperatively with State and county organizations to establish priorities for control and to establish monitoring standards to establish successful treatment strategies. A permit condition for all surface-disturbing activities such as leasable mineral, locatable mineral and salable mineral development/extraction and their related facilities such as right-of ways and access roads should include annual physical inspections for and treatment of noxious weeds by the permit holder. Permit holders should be required to submit an annual report of noxious weed monitoring/treatment activities as a condition of permit approval.	
10214	10214-7	Mining impacts water quality, recreation, wildlife habitat, and livestock grazing. Cumulative impacts that have and will result from bentonite mining need to be evaluated. By doing this effective measures can be put into place to keep the industry from having unnecessary/undue degradation on the environment. In situ leach mining operations require test wells to detect any leakage or contamination of groundwater outside the aquifer mining zone. In addition, suitable bonding is required to assure remediation of groundwater contamination that may result from in situ mining operations. Concurrent reclamation should, generally, be required of all open-pit mining operations.	2049
10214	10214-8	The BLM should, however, give additional attention to route management. Although the legal use of off highway vehicles on designated roads and trails is a popular and valid use of public lands, it is extremely important to protect our wildlife, scenic and cultural values. These resources provide the basis of our recreation industry and play a critical role in providing quality of life benefits for those of us that have chosen to make the Big Horn Basin our home. Due to the importance of these resources, motorized vehicle use on most of the BLM lands covered by the RMP should be classified as limited to designated roads and trails with seasonal closures on the majority of sage grouse nesting areas and big game crucial winter range. To accomplish this it will be necessary for the BLM to work with state, county and local organizations to identify areas, roads and trails to promote appropriate motorized use. The effective implementation of any travel management plan(s) will require vigorous enforcement against unauthorized use.	2034
10215	10215-1	To the extent that Alternative D deviates from Alternative A, changes should be based on mandatory statutory and regulatory changes or identified failure to meet the multiple use mandates for BLM land management. WSGA finds that several proposed changes fail to meet these criteria. The increased emphasis on "conservation of physical, biological, and heritage and visual resources"; designation of numerous types of priority management areas (SMAs, MAs, ACECs, SRMAs, ERMAs); these all represent further erosion of the fundamental multiple use concept which Congress has determined should guide BLM resource management.	2055
10215	10215-11	Records 4092-4111 Greater Sage Grouse: The USFWS has accepted the Wyoming Governor's Executive Order and the concept of core areas as an appropriate methodology to address the needs of the greater sage grouse. WSGA urges BLM to reference and adopt this strategy as its management guidance.	2071
10215	10215-12	Record 4115: This section should specify that, if the gray wolf is delisted in Wyoming, BLM will undertake no conservation or management actions to protect the wolf or its habitat unless requested to do so by the WY G&F.	2042

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10215	10215-14	Record 6283: The language under alternative D is very unclear. WSGA suggests using language from alternative A or otherwise clarifying the intent.	2011
10215	10215-2	While WSGA concurs that "BLM is required to inventory lands to determine whether they possess wilderness characteristics", this inventory under FLIPMA carries no greater weight than the inventories for grazing suitability, minerals etc. There is no requirement that these lands be managed primarily for their wilderness characteristics. In light of the congressional prohibition of the use of funds for the identification of LWCs and designation of Wild Lands, WSGA assumes that all references to LWCs, Wild lands, Secretarial order 3310 and corresponding BLM Manuals will be removed from any final RMP.	2027
10215	10215-5	WSGA respectfully suggest the use of more current and more directly applicable USDA NASS data on pages 3-176/177. Using recently released 2010 data, Wyoming accounted for 2.2% of the U.S. inventory of beef cows, giving us a ranking of 15th. For 2010 Wyoming had 6.7% of the total number of breeding sheep, a ranking of 3rd, and ranked 3rd in wool production.	2011
10215	10215-6	Record 1037: WSGA notes that Alternatives A-C include references to maintaining natural flow regimes "in compliance with Wyoming water laws". Alternative D fails to include this language. We hope that this was an oversight that will be corrected.	2031
10215	10215-8	Record # 4077: If the purpose of this restriction is to mitigate negative impacts of livestock on elk parturition, such actions should only be considered on a case-by-case basis if formally requested by the WY G&F, the agency with management authority over elk. If the purpose is to reduce the risk of brucellosis transmission to cattle, WSGA recommends that the following language be substituted: "BLM would consider implementation, on a case by case basis, of management actions jointly recommended by wildlife managers, grazing permittees and animal health officials that would control the transmission of brucellosis."	2025
10216	10216-10	On page 2-39, we comment that "Livestock Grazing Management" should not be included in the "Resource Topic" for the Surface-disturbing/surface disturbance "Term or Concept".	2011
10216	10216-11	On page 3-116, we comment that the Final RMP should convey to the public ALL of the reasons the BLM used when they made the decisions over 30 years ago to remove all "wild" horses from Foster Gulch, North Shoshone, Zimmerman Springs, Alkali Spring Creek, and Sand Draw Herd areas. For example, we are aware that a significant reason for removing all "wild" horses from the Foster Gulch Herd area was an insistence from the Wyoming Game and Fish Department that a new fence on the south side of this Herd area which would have been required to keep these horses inside the Herd area would have been very detrimental to seasonal migrations of mule deer. The BLM and public agreed with that reason and those horses were removed. It is also our understanding that there were legitimate reasons that were considered much more significant than the "competition for forage with livestock" shown on page 3-116 & 7 as justification for the BLM decisions to remove all horses from the Zimmerman Springs and Sand Draw areas. Please convey ALL of these justifications to the public.	2030
10216	10216-12	We also comment that the Final RMP should include the viable option of a complete removal or management for a 100% non-reproducing herd of "wild" horses in the Fifteen Mile HMA. The horse program within the BLM is in a state	2030

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		of desperate financial and administrative condition. The BLM needs to prioritize the number of HMAs their budget and staff can properly manage in compliance with the 1971 Wild Horse and Burro Act. The Fifteen Mile HMA certainly qualifies as an HMA that could be returned to a priority for wildlife, recreation, and livestock multiple uses. The health of the lands and natural resources could then recover it would save the BLM a lot of time and the public's money. The WSGB has been on-the-ground in a number of rangeland areas in the Fifteen Mile HMA. It is our opinion that a number of sizable polygons in this HMA do NOT meet one or more of the Wyoming Rangeland Health Standards due to impacts to natural resources from year-long "wild" horse use. We are of an understanding that a significant reason for the amount of nonuse by livestock permittees who hold grazing rights in the Fifteen Mile HMA is directly related to the adverse rangeland health and water quantity/quality issues created by the "Wild" horses in this area. We comment that a new assessment of the Wyoming Health Standards should be conducted in the Fifteen Mile HMA with the participation of rangeland scientist from outside the employ of the BLM.	
10216	10216-13	On page 3-179, we comment that the paper by Holechek, 1988, should not be the basis for the narrative on the subject of "suitability" because his paper only applies, if at all, the New Mexico rangelands, not to cool season grasslands in Wyoming. We can find NO science based, peer reviewed published literature or research that supports the concept of distance to water and suitability of rangelands for livestock grazing in cool season ecosystems and we request that this concept be removed from the Final RMP	2011
10216	10216-14	On page D-1, the narrative under 1.0 speaks to a requirement that cooperative agencies need to be involved in the continued monitoring of the implementation of the entire RMP. But the narrative under 4.0, MONITORING WORKING GROUP conveys an intent to develop a "Monitoring Working Group" to develop an overall monitoring plan related to livestock grazing issues. This section states that guidance and direction to monitor implementation of the entire RMP will be provided by Appendix C. Appendix C deals with livestock grazing monitoring and evaluation protocols. It is our comment that monitoring the implementation of the entire RMP is a MUCH different task than monitoring of livestock grazing influences on federal rangelands. Please provide a much clearer statement in the Final RMP as to how the BLM intends to monitor the implantation of the entire RMP as a separate process from monitoring the impacts, if any, of livestock grazing.	2011
10216	10216-15	In Appendix C, under 2.0, DATA COLLECTION, why are the permittees not included in the list of those with whom the BLM intends to cooperate in the collection, analyzing, and report monitoring data? Why are the permittees not specifically included in those involved in the determination of causes and effects, predictive modeling, and condition and trend from the results of the monitoring program ?We propose that the Final RMP clearly convey an intent by the BLM to use the "Joint/Cooperative Monitoring Program" , JCM as supported by, and authorized by the National Memorandum of Understanding between the National Public Lands Council and National BLM Director for all monitoring programs in the RMP area. If the RMP Team does not have a copy of this MOU, please contact the Director of BLM or BLM Chief of Range for that information.	2054
10216	10216-16	We do not see in this Draft AMP a Table that shows the current Preference level of livestock AUM's held by your permittees. Appendix P only shows the level of	2011

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		"active AUMs". Please include a Table in the Final RMP that conveys the Preference level, active use level, and suspended use levels of livestock AUMs for each permit and lease in the RMP area.	
10216	10216-17	In the Final RMP, please convey an additional level of detail with respect to the policies and specific management actions or changes to current management that will be used by the BLM to guide livestock grazing activities in identified sage grouse seasonal habitats. We also request that the Final RMP convey in the ROD a commitment to identify and map all seasonal grouse habitats on federal lands within a specific time frame. Neither the permittees nor BLM can expect to be effective with respect to the conservation of grouse without that knowledge. The information in the draft RMP is not specific enough to be able to evaluate the potential impacts of the grouse subject sections on either current or future livestock	2011
10216	10216-18	In Appendix W, in the fifth paragraph on page W-1, a narrative conveys that watershed and vegetation management "objectives" would not be met if utilization levels consistently exceed the levels in Table W-1.We specifically request that the Final RMP offer peer reviewed, science based support for this statement. We can find no statements in the draft RMP that convey what are the specific measurable "objectives" with respect to watershed and vegetation management that would not be met if the use levels in Table W-1 are exceeded. We can find Goals, but no objectives. Objectives are by definition, measurable, (see Glossary at pg. 24 and Appendix N at N-8). If the RMP contains site specific objectives that the BLM feels will react in a trend to the use levels in W-1, please guide us to those so we can evaluate and provide a comment with respect to whether or not the restrictive utilizations in Table W-1 could accomplish what the RMP conveys.	2033
10216	10216-19	We also comment that we have read Appendix N, Wyoming Standards For Rangeland Health, and we can find no direct relationship between the utilization levels in W-1 and whether or not an allotment would either pass or fail these "Standards" or help fix a flunked standard. We have reviewed considerable published and peer reviewed range science literature on the subject of the influence of utilization on the trend of resource values. In cool season ecosystems, with the exception of situations of consistent, year after year grazing during the growing season at use levels of either "too much" often defined as 70% or more, or "too little" often defined as 10% or less, we can find nothing to support that utilization by livestock in a rotation system at levels that are going to be required by Table W-1 will have ANY measurable effect on trends of resource parameters. We can find NO published literature to support that use levels required by Table W-1 will have a measurable effect on either rangeland health parameters according to the Rangeland Science profession or the Wyoming Rangeland Health Standards. It is also the experience of the WSGB that in situations where an allotment has flunked one or more of the Wyoming Standards, and the BLM has applied utilization standards as an "effective action" as required by CFR 4100 Part 4180, we can find no documentation from the BLM to support that the utilization prescription actually brought the allotment back into compliance with the Wyoming Standard.	2011
10216	10216-20	We comment that the Final RMP should contain a statement that management of utilization levels for the expressed purpose of helping bring an allotment back into compliance with one or more Wyoming Standards or to assist in achieving one or more site specific resource objectives jointly develop between the BLM	2076

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		and permittee, will ONLY be applied when it has been determined from data collected from a science-based, joint cooperative monitoring program with the permittee(s) that active management of utilization is a required and necessary "effective action" under CFR 4100 part 4180.	
10216	10216-21	In Appendix V, WEPP Technical Support Document, we comment that the parameters used as input to the WEPP model to simulate conditions in the Planning area are much too generic to adequately represent the very wide variety of actual on-the-ground situations. For example, at each proposed rangeland improvement, the variability in gradients, aspects, soil types, bare ground percentages, and rock cover, in the Big Horn Basin can and will be dramatically different. We request that the entire section of the RMP with respect to the predicted results from the WEPP model be removed because the reliability of predicted results of soil erosion from this model in as conveyed in Table V-1 can not be estimated with any degree of precision due to the inflexible inputs to the model. The results convey an amount of soil erosion from human caused activity that is unreliable and misleading to the public. We VERY much disagree with the statement in this Appendix that conveys that the model estimated that with no disturbance there would only be trace amounts of annual runoff. It is common knowledge that the Bighorn Basin is and always has been before man arrived, a very highly erosive environment.	2011
10216	10216-22	We agree with the definition of "utilization" in the Glossary and request that the narratives in entire RMP related to this subject recognize and apply this definition where appropriate.	2011
10216	10216-4	We also request that the Final RMP/ROD specifically exclude livestock management activities conducted by the permittees to accomplish the terms and conditions on their permit as required by the BLM from the additional proposed off-road restrictions. This is another example of an adverse impact on permittees.	2011
10216	10216-6	We do not support the addition of any new Areas of Critical Environmental Concern, (ACEC), and request the removal of existing ACECs until such time as it has been determined through a public process that there are any areas in the Worland or Cody Field offices of the BLM that qualify under the definition of that concept as stated in the Federal Land Planning and Management Act, FLPMA. The definition of an ACEC in the FLPMA clearly conveys that an area of federal lands can only be proposed for ACEC status if that action by the BLM, "is required to protect and prevent IRREPARABLE (our emphasis) damage to important historic, cultural, or scenic values." (quote from the FLPMA definition)The key word from this Congressional definition is "IRREPARABLE" and we have not read in this draft RMP any support for current or proposed ACECs as a requirement to prevent "IRREPARABLE" damage to federal lands. If the Final RMP/ROD includes ANY ACECs, we request that these documents clearly convey what will be done by the BLM with respect to action items that preclude "irreparable damage" to these ACECs.	2001
10216	10216-7	On page 2-33, in the last sentence on this page, please convey what and specifically where are the "new resource uses" that will be mitigated to minimize or avoid conflict with livestock grazing?	2011
10216	10216-8	On page 2-35, we comment in total opposition to the seasonal restriction on livestock grazing in elk parturition areas. To date, neither the WSGB nor the public have been provided any justification for the concern that livestock grazing has ANY adverse effect of elk calving success ratios. We request that the	2011

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		Final RMP/ROD remove this unfounded bias.	
10216	10216-9	On page 2-35, we also comment that the seasonal restrictions from February 1 to July 31 should not apply to livestock or rangeland management practices. The Executive Order from the Wyoming Governor with respect to Sage Grouse specifically conveyed that normal livestock and rangeland management practices we considered "de minimus" by that Order and we understand that the State BLM has adopted that Order for federal BLM lands in Wyoming.	2011
10217	10217-1	I believe the wild horses of the two HMAs in the Bighorn Basin deserve protection and preservation. I note that these horses, and most especially the McCullough Peaks horses, are attracting more and more recreational viewers to the HMAs each year. I further note that recreational use in general (hikers, horseback riders, ORVs, fossil hunters, sight-seers, hunters, and photographers) in both the McCullough Peaks area and the Fifteen Mile Basin has risen significantly in recent years. I contend that the final RMP should respond to the public's interest in these recreational opportunities by managing both areas as Special Recreation Management Areas (SRMAs).	2062
10217	10217-2	For the McCullough Peaks area, I suggest the establishment of the SRMA of 160,860 acres, as put forth in Alternative B. The SRMA should be managed for both motorized and non-motorized recreational use with No Surface Occupancy restrictions on future oil and gas leasing within this area. Any currently held leases which may be "grandfathered in" should be strictly held to the BLM's highest "Gold Book" standards, with NSO's stipulated wherever possible. The SRMA should be managed as a ROW avoidance and/ or mitigation area, and surface disturbing activities should be limited to development of recreation related facilities or activities which will enhance wildlife habitat. Since the McCullough Peaks area currently offers a world-class viewshed, it should be protected by designating the entire SRMA as Visual Resource Management Class II. Future developments of renewable energy resources (wind, solar, geothermal) should be disallowed. Motorized vehicle use should be limited to designated roads within the SRMA.	2062
10217	10217-3	As to the McCullough Peaks HMA, I believe that the western boundary should extend to the Shoshone River. In past years I have personally observed wild horses coming down to the Shoshone River to drink. The river presents a natural barrier for horses crossing from BLM land onto private lands across the river. This is part of the wild horse historic range and the river obviously provides a perennial water source for the western side of the McCullough Peaks wild horse range. Water is a limited commodity within the HMA.	2030
10217	10217-4	I also suggest that the RMP be written so as to allow for the possibility of putting in crossing areas for wild horses and other wildlife to move from the McCullough Peaks area to BLM lands on the east side of Highway 32. Underpasses near Dry Creek and Coon Creek come to mind. These safe crossing areas would allow wild horses to access that area which lies east of Highway 32, which is also a part of their historic range. I believe that the BLM refers to this area as Foster Gulch.	2030
10217	10217-5	The RMP should also provide a mechanism which will trigger a reevaluation of the Herd Management Level (HML) for both the McCullough Peaks and the Fifteen Mile HMAs. I would suggest that a fresh assessment of the HMLs is appropriate as soon as is practical, and another assessment should be programmed for twenty years hence.	2030

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10217	10217-7	I firmly believe that a restriction should be imposed upon approaching closer than 100 yards from wild horses. This restriction protects both the human observers (recreationists, photographers, hikers, etc.) and the horses. It should be specified that designated wild horses managers are exempt from this restriction, so that the PZP field darting, necessary gathers, and the like may be continued as management practices.	2030
10217	10217-8	I recommend designating the Fifteen Mile Basin area as a Special Recreation Management Area (SRMA). By doing so, it would help to protect this area from activities which would degrade its outstanding recreational values, and paleontological resources. It would also serve to create a physical connection between the Bobcat Draw Badlands, Red Butte, and Sheep Mountain Wilderness Study Areas. The SRMA should be managed with limitations to motorized vehicle use on designated roads and trails only. NSO should apply to oil and gas leasing. ROWs should be avoided and or mitigated. Surface disturbance should be limited to establishing recreational facilities of enhancing wildlife/ wild horse habitat. It should be given a VRM class I or Class II rating (most restrictive as possible), and renewable energy sources should not be developed. Additional water development projects should be planned for this area.	2062
10218	10218-1	In the BLM RMP, a fair amount of discussion pertained to the protection of the Paleocene-Eocene Thermal Maximum (PETM) stratigraphic zone. In particular, a number of Areas of Critical Environmental Concern (ACEC) were proposed based on the protection of this geologic horizon as the outcrop snakes around the basin. These ACECs include the Clark's Fork Basin/Polecat Bench West Paleontological Area, McCullough Peaks South Paleontological Area and Foster Gulch Paleontological Area. The PETM horizon does not need any protection. Paleocene and Eocene sediments in the Bighorn Basin are composed of claystones, mudstones, siltstones, sandstones and occasional coals. Almost all geoscience field studies of intervals composed of claystones, mudstones, siltstone, coal and thin sandstones are dependent on fresh exposures along road cuts. Without fresh exposures, there is little to study on the surface. Almost all geoscience field trips that focus on these types of rocks take their participants to road cuts or mining highwalls. Studies of the PETM would benefit from oil and gas development that would provide fresh exposures. The PETM is not a depleting resource like Native American artifacts on the surface. The PETM horizon continues into the subsurface. If some of the PETM is removed by oil and gas surface development, there is more PETM immediately below what was removed. The BLM RMP does not say how restricting surface disturbance on the PETM will specifically help the study of it. It seems rather obvious that surface disturbance will provide critical exposure to these soft sediments for better study.	2034
10218	10218-2	In the BLM RMP, a fair amount of discussion pertained to the protection of botanical and vertebrate fossils. In particular, a number of Areas of Critical Environmental Concern (ACEC) were proposed based on the protection of these fossils. These ACECs include the Clark's Fork Basin/Polecat Bench West Paleontological Area, McCullough Peaks South Paleontological Area and Foster Gulch Paleontological Area. The sediments and areas that contain these fossils do not need any protection. These fossils are exposed to erosion and degradation every day. They slowly fall apart and dissolve. The particles that remain are then washed down the drainages and rivers. The government does	2034

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		not allow private/commercial collection of the vertebrate fossils, thus what value might exist with these fossils is lost since they just erode. Compared to how much erodes away, very little is collected for academic studies. Erosion of the rocks that contain these fossils has been occurring for millions of years. It is not a depleting resource like Native American artifacts that only occur on the surface. The beds that contain the fossils continue into the subsurface and continue across the basin. There is an almost unlimited supply of new fossils below the surface. If some of the fossils are removed by oil and gas surface development, there are more fossils immediately below what was removed. Surface disturbance by oil and gas development would provide fresh exposures in these sediments to better study and potentially find additional fossils. The value of botanical and vertebrate fossils potentially disturbed by oil and gas development in the Bighorn Basin is miniscule compared to the value of oil and gas that could come from that same area.	
10218	10218-3	My experience with oil and gas exploration from a long career is that new geologic ideas and new technology results in the economic development of oil and gas resources in areas that were previously thought to be non-commercial. The BLM and the USGS may believe an area has low potential for commercial oil and gas, but that same area may be a tremendous oil and gas resource for the nation in the future. We have seen that repeatedly across the nation in new plays like the Bakken, Eagle Ford, Barnett, Marcellus, Fayetteville, Bone Springs and Haynesville shales. Do not shut down an area to future oil and gas development because today you perceive it to have low potential.	2051
10219	10219-4	3.6.6 Lands with Wilderness Characteristics. Many existing roads, livestock reservoirs, and fences were not considered, to be able to consider this an area with wilderness characteristics. When is a road not a road? Reminds me of "it depends on what the definition of "is" is." Roads are roads. Reservoirs that are on the BLM's own listing of BLM allotments were not included.	2027
10220	10220-1	Surface disturbance should be limited to mechanical activities, and be consistent with other RMPs, therefore the Big Horn Basin RMP should use, Information Bulletin WY-2007-029, Guidance for Use of Standard Surface Use Definitions. New definition: Updated 5/26/2009Surface-Disturbing Activities: These are Public Land resource uses/activities that disturb the endemic vegetation, surface geologic features, and/or surface/near surface soil resources beyond ambient site conditions. Examples of surface-disturbing activities include: construction of well pads and roads, pits and reservoirs, pipelines and power lines, and most types of vegetation treatments (e.g., prescribed fire, etc.). NOTE: Some resource uses, commodity production and other actions that remove vegetative growth, geologic materials, or soils (e.g., livestock grazing, wildlife browsing, timber harvesting, sand and gravel pits, etc.) are allowed, and in some instances formally authorized, on the Public Lands. When utilized as a land use restriction (e.g., No Surface Disturbing Activities), this phrase prohibits all resource use or activity, except those uses and activities that are specifically authorized, likely to disturb the endemic vegetation, surface geologic features, and surface/near surface soils. Original definition: Grass Creek Planning Area 1998Surface-Disturbing Activities (or Surface Disturbance): The physical disturbance and movement or removal of land surface and vegetation. These activities range from the very minimal to the maximum types of surface disturbance associated with such things as off-road vehicle travel or use of mechanized, rubber-tired, or tracked equipment and vehicles; some	2054

Table B-1. Individual Comments and BLM Response Index (Continued)

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		timber cutting and forest silvicultural practices; excavation and development activities associated with use of heavy equipment for road, pipeline, power line and other types of construction; blasting; trip pit and underground mining and related activities, including ancillary facility construction; oil and gas well drilling and field construction or development and related activities; range improvement project construction; and recreation site construction	
10220	10220-12	6045 Snowmobiling is not a surface disturbing activity and should not be limited to roads and trails.	2034
10220	10220-13	Recreation is too specific for this large document it is difficult to comment because it is unclear to where the described areas are. The names and locations are confusing for this large resource area. There is no clear description of the land locations and therefore it is difficult to identify the impacts of the alternatives.	2062
10220	10220-14	6000 Lands With Wilderness Characteristics/Wild Lands uses incomplete inventories to classify wilderness characteristics and should be removed from this document, furthermore funding has been removed for wildlands, so they should be removed.	2027
10220	10220-15	Goal LR10.1 Remove "consistent with multiple-use needs" replace with "for." Livestock grazing should be managed for sustained yield. Monitoring and mitigation can coordinate livestock grazing with other resource objectives. A resource (livestock grazing) has its own goals and actions that are designed to manage that resource (livestock grazing), stating that a resource (livestock grazing) will be used to meet other objectives is not management of the resource (livestock grazing), it is a management action of another resource that should not be in another resources (livestock grazing) actions.	2011
10220	10220-17	6268 Replace "stakeholder" with "interested public." Interested public is cited in CFR 4100.0-5. Stakeholder is not defined in the federal regulations.	2011
10220	10220-18	6268 Remove "and meet other multiple use objectives." Each resource should stand on its own merits rather than one resource stating that it will give. This is unfair multiple use and could cause economic loss to permittees and local economies. A resource (livestock grazing) has its own goals and actions that are designed to manage that resource (livestock grazing), stating that a resource (livestock grazing) will be used to meet other objectives is not management of the resource (livestock grazing), it is a management action of another resource that should not be in another resources (livestock grazing) actions	2011
10220	10220-19	6276 Remove "to support other resource objectives and" replace with "to."	2011
10220	10220-2	1000 PR: 3 remove the word significant. Significant cannot be measured.	2009_1
10220	10220-22	The BLM failed to consider new technologies that can manipulate plants communities and water develop that could prevent no net loss of AUMs. Appendix P should include Preference AUMs	2011
10220	10220-23	Utilization Levels in Appendix W Table W-1 are new levels and are incorporating precipitation zone with season of use to classify levels of utilization. These changes in utilization levels were not compared and analyzed for environmental impacts regarding AUMs or economic impacts. "35% or less utilization of current standing crop during growing season" conflicts with the definition of utilization. Current year's forage production cannot be determined during the growing season, therefore 35% cannot be determined. Extensive wildlife use cannot be analyzed or described in quantitative terms as stated in Footnote 1 of Appendix W.	2074

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10220	10220-4	1039 PR: 4.3, 4.4 there is no definition to "casual factors."	2031
10220	10220-7	4132 Remove "through upland management" since impact is marginalized	2042
10220	10220-8	GOAL BR: 11 Remove "thriving" descriptive personal interpretation.	2030
10230	10230-1	Along the south side of Gypsum Creek Road are north-facing cliffs composed of dark shale. (See Map 2). These cliffs have been used extensively for motorcycle hill-climbing. One of my concerns is that your Preferred Alternative designates this area as "Limited to Existing Roads and Trails." This is not practical in a historical play area. There are trails everywhere. Further, anyone who does not make it to the top of the hill must necessarily leave the existing trail, at least for a short distance. The cliffs should also be designated "Open." There are areas along the ATV Trail between the Bentonite Hills and the cliffs that have historically been used as play areas. One such area is depicted on Map 3. These areas have no surface water, no vegetation, and support no wildlife. Being composed primarily of bentonite, the soil (such as it is) swells with every rain. It then shrinks and crumbles as it dries, erasing recent ATV tracks and trails. This land is ideally suited for Play Areas - and little else. As appropriate, non-vegetated areas along the ATV Trail should be designated as "Open" areas.	2034
10248	10248-1	. The plan is a 20 year plan yet the BLM fails to include reasonably foreseeable development which addresses horizontal and directional drilling.	2061
10248	10248-2	By decreasing lands available for grazing by 27% you are negatively effecting the ranching industry, ranch employment and all jobs supporting the ranching industry including federal employment, which will decrease property tax, sales tax, and retail wholesale spending resulting in an economic hardship. The BLM has not shown how these decreases will better the LWCs by not allowing grazing.	2027
10248	10248-3	There is a discrepancy in the Big Game Winter Range area identified by the BLM and also by the WGFD. BLM Big Game Crucial Range covers nearly twice the area as WGFD Big Game Crucial Habitat, nearly 649,246 acres. This discrepancy is unacceptable and unjustified. The BLM must reevaluate these areas in the Draft RMP and limit the designation of such areas to those necessary for the maintenance of populations at object levels.	2022
10248	10248-4	An example is Legend Rock Petroglyph site. All alternatives states that a three mile buffer zone will be used around all cultural sites. When you follow the trail to view the petroglyphs you are facing a cliff face on one side so there is less than 100 yards of visual resource. If you turn around you face a small hill which also limits your view. A three mile buffer is unnecessary in this instance.	2004
10248	10248-5	NO WHERE in the plan do you address what roads can, mayor will be closed or your sound reasoning of why.	2034
10248	10248-7	The BLM did not conduct a study of special designations and other management areas and the economic impact on stakeholders and locals governments from the associated constraints and restrictions.	2046
10261	10261-1	EPA believes that the Draft EIS contains insufficient information to evaluate and disclose potential impacts to air quality and air quality related values. A thorough analysis of air quality is essential because of the proximity of the proposed development and its associated projected emissions to five federal Class I areas (North Absaroka, Washakie, Fitzpatrick and Bridger Wilderness Areas, and Yellowstone National Park) and four sensitive Class II areas (Bighorn Canyon National Recreation Area, Bighorn National Forest, Teton Wilderness Area, and Cloud Peak Wilderness Area). More specifically, these sensitive areas	2009

Table B-1. Individual Comments and BLM Response Index (Continued)

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		are located either within, directly adjacent to, or within 35 miles of the RMP planning area. Without an air quality impact analysis to confirm otherwise. EPA must assume that the predicted cumulative emissions from the estimated 1.534 new oil gas and coalbed methane wells identified for the preferred alternative are potentially substantial.	
10261	10261-10	The Draft EIS provides no explanation of or justification for BLM's selection of a preferred alternative that does not protect and enhance Wild and Scenic River resources. The EPA recommends that the Final EIS describe the basis for BLM's decision with regard to listing of waterways within the planning area.	2018
10261	10261-11	The Draft EIS estimates 920 acres of short term disturbance and 139 acres of long-term disturbance to wetlands and riparian areas. The Draft EIS further explains that due to requirements to avoid surface disturbing activities within 500 feet of water, actual direct impacts to wetlands would be less than this estimate. The EPA recommends that the Final EIS display the reduced disturbance achieved in order to provide a more accurate estimate of potential disturbance that considers the avoidance requirement. Doing so will more clearly identify where concerns exist, and enable focus on sensitive areas for protection.	2033
10261	10261-12	It does not appear that the Draft EIS addresses the jurisdictional status of wetlands in the planning area. We recommend that a preliminary assessment of wetland jurisdiction be included in the Final EIS. Having this information readily available will be of use to BLM in future project planning by enabling focus of management practices on areas where sensitive resources are most at risk of being impacted. We further recommend that the RMP/EIS explain that jurisdiction will be determined in future project specific EISs. Further, because a current National Wetlands Inventory is not available for the full planning area, we suggest that the BLM prepare an inventory of aquatic resources, characteristics, functions and overall ecological health. Having such an inventory will provide greater wetland and riparian area protection in the Bighorn Basin by providing information that can be used by BLM when authorizing surface disturbance or planning mitigation for unavoidable impacts to wetlands. Because preparation of an inventory may take time, we recommend that the Final EIS explain how BLM plans to undertake an aquatic resource inventory in the future, and offer our assistance in designing such an inventory.	2033
10261	10261-13	Additionally, we are interested in the Draft EIS's reference to potential carbon sequestration research and projects in Alternatives C and D; however, we were not able to find any detail on these efforts in the Alternative descriptions in the Draft EIS. We recommend that BLM consider additional mitigation measures that could reduce greenhouse gas emissions from RMP activities, for example methods to limit fugitive emissions of methane from oil and gas operations or to reduce combustion emissions.	2003
10261	10261-14	We recommend that the discussion of potential greenhouse gas emissions associated with other activities (e.g.. motorized vehicle use as was included in the emissions inventory prepared for the Lander RMP) be quantified if possible, or else qualitatively compared as a total impact associated with each alternative, to allow for a more clear comparison among alternatives.	2003
10261	10261-15	We also urge that BLM provide additional detail to Alternative D of this management action to make clear how the BLM will address water bodies not meeting state water quality standards. We believe this can be accomplished by identifying the best management practices and discussion how they will be	2031

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		prioritized and implemented to address causal factors related to the impairment of water quality.	
10261	10261-16	The Draft EIS identifies mitigation measures associated with Alternative D to address some potential impacts to surface water quality, including requiring a 1/4 mile water resource buffer for placement of salt, mineral or forage supplements. Given that the Draft EIS acknowledges that livestock may increase loading of fecal bacteria. EPA suggests that the Final EIS clearly discuss how this buffer will be adequate to protect water quality in the planning area, or whether additional mitigation measures are needed (e.g. larger buffer, timing). Finally and because Alternative B provides for a 1/2 mile buffer, we recommend that the Final EIS explain whether any additional benefits would be gained from this wider buffer size.	2031
10261	10261-17	Draft EIS, Table 3.3, Applicable NAAQS and Representative Concentration. Please note that the sulfur dioxide method measured by the WARMS network is not directly comparable to the SO2 NAAQS. The WARMS method is a filter-cartridge based method used to sample sulfateaerosols, typically used in for visibility-related comparisons. An equivalent reference method analyzer meeting the requirements of 40 CFR Part 50. Appendix A should be used to compare against the NAAQS. We recommend contacting the Wyoming DEQ for appropriate S02 monitoring data.	2009
10261	10261-18	Draft EIS. Section 4.1.1, Air Quality and Appendix U. Technical Support Document for Air Quality. The EPA is confused by the discussion on page 4-6 of the Draft EIS, which lists "fire management (including prescribed fire)" as among the activities for which emissions have been quantified. but later states "emissions from any prescribed fire activities conducted on BLM land within the Planning Are have not been estimated in this analysis'" Based on Appendix U, it appears to us that prescribed fire emissions have been included in the emissions inventory, and we recommend that the Final EIS clarify this point.	2009_1
10261	10261-19	In addition to the commitment to manage prescribed burns to comply with Wyoming DEQ Air Quality District smoke-management rules and regulations already included as Management Action 1001, we recommend that the Final EIS include: (1) discussion of appropriate smoke monitoring techniques and mitigation (including meteorological conditions favorable for mitigated prescribed fire smoke and alternatives to prescribed fire such as mechanical fuel reduction methods); (2) requirements for the incorporation of the Interagency Prescribed Fire Planning and Implementation Procedures Guide (July 2008) into site-specific burn plans that would be designed for each prescribed burn conducted under this GMP; and (3) commitment to public notification of pending burns.	2009_1
10261	10261-2	Our understanding is that BLM has not completed a cumulative air quality impact analysis for the 6,133 oil and gas wells that have already been drilled on BLM administered mineral estate. We also understand that BLM has not completed such an analysis for the 4,544 existing active wells within the planning area or for the 1.534 planned wells. In short, the EPA believes that the "level of concern" that would warrant modeling under Management Action 1005 (contained in the Draft RMP) has already been reached.	2009_1
10261	10261-20	We recommend that the Final EIS specify that the 20 acre NSO will apply to all wetlands regardless of jurisdiction, in accordance with Executive Order 11990. In addition, we recommend that BLM consider whether any high value wetland areas smaller than 20 acres would also warrant protection through a SO	2033

Table B-1. Individual Comments and BLM Response Index (Continued)

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		stipulation. Factors to consider include but are not limited to: the jurisdictional waters of the U.S.; agency responsibilities under Executive Orders 11990 and 11988; the needs of species of concern: and potential impacts to aquatic communities.	
10261	10261-21	We recommend that this plan include the following key elements:1. A statement that: "The activity in the basin has already reached a level of concern regarding cumulative adverse air quality impacts. This concern is based on the level of current emissions (1100 tons per year NOx) and the proximity (between 1 and 50 miles) of proposed leasing areas to five federal Class I areas, including Yellowstone National Park, North Absaroka, Washakie, Fitzpatrick, and Bridger Wilderness Area." 2. A discussion of the current air quality status of Class I areas in the project area, based on existing monitoring data and any other available information.3. A statement that: "basin wide modeling to characterize the air quality of Class I areas will occur as soon as possible, subject to funding and staffing levels."4. A statement that: "The modeling would be either (1) a project-specific model (e.g., Calpuff) or (2) another planned modeling effort decided upon in consultation with EPA and DEQ.5. A description of activities that BLM may authorized before Class I area Characterization is completed (e.g.. A requirement for Applications for Permit to Drill or field development proposals to include an emissions inventory until such time as the Class I modeling and characterization is completed).6. A statement that: "A statement that "based upon the findings of the Class I Characterization, and as provided for by law and consistent with lease rights and obligations, BLM will ensure implementation of reasonable mitigation and control measures and design features through appropriate mechanisms including lease stipulations and conditions of approval, notices to lessee, and permit terms and conditions."7. A statement that "BLM would consider applying mitigation measures to oil and gas projects developed under this RMP in the event that a future air quality impact analysis determines there are adverse impacts to Class I areas. "8. Inclusion of a list of mitigation measures that BLM could apply in the event future air quality modeling shows there to be an adverse impact to Class I.9. Inclusion of the Oil and Gas mitigation table currently in the Lander Air Plan, revised as appropriate to apply to the Bighorn Basin RMP.	2009_1
10261	10261-22	The EPA recommends that the BLM develop lease stipulations for protection of sensitive drinking water resources during this RMP revision, which presents a key opportunity for avoidance and mitigation of potential significant impacts. Based upon our knowledge of the planning area, including the presence of sensitive groundwater and surface water resources designated by the State of Wyoming, we provide the following recommendations for inclusion in the Final EIS: Groundwater recharge areas: Consider No Leasing in a recharge area with a 1000 foot wide buffer zone on both sides of all perennial streams for a distance of one mile upstream of the recharge area or to the point where the stream becomes intermittent. Sole Source Aquifers: Consider No Leasing. Source Water Protection Areas and Well Head Protection Areas: Consider No Leasing in Groundwater Zones 1-3. Consider No Leasing in Surface Water Zones 1-2. If leasing occurs, impose No Surface Occupancy lease stipulations in Groundwater Zones 1-3 and Surface Water Zones 1-2. Impose Controlled Surface Use Stipulations in Surface Water Zone 3 including but not limited to: Closed loop drilling systems. Line surface impoundment ponds (evaporation ponds or drilling pits) with synthetic liners and subsequently decommissioned by removing all contaminants and liner and reclaiming the area with natural	2031

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		vegetation. Identify private wells and set stipulations to be protective (e.g., no occupancy within immediate area, collect baseline data on groundwater, etc.); In cases already permitted but not drilled, impose Conditions of Approval for APDs including but not limited to the Controlled Surface Use Stipulations listed above. For areas with unconfined shallow groundwater, because the shallower the depth to water the more sensitive an aquifer is to contamination: Consider No Surface Occupancy; Prohibit use of evaporation ponds in proximity to shallow aquifers; Review the geology of shallow aquifers to determine well construction requirements, which may include cementing to surface and drilling with a fresh water mud system. To accurately identify sensitive aquifer systems, we recommend using the Wyoming Ground Water Vulnerability Assessment Handbook. General recommendations for standard lease stipulations/best management practices: A general well design requirement to set surface casing and cement to a specific formation or depth if there are aquifers at depth that need protection; Surface casing needs to be below the lowermost USDW and set into a confining (e.g. shale) layer; A requirement for an intermediate string of casing and cement may be appropriate in the event of encountering very deep aquifers; Specify in the RMP that future oil and gas projects will need a Water Resource Management Plan to address water consumption and produced water disposal including identifying water recycling opportunities.	
10261	10261-3	For the reasons stated above. EPA prefers that the Final EIS include a quantitative analysis that utilizes air quality modeling of the potential impacts of activities authorized under the Bighorn Basin RMP. Nonetheless, we agree that air quality impacts can be adequately evaluated and disclosed provided that BLM pursues one of the following approaches: l) Conduct basin-wide dispersion modeling based on the emissions inventory and include this information in the Final EIS; or 2) Utilize representative photochemical grid modeling planned for another project (e.g. Powder River Basin Coal Review) with the appropriate modeling domain for the Bighorn Basin to determine the contribution of the RMP activities and include this information in the Final EIS; or3) Modify Management Action 1005 in the Final EIS to include an air resources management plan. The air resources management plan should be included in the Final EIS and as described in Attachment 2 contain additional detail clarifying how and when modeling will be performed and mitigation potentially implemented.	2009
10261	10261-4	Incomplete Disclosure of Groundwater Characteristics and Potential Impacts The characterization of groundwater in the Draft EIS does not include important and up-to-date information necessary to protect groundwater water resources. The Draft EIS acknowledges that the planning area includes sensitive drinking water resources, but does not contain a complete and up-to-date evaluation of these resources, including recharge areas and source water protection zones designated by the State of Wyoming. The Draft EIS references the Wyoming Water Development Commission's (Commission's) 2003 Wind/Bighorn River Basin Plan for the ground water analysis. The Commission is currently updating the 2003 report and intends to circulate the revised report for public comment later this summer. Additional data that is included in the 2011 revision includes identification of the major aquifers in the basin, their three dimensional extent and the physical and chemical characteristics of their groundwater; estimates of the quantity of water in the aquifers and aquifer recharge rates: and descriptions of the aquifer recharge areas. In addition, EPA recommends BLM consider the Wyoming Ground Water Vulnerability Assessment Handbook	2031

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		(SDVC Report 98-0 I. 1998) which includes maps of aquifer sensitivity and identifies shallow groundwater aquifers that are susceptible to contamination. Analysis of this updated information in the Final EIS will maximize the ability of the BLM to determine where leasing stipulations are needed to protect current and future drinking water resources. The EPA recommends that BLM use this updated information in the Final EIS to identify water budget projections related to activities considered on BLM land, since water shortages were identified in the Draft EIS as a potential concern. In the event that updated groundwater hydrology and quality information is unavailable, we recommend that the Final EIS explain that the groundwater resources are not fully defined and identify the potential future requirements applicable to operators for gathering information on water quality and depth of useable groundwater and subsequently to comply with protective requirements as appropriate.	
10261	10261-5	The Draft EIS provides insufficient information regarding mitigation measures that could be employed to protect groundwater resources.	2031
10261	10261-6	According to the Draft EIS, one of the key ways BLM intends to address these potential impacts is to establish best management practices (BMPs). However, the Draft EIS does not provide the specificity needed to assess the adequacy of the BMPs. EPA suggests that BLM provide this specificity by including additional information in the Final EIS on the types of BMPs the BLM plans to implement including the circumstances under which the BMPs would be applied. Specifically, EPA recommends the Final EIS include: 1) A list of BMPs that may be required to protect groundwater resources. EPA recommends BLM consider the groundwater BMPs that were developed for the Pinedale Anticline oil and gas field in response to monitored groundwater contamination.2) Identification of the circumstances under which the BMPs would be applied (e.g. wetlands, shallow water aquifers. proximity of water wells.)3) Identification of how BMPs would be monitored and enforced.	2031
10261	10261-7	We recommend that the BLM develop lease stipulations for sensitive resources to ensure that the potentially significant impacts are avoided as much as possible. Our specific recommendations for stipulations to avoid and protect sensitive drinking water resources are attached (See Attachment 3). EPA developed these recommendations based on the Wyoming's Source Water Assessment and Protection Guidance (October 2000) and in consideration of BLM's Instructional Memorandum UT 2010-055 Protection of Groundwater Associated with Oil and Gas Leasing, Exploration, and Development.	2031
10261	10261-8	The Draft EIS contains insufficient information to evaluate the adequacy of BLM's planned groundwater monitoring program. The Draft EIS indicates the BLM plans to require groundwater monitoring "in areas of concentrated oil and gas development where groundwater has been determined to be of 'High' and' Moderately High' priority by Wyoming DEQ" (Management Action 1028. Draft EIS page 2-47). However, neither the location of the development relative to the WDEQ priority areas nor the level of monitoring to be expected of oil and gas lease holders is disclosed. EPA believes this information is necessary to evaluate the adequacy of the proposed monitoring program and therefore requests that it be it included in the Final EIS/RMP. An essential component of future project-level monitoring is baseline and long-term monitoring for private wells and clearly defining how the water supply will be replaced in the event that it is impacted. Monitoring is important to assure mitigation measures are adequate and that groundwater resources are being fully protected. In the	2031

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Table B-1. Individual Comments and BLM Response Index (Continued)

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		absence of modeling to determine the distance from the project at which impacts may occur we recommend that monitoring occur in private wells within one mile of the project area (the BLM Pinedale Anticline project and the U.S. Forest Service Eagle Prospect project area examples of where similar monitoring programs have been established). Groundwater baseline monitoring may also be necessary to identify the depths of aquifers that are used or could be used in the future for drinking water, referred to as Underground Sources of Drinking Water (USDWs). Aquifers are presumed to be USDWs unless they have been specifically exempted or if they have been shown to fall outside the definition of USDW (e.g.. over 10,000 mgf TDS). We further recommend that the Final EIS/RMP include a commitment that future project-level NEPA analyses for oil and gas development will contain a specific comprehensive monitoring plan and program to track groundwater impacts as drilling and production operations occur.	
10262	10262-13	Relevance and importance criteria used in the analysis of Areas of Critical Environmental Concern (ACEC) is generic and does not include data sets to confirm or deny the four noted importance criteria and the five relevance criteria.	2001
10262	10262-7	Protective measures for fish include intensively manage intermittent streams on a case-by-case basis. Intensive management measures for fish, or their need, are not disclosed and thus could unnecessarily hamper local governments and stakeholders.	2002
10262	10262-89	Throughout the RMP/EIS, there are many terms and practices regarding fish resources that are not defined or described. The issues have been highlighted where clarification is needed, including questions that will assist in better identifying where such information is lacking.	2002
10262	10262-200	Please justify only including carbon dioxide emissions in Tables 4-3 and 4-4, particularly when they are titled "Carbon Dioxide Equivalent Emissions" implying inclusion of other greenhouse gases.	2003
10262	10262-2	Cultural site and historic trail buffers are excessive. Alternative D buffers for cultural sites, national, and other historic trails would restrict or constrain resources uses on BLM that have yet to be identified. The BLM does not identify intact segments of historic trails nor do they identify cultural sites where the scene and setting is intact. The three mile buffer on cultural sites and the two, three, and five mile buffers (depending upon resource) of the historic trails shall be reduced and the BLM must identify exactly where the scene and the setting is intact in the Bighorn Basin to effectively analyze the economic impacts of these actions. If the BLM cannot produce intact segments of historic trails or properly identifying the cultural sites where the scene and setting is intact then the buffers for both resources will be eliminated.	2004
10262	10262-275	In the description of the affected environment, Table 3-19 on page 3-65 should be re-titled. It displays fire regime groups not the fire regime condition classification system.	2008
10262	10262-276	The bottom of page 3-65 needs references to support the rationale for not allowing fires to burn in cheatgrass invaded sage-grouse habitats. The assumption is that cheatgrass will expand and damage sage-grouse habitat. This is a statement of fact that needs to be supported by scientific evidence. We do not necessarily disagree, but some explanation or reference should be provided.	2008
10262	10262-277	On page 3-67, the sentence stating "Upslope from the basin bottom, fuel types	2008

Table B-1. Individual Comments and BLM Response Index (Continued)

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		and fire regimes are similar to those found in the physiographic areas, and nearly all wildfires and prescribed fires occur in these areas" needs to be corrected. The use of "physiographic" in this sentence is awkward and confusing.	
10262	10262-278	The fire and fuels analysis could benefit from a better explanation or quantification of fuels conditions. Right now there is only a cursory discussion of the existing condition of fuels. Of the lands that are classed in FRCC 2 and 3, what vegetation types that are most changed? Table 3-21 identifies acres of fires burned. It would be helpful to know the cover types these wildfires occurred.	2008
10262	10262-279	In Section 3.2.2 (prescribed fires), there is no quantification. Please include the acreage of fuel treatments per year by cover type.	2008
10262	10262-280	No analysis methods are identified in the environmental consequences, only assumptions and definitions are given. What are the indicators? How are alternatives being compared? Without this discussion, much of the following analyses are meaningless. It seems much of the subsequent analysis is based on speculation because it is difficult to predict fire behavior, weather, etc. While this is understandable, there should probably be a discussion here about the nature of the unpredictability of variables and outcome.	2008
10262	10262-281	Several issues are identified as potentially "adversely impacting wildfire management" but there is no indication to the context or intensity. Are these impacts significant? Why or why not? If these can't be quantified they at least have to be explained in more detail to explain more about significance. This needs to be addressed throughout the majority of the fire and fuels section.	2008
10262	10262-282	Under the discussion in the last paragraph of page 4-90 in Section 4.3.1.3, quantitative figures are finally given. Unfortunately, the context and intensity is not adequately discussed. It appears here that the analysis is using acres of treatment as an indicator. What do these numbers mean? Are they significant? Are they discountable? How does this help someone make a decision on the best alternative? Please frame this discussion with better interpretation of the differences and how this would help the decision maker decide on an alternative. This needs to occur wherever numbers are presented.	2008
10262	10262-86	The fire and fuels analysis could benefit from a better explanation or quantification of fuels conditions. In its current form, there is only a cursory discussion of the existing condition of fuels	2008
10262	10262-1	The Wyoming Department of Environmental Quality (WDEQ) is not given a seat at the table in the monitoring of air quality in the Bighorn Basin. Air quality and state-of-the-art monitoring is important to the LGCA. It is fundamental that the WDEQ is given primacy in monitoring of air quality in the Planning Area.	2009
10262	10262-180	Page 3-5 states that air quality monitoring sites in the Bighorn Basin and relevant sties nearby are listed in Table 3-1. Please include a map of the air quality monitoring sites listed in Table 3-1.	2009
10262	10262-181	The North Absaroka is described as one of two air quality monitors located in the planning area. The location provided in Table 3-1 places the site outside of the planning area. Please clarify this discrepancy.	2009
10262	10262-182	The process for identifying relevant air quality monitoring sites is not described in the RMP/EIS. Please include the criteria used in selecting relevant sites.	2009
10262	10262-183	Along with descriptions of the site selection process, please include an expanded description of the relevant sites, particularly the differences in	2009

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		climate and topography from locations in the planning area.	
10262	10262-184	Please include justification for not including air quality monitoring sites located to the southwest. For example, the Boulder monitoring station (NO2, O3, and PM10) is located approximately 70 miles from the planning area, and the Bridger Wilderness IMPROVE monitor is located approximately 58 miles from the planning area. Both are a shorter linear distance than Thunder Basin SPM and IMPROVE sites (100 miles).	2009
10262	10262-185	Following expanded description of the process used to identify relevant air quality monitoring sites, please provide justification of their ability to accurately characterize the air quality in the Planning Area. If this justification cannot be provided, or is deemed insufficient by the cooperating agencies, then additional air quality monitoring stations should be established.	2009
10262	10262-186	Additional air quality monitoring sites distributed throughout the basin should be established to accurately represent the air quality in the Planning Area.	2009
10262	10262-187	Table 3-3 presents applicable standards for criteria pollutants and current representative concentrations for the Planning Area. Beginning with page 3-8, the Trends section does not address all sources presented in Table 3-3. Please provide justification for selection of presented data.	2009
10262	10262-188	Page 3-13 states that a WARMS monitoring site is currently operating northwest of Worland. Please present any relevant data from the Worland WARMS monitoring site, even though the three years of data required for determining compliance have not been collected. Observed concentrations of ozone at a site within the planning area would provide information that is more relevant than data from a site significantly removed from the planning area.	2009
10262	10262-189	Figure 3-5 on page 3-14 does not include the NAQQS standard for ozone, which deviates from previous figures. Please show the 75ppb standard in Figure 3-5 in order to clearly represent the standard as compared to ozone concentrations at the Thunder Basin SPM Site.	2009
10262	10262-199	Please include measurements from the Worland monitor established in 2010.	2009
10262	10262-114	There are no impacts disclosed for management actions relating to wildlife habitat, special status species, special designations, etc., although it states that "when rangelands are not meeting resource objectives, the BLM implements changes in grazing management".	2011
10262	10262-115	There are also several areas in the management action Table 2-5 (RMP/EIS pg. 2-160â€"162) that state management must be consistent with "other resource objectives", but does not disclose which resources or objectives. The other resource management actions could have significant impacts to livestock grazing, but are not disclosed in the RMP/EIS.	2011
10262	10262-15	Counter to existing BLM RMPs in Wyoming, the RMP/EIS discloses in the glossary that grazing is a "surface disturbing activities." Livestock grazing should not be considered a surface disturbing activity due to the onerous/nebulous requirements that such a designation would carry.	2011
10262	10262-177	The LGCA is concerned that these other resource management actions could have significant impacts to livestock grazing but are not disclosed in the RMP/EIS. The County and Conservation District Land Use Plans are clear in that they are opposed to any reductions in grazing, particularly if they are not backed up by scientific data including monitoring of vegetation resources, trend analyses, etc.	2011

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10262	10262-298	This section presents that in 2007, "...the WFO estimated that approximately 57,000 acres in the field office were infested with nonnative annual bromes." This inventory is stated to only cover 10% of the Bighorn Basin so, "actual infested acreage might vary." We argue that this acreage could be substantially higher. The 57,000-acre figure is contradictory to table 3-22 in the RMP/EIS, which presents acres for non-native annual bromes at 37,505 for BLM surface estate and 46,875 for BLM mineral estate. [Figure 11 Spatial comparison of BLM's 'BighornBasin_GapVegetation' and 'WFO_Invasive_NonNative' GIS layers] The discrepancy seems to lay in the GIS data provided by the BLM. A GIS layer entitled 'WFO_Invasive_NonNative' totals 57,413 acres, which approximates the 57,000 acres presented in section 3.4.4. The issue seems to be that not all of the shapes in the 'WFO_Invasive_NonNative' GIS layer were incorporated into the 'BighornBasin_GapVegetation' GIS layer. Figure 11 below presents a comparison of the BLM's 'BighornBasin_GapVegetation' and 'WFO_Invasive_NonNative' GIS layers. Notice how only some of the shapes from 'WFO_Invasive_NonNative' were captured by the 'BighornBasin_GapVegetation' layer. The LGCA requests that this issue be explained and corrected, and a complete vegetation and noxious weed inventory be completed for the basin.	2012
10262	10262-299	Cooperative Management in Invasive Species and Pest Control In this section it is stated, "The goal is to contain and reduce densities of known invasive species populations." This sentence needs to be introduced to state that only very small portions of the Bighorn Basin have been inventoried for weeds and the sentence in question needs to be added to account for newly identified populations.	2012
10262	10262-88	Within the Invasive Species and Pest Management section there is nearly nonexistent disclosure of relevant field-verified data. The most glaring deficiency within this subject area is that only 10% of the Worland Field Office has been inventoried for invasive nonnative annual bromes. Clearly an EIS cannot accurately analyze the impact of invasive species when only 10% of the Worland Field Office has been inventoried. Prior to finalization, the BLM must conduct a new, expanded inventory and reanalyze impacts.	2012
10262	10262-268	Also, following any updates to the oil and gas development potential in the Planning Area the BLM shall reevaluate the indirect impacts from ROW management actions.	2013
10262	10262-53	Withdrawals: Alternative A GIS files contain blank records in the GIS attribute tables. Acres do not match those in the RMP.	2013
10262	10262-229	The BLM reviewed proposals for three areas nominated for MLP reviews: Absaroka-Beartooth Front, Fifteen Mile, and Bighorn Front. After review, the BLM stated none of the areas met the criteria necessary for MLP analysis; however, they did identify resources of concern within those areas. They also stated additional MLP areas may be identified and analyzed at the BLM's discretion at any time.	2014
10262	10262-230	The LGCA is concerned that future lease sales and therefore exploration and production may be slowed significantly if MLPs are required in other sections of the Planning Area, or if the BLM identifies additional resources of concern in the three MLPs analyzed to date.	2014
10262	10262-242	The LGCA requests an addition to that list: the additional challenges resulting from NEPA processes that may be necessary if the IM 2010-117 is implemented prior to the letting of leases in the Planning Area, as discussed above. It is	2014

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		thought that the execution of a MLP will detrimentally impact oil and gas exploration and development and could ultimately force oil and gas companies to spend their exploration budgets elsewhere.	
10262	10262-265	The LGCA is concerned that future lease sales and therefore exploration and production may be slowed significantly if MLPs are required in other sections of the Planning Area, or if the BLM identifies additional resources of concern in the three MLPs analyzed to date. Further, if either of those issues arises in the future and the BLM requires a MLP to be conducted, it is possible oil and gas companies will become discouraged and will not pursue leasing in the Planning Area. Please reevaluate these consequences before accepting Instruction Memo 2010-117 as permanent direction.	2014
10262	10262-143	The Alternative D GIS shapefile for Mineral Constraints does not include the standard constraint restriction category.	2015
10262	10262-144	The shapes on Map 20 closely, but not exactly, matched the resulting analysis performed by the LGCA for the standard constraints. The acreage reported in the RMP Table 2-5, record number 2024, of approximately 257, 000 acres did not match the resulting GIS acres of approximately 200,000.	2015
10262	10262-145	An issue with the definition query given to the LGCA by Mr. Hiner has arisen during the GIS data review and acreage analysis. The definition query provided by Mr. Hiner is Fed_Min = All, Oil-Gas, Oil-Gas-Coal, and Oil-Gas-Sand-Gravel. The Alternative D Mineral Constraints GIS shapefile was cut to the Federal Mineral Ownership GIS file to disclose acres of constraints only on BLM administered minerals for oil and gas development. The red outlines and blue highlights on the following map [Figure 2] are the federal mineral ownerships for the BLM. The green polygons are the Alternative D Mineral Constraints that were cut to the Federal Mineral Ownership according to Mr. Hiner. The map shows that the polygons are not coincidental and boundaries do not align. The Alternative D Mineral Constraints migrate in and out of the "Other" mineral ownership category in the Federal Mineral Ownership layer. The "Other" category was not included in Mr. Hiner's query for federal mineral ownership in relation to mineral constraints. The conclusion drawn is that the LGCA received an inaccurate Federal Mineral Ownership layer or that the layer has been edited in such a way that the edits are unbeknownst to anyone other than the BLM. Due to this issue, the LGCA will be unable to accurately verify any analysis related to federal mineral ownership or reporting of related acreages in the RMP.	2015
10262	10262-146	After review of the BLM-provided GIS data for Withdrawals, the LGCA has been unable to reproduce the acreage reported in Table 2-2 in the RMP. Several factors contribute to the irreproducible acreages reported in the RMP. The GIS attribute tables for both Alternative A and D GIS data are missing information. There are blank records in the attribute table. The selection process for identifying the lands carried forward as Withdrawals was not documented in the GIS data. Trial and error reviews of query selections and a review with Mr. Hiner, failed to resolve the issue of the selection process. The blank records contribute significantly to the difficulty of identifying the selection process and reconciling mismatching acreages. To date, Mr. Hiner at the BLM has not been able to resolve the Withdrawals issues. The LGCA will continue to seek resolution of these issues. The following screen shot [Figure 3]Â documents the missing attribute data in Alternative A Withdrawals. The highlighted column is the Withdrawal classifications.	2015

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10262	10262-154	Upon review of the constraints on leasing for geothermal development, the LGCA was unable to match the acreages of "open to geothermal leasing" and "administratively unavailable to geothermal leasing" for Alternative D. A dissolve process based on constraint designations was performed in an attempt to correct for any overlapping polygon or duplication of acres. This process failed to produce matching acreages between the GIS data and RMP Table 2-2.	2015
10262	10262-155	It appears that the geothermal leasing constraints still contain overlapping designations. Controlled Surface Use (CSU) designations overlap into areas with Timing Limited Stipulations (TLS), resulting in double counting of acreages.	2015
10262	10262-156	The GIS data presents 387,699 acres as unavailable to geothermal leasing, contradicting the 324,737 acres reported in RMP Table 2-2.	2015
10262	10262-157	Given the overlapping polygons for CSU and TLS stipulations, matching acres open to geothermal leasing between the RMP and GIS will be impossible without removing the overlapping constraints.	2015
10262	10262-158	It appears that in the BLM GIS data, CSU polygons were simply drawn on top of existing TLS polygons. By cutting the CSU polygon into the larger TLS polygons, the data would not show overlapping polygons and double counting of acreages.	2015
10262	10262-163	Review of the new Alternative A Withdrawals file has revealed blank records as well. This is not a solution to the problem of missing attribute data.	2015
10262	10262-164	The LGCA should have received the final GIS product which contains GIS documentation of the acreages presented in the RMP. It is the LGCA's contention that the BLM should have sent the final product of ICF's completed analyses of GIS data that yielded the numbers produced in the RMP. These files would have included the appropriate metadata describing how the files were produced from the original BLM files supplied to ICF. These files are required as part of the administrative record.	2015
10262	10262-165	Final analysis GIS files or specific definition queries had to be produced to accurately report RMP analysis acreages. If ICF performed the GIS analysis, then they must have final analysis files or definition queries.	2015
10262	10262-166	The updated file contains missing data in the attribute table. Caleb's email discussed how to complete the GIS attribute table based on Table 3-40 in the RMP and how to clip the Withdrawals to the Federal mineral ownership layer. This should have been done by the BLM.	2015
10262	10262-167	The LGCA pointed out a 42-acre parcel of Withdrawals for Alternative A and D located on private surface and private subsurface. This should not have been included in the Withdrawals for either alternative. Forty-two acres does not seem significant on a 4.2 million acre Federal mineral ownership scale. When the bentonite industries current operations are only 1,200 acres (4% of their operations), 42 acres becomes more significant.	2015
10262	10262-245	Yet, the calculated percentages for each classification category (high, medium, and low) are not disclosed in the RMP/EIS. A review of Figure 40 (Potential for occurrence of oil and gas within the Bighorn Basin Planning Area) presented in the RDF shows that approximately 92 percent of the Planning Area is depicted as having high potential for oil and gas occurrence.	2015
10262	10262-257	On Page 3-42 under Management Challenges it is disclosed that "Approximately 30,000 acres of land has been disturbed in the Bighorn Basin due to bentonite mining, along with approximately 4,000 acres of road and haul-road disturbance (BLM 2008c)." These disturbance acres are in conflict with calculations provided	2015

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		by representatives from the bentonite industry (Scott pers. comm.). Please review for accuracy the 4,000 acres of reported road and haul-road disturbance in the RMP/EIS.	
10262	10262-52	Mineral Constraints: Alternative D Mineral Constraints is missing all records for the "Standard Constraints."	2015
10262	10262-56	Geothermal Constraints: GIS files contain overlapping polygons resulting in conflicting management in those areas and double counting of acres in GIS.	2015
10262	10262-217	The RMP/EIS (pg. 3-43) states "Coal production in the Planning Area is generally not considered economically feasible due to the relative thinness of the coal beds, thickness of the overburden, and low quality of the coal." Yet there is a record of historical mining activity in the Planning Area and the USGS named eight important coal fields within the Bighorn Basin (USDI 2009b). Please remove or modify the statement in the RMP/EIS in order to accurately portray the affected environment.	2017
10262	10262-252	The RMP/EIS (pg. 3-43) states "Coal production in the Planning Area is generally not considered economically feasible due to the relative thinness of the coalbeds, thickness of the overburden, and low quality of the coal." However, there is a record of historical mining activity in the Planning Area and the USGS has named eight important coal fields within the Bighorn Basin (USDI 2009b). Therefore, the BLM shall remove or modify the statement in the RMP/EIS in order to accurately portray the affected environment.	2017
10262	10262-93	Predators, including gray wolves and grizzly bears, have adverse impacts to big game in the Bighorn Basin. The RMP/EIS states that management challenges to big game include (RMP/EIS pg. 3-98): habitat conditions, fire management, drought, increased development and urbanization, habitat fragmentation, motorized vehicle misuse, disease, hunter access, and the impacts of livestock grazing management on the frequency, quality, and composition of key forage species. Note that predators and predation are not listed as a management challenge for big game. The BLM must acknowledge, account for, and analyze the predation of big game species in the RMP/EIS.	2020
10262	10262-28	Descriptions of wildlife species and habitats are based on perceptions, not qualitative and quantitative data.	2025
10262	10262-91	if woody plant communities for pronghorn, mule deer, or moose have indeed declined, the Affected Environment should identify the key variables and provide quantifiable data to show baseline conditions compared against historic conditions (which are also not disclosed in the RMP/EIS) that would support such a contention. Under CEQ 1502.22 Incomplete or Unavailable Information, the BLM has a duty to provide relevant information unless it is proven to be unattainable or the agency would incur exorbitant costs to obtain the information. Neither of which are the case in this circumstance.	2025
10262	10262-92	Recognizing the mandate outlined in CEQ 1502.22, the LGCA requires that the BLM qualify and quantify the aforementioned management challenges for big game species prior to any management decision(s) that alter or minimize allotment management plans or allotments, road-use designations, oil and gas activities, or additional multiple-use activities. At present, the BLM could choose to alter grazing allotments, road designations, hunting units, etc. as a rationale for improving big game habitat based on exceedingly inadequate and incomplete information. The effects of such could have detrimental social, economic, and political impacts.	2025

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10262	10262-109	When reviewed by the LGCA, skepticism arose about the wilderness characteristics, or lack thereof, contained within the areas. Given the vast local knowledge of the areas by LGCA members, there was skepticism of the designations based on roads and structures known to be present.	2027
10262	10262-11	The BLM did not identify structures within the LWCs that detract from wilderness characteristics. Using the BLM's own GIS data the LGCA identified 634 miles of roads, of which 518 miles are two track, 442 reservoirs, 296 miles of fence, 569,273 acres of active allotments, 154 range improvements, 10 miles of water pipeline, 17 water wells, eight oil fields, 68 miles of oil and gas pipeline, eight active oil and gas wells, 59 plugged and abandoned oil and gas wells, and 248,315 acres (43%) have oil and gas leases. Since the release of the preceding, the LGCA conducted a local stakeholder review. Likely, these totals will be increased based on the incorporation of stakeholder review data. The BLM is required to identify structures based on their own guidance in BLM Manual 6301 and summarize and analyze the cumulative effects of structures on wilderness characteristics. Clearly, the BLM did not do so. The LWC inventory must be entirely revised using LGCA input and data.	2027
10262	10262-110	The BLM ignored their data and other readily available data sources for structures when designating LWCs.	2027
10262	10262-111	The LGCA/ERG LWC Inventory found that almost 20% of the 3.2 million acres of BLM lands in the Bighorn Basin were erroneously identified as having wilderness characteristics. In the 3.2 million acres, the BLM has identified 56 LWC areas comprising a total of 571,000 acres. Within 571,000 acres there are 634 miles of roads, of which 518 miles are two-track, 442 reservoirs, 296 miles of fence, 569,273 acres of active allotments, 154 range improvements, 10 miles of water pipeline, 17 water wells, eight oil fields, 68 miles of oil and gas pipeline, eight active oil and gas wells, and 59 plugged and abandoned oil and gas wells (248,315 acres (43%) have oil and gas leases).	2027
10262	10262-112	the LGCA has requested the BLM to initiate a new inventory process and postpone indefinitely the management of LWCs until a comprehensive and objective inventory is completed.	2027
10262	10262-48	Improper or incomplete inventory of LWCs as is illustrated in Appendix A. Note that the LWC inventory and maps have been presented during public meetings. There are numerous specific references to incorrect information provided by the BLM in Appendix A.	2027
10262	10262-49	The BLM LWC Inventory is flawed. The BLM did not include any GIS data for structures detracting from wilderness characteristics in inventory forms or on maps. Refer to Appendix A for more detail on this issue.	2027
10262	10262-59	Nevertheless, the BLM-preferred alternative in the RMP/EIS includes LWCs that potentially reduce or eliminate significant acreage available for oil and gas leasing even though the BLM LWC inventory included lands that contain significant development including roads, pipelines, oil and gas wells (active and abandoned), reservoirs, fences, and grazing improvements. The LGCA LWC Inventory found that almost 20% of the 3.2 million acres of BLM lands in the Bighorn Basin were erroneously identified as having wilderness characteristics.	2027
10262	10262-100	Should any expansion of wild horses occur, which is not mandated by the WFRHBA and thus unnecessary, this expansion must result in no reduction in livestock AUMs.	2030
10262	10262-102	Currently wild horses in the Planning Area are within the mandated appropriate	2030

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		management level (AML) range established in the Consent Decree. Yet, the LGCA's stated position is that wild horse populations should be further reduced to a total head that is at or near the minimum AML.	
10262	10262-98	The Affected Environment discussion of wild horses states that population growth is expected at a 15% annual rate. But, in Environmental Consequences - Methods and Assumptions, it is stated that the number of wild horses would increase by 18% annually.	2030
10262	10262-99	As a nonnative species that unduly affects grazing permittees, the LGCA firmly asserts that the BLM should manage wild horses in the Planning Area only to the extent that the minimum requirements of the Wild Free-Roaming Horses and Burros Act (WFRHBA) are met.	2030
10262	10262-207	With the exception of the WEPP model, "assumptions and methods" section only includes assumptions, not methods.	2031
10262	10262-208	No actual water quality data is presented in Chapter 3. Although it is not expected that the RMP/EIS document the quality of surface water in all drainages throughout the Big Horn Basin, more data should be provided in the RMP to document baseline water quality.	2031
10262	10262-209	Indicators for water according to the Final AMS are chemical, physical, and biological characteristics (Page 2-19 of the AMS). No data are presented to provide a baseline for these indicators.	2031
10262	10262-78	First, the AMS listed three indicators for water: (1) chemical characteristics, (2) physical characteristics and (3) biological characteristics. Yet none of the indicators is mentioned in the RMP/EIS and no baseline information regarding the indicators is provided in Chapter 3 of the RMP/EIS.	2031
10262	10262-79	in order for there to be adverse impacts to water resources, there must be demonstrated negative impacts as measured by indicators. Without the presence of baseline data pertaining to chemical, physical, and biological characteristics, it cannot be demonstrated that adverse or positive impacts would occur as a result of any alternative action.	2031
10262	10262-105	Specifically unclear is the sensitivity levels in the inventory	2032
10262	10262-106	Why are several VRM classes were expanded from Alternative A to Alternative D (e.g. Sheep Mountain Anticline).	2032
10262	10262-25	It is unclear how Visual Inventory Classes and Visual Resource Management (VRM) classes were determined. Specifically, it is not clear how sensitivity levels were designated in the Inventory	2032
10262	10262-26	it is not stated why some VRM classes were expanded from Alternative A to Alternative D	2032
10262	10262-16	Acreage discrepancies are present within the RMP/EIS (e.g. vegetation resources).	2033
10262	10262-24	Vegetation inventories are deficient, particularly invasive species inventories.	2033
10262	10262-284	It is stated that Wyoming Gap data are suitable for RMP/EIS level planning. The LGCA argues that these data are not sufficient and other available vegetative datasets were not investigated or analyzed. Gap only provides cover type, and does not provide size/height or percent cover. LANDFIRE offers a nationally standardized and comprehensive dataset of vegetation cover types, canopy cover, canopy height, fuels, and fire regimes. The Bighorn Basin is covered by LANDFIRE version 1.1.0 that portrays the basin for 2008. Version 1.1.0 was released in early 2011. Besides presenting more current information than Gap	2033

Table B-1. Individual Comments and BLM Response Index (Continued)

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		data, the LANDFIRE data offers increased detail of the Planning Area's vegetative components.	
10262	10262-285	Statewide Gap data was modified for the Worland Field Office during the planning process, but this modification was not identified in the Biological Resources section. The LGCA has compared statewide Gap data to the layer presented in the RMP/EIS revision, and the two datasets are inconsistent. The Cody Field Office matches the statewide Gap layer, but not in the Worland Field Office. It is misleading for the BLM to state that the Wyoming Gap Analysis data were used, when, in fact, it is a modified dataset. We request a discussion of the data used to update Gap, as well as an accuracy assessment of the modified data.	2033
10262	10262-286	The RMP/EIS mentions increases in bark beetle activity but provides no numbers to support this statement. The USFS, since 1994, has maintained an Aerial Detection Survey providing spatial data of insect damage by year. These aerial surveys extend past the USFS boundary to the lower tree line, thus covering a majority of the forested areas in the Bighorn Basin Planning Area. These data could have been incorporated to better illustrate the insect activity in the basin.	2033
10262	10262-287	The description of the existing conditions of forested communities is completely inadequate. Each of the three forest community descriptions are nearly identical and portray the communities in very broad and vague metrics. For example, the RPM/EIS states that lodgepole pine "stand ages are between 1 and 150 years." Not only is this statement vague, but it is contradictory to the best available science. The biophysical setting description for the Rocky Mountain Lodgepole Pine Forest presents fire return intervals of 100 to 200 years.	2033
10262	10262-288	The LGCA requests a breakdown of acres by early-, mid-, and late-successional stages, percent cover, and departure from historic fire regimes. The discussion of historic fire regimes is inadequate and no quantification of departure was provided. Table 4 below is an example of how LANDFIRE data can be used to quickly analyze forest conditions. LANDFIRE does not provide size (diameter breast height (DBH)) classes, but does provide canopy height, which can be used as a surrogate for age classes. A brief review of forest ages within the Planning Area shows that there are minuscule amount of early-seral forests when compared to mid- and late-seral stands.	2033
10262	10262-289	Similar to the Forest Communities section, this section has a lack of citing literature and no presentation of quality and quantity of the woodland communities located within the Planning Area.	2033
10262	10262-290	The LGCA requests that the BLM further address the decline in the forest products infrastructure in the Bighorn Basin and present the potential of new technologies to revive production at closed mill operations while providing forest health treatment opportunities. There is significant potential to use dead and dying forest products, combined with green woody material, for a myriad of uses. The economics of such activities improves with contribution from appropriated fuel reduction funding sources. Long term landscape scale contracts, such as stewardship contracting, can provide small business flexibility to meet changing market conditions and supply stability to obtain financing to make important capital investments	2033
10262	10262-291	This section speaks to the recent insect outbreak and provides no quantification. The USFS Rocky Mountain Region, in cooperation with the Wyoming State Forestry Division, conducts annual flights mapping insect	2033

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		damage (USDA 2008). These data are readily available online and cover a majority of the forested portions of the Planning Area. The LGCA requests that the BLM incorporate these data into the Forest Communities section of the RMP/EIS. [Table 5 Aerial Detection Survey Data for the Bighorn Basin 2008]	
10262	10262-292	The RMP/EIS states that shrublands represent approximately 2,690,284 acres of BLM administered land. Using BLM supplied Gap data and surface ownership GIS layers, the LGCA cannot recreate this number. BLM GIS files display 2,662,057 acres of shrublands. The LGCA requests that the BLM explain this discrepancy. The source of this inconsistency could be generated by the designations of shrublands and barren types. RMP/EIS Table 3-22 presents barren lands as 43,114 acres, and BLM-provided GIS files present 71,314 acres. This 28,000-acre discrepancy can be traced to a single Gap polygon located southwest of Burlington, which is attributed as Basin exposed rock/soil type in the Description field in the BLM Gap data, but is displayed as 'Shrubland-Sagebrush' on Map 29 of the RMP/EIS.	2033
10262	10262-293	Additionally, the BLM-supplied Gap data had three blank records, totaling 1,340 acres. These areas are classified as forests/woodlands and riparian/wetlands on Map 29. We request justification for these assignments.	2033
10262	10262-294	Table 6 presents successional classes for the Inter-Mountain Basins Big Sagebrush Shrubland - Wyoming Big Sagebrush biophysical setting. This analysis shows that there is a buildup of late-seral stands of sagebrush, uncharacteristic of historic plant communities (USDA and USDI 2010). [Table 6 Successional Classes in the Inter-Mountain Basins Big Sagebrush Shrubland - Wyoming Big Sagebrush Biophysical Setting (USDA and USDI 2010)] Reference conditions for the Wyoming Big Sagebrush type show a historical presence of 15% and 5% in Class A and B respectively (Barret et al. 2010). This distribution of early- and mid-seral stands was driven by the mean fire return interval of 54 years for the Wyoming Big Sagebrush type (Barret et al. 2010). The departure from historic conditions provided in Table 6 can be further examined by analyzing the fire regime condition classes (FRCC) in these shrubland habitats. Landscapes determined to fall within the category of FRCC 1 contain vegetation, fuels, and disturbances characteristic of the natural regime; FRCC 2 landscapes are those that are moderately departed from the natural regime (34-66% departure); and FRCC 3 landscapes reflect vegetation, fuels, and disturbances that are uncharacteristic of the natural regime (67-100% departure) (USDA 2007). Table 7, below, presents the FRCC of the major shrubland existing vegetation types. [Table 7 Fire Regime Condition Class by Existing Vegetation Type (USDA and USDI 2010)] The buildup in late-seral sagebrush stands, presented in Table 6, can be explained by the increase in FRCC 2 presented in Table 7. The major driver of this increase can be attributed to missing one or more burn cycles, or an increase in non-native vegetation. [Table 8 Fire Regime Condition Classes by Fire Regime Groups (USDA and USDI 2010)] Resource Condition The Resource Condition section presents differing descriptions of fire's role in the sagebrush/grassland communities. It is discussed that lack of fire has lead to an increase in juniper and a loss of age class and structural diversity, and it is stated that areas experiencing multiple wildfires have been converted to cheatgrass monocultures. There needs to be a more in-depth discussion of the role of fire, which should be accompanied with tabular and spatial data.	2033
10262	10262-295	Riparian/Wetland Communities Existing conditions and acres are lacking.	2033
10262	10262-296	It is stated that, "Based on PFC assessments, many riparian/wetland areas in the	2033

Table B-1. Individual Comments and BLM Response Index (Continued)

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		planning area have improved over the last 15 to 20 years in response to implemented changes in grazing and other management actions." Table 3-23 presents a current PFC inventory for wetlands. Data to show the PFC ratings from 15-20 years ago are not presented. If the BLM cannot show two inventories with an improvement, the LGCA asks that the above-mentioned sentence be removed or rewritten.	
10262	10262-297	In the Management Challenges section it is stated that, "Allotments can fail standard #2 for many reasons. If failure to meet the standard is attributable to existing livestock grazing management or utilization level, then the BLM must make management changes to correct the issue." It is the assertion of the LGCA that the BLM have a minimum of two data points with a temporal range showing a downward trend before any grazing management decisions are made.	2033
10262	10262-301	Many of the vegetation goals and objectives deal with the desired plant community without adequate discussion of ecological sites or a breakdown of the existing conditions across the basin. The LGCA requests that a full description of ecological sites and the methods used to calculate percent similarity to historic climax plant community are provided.	2033
10262	10262-302	The figures presented in Record #4031, in Table 2-5, under the Alternative A column, need to specify if they are goals for percent composition by weight or by cover.	2033
10262	10262-303	Table 4-8 in this section does not present totals by alternative. Upon migrating these data into Excel and calculating totals by alternative, it was noted that very few of the totals matched the acreages provided in RMP/EIS Table 2-2. The LGCA requests that this table be reworked, with totals added, to match Table 2-2.	2033
10262	10262-306	The adverse and beneficial impacts need to be better explained. The RMP/EIS states that grazing and fire could be adverse or beneficial, and no reasoning or explanation is provided. Neither the role of fire in these vegetative systems nor a discussion of the benefits of proper grazing are presented.	2033
10262	10262-307	The RMP/EIS states, "Current trends in plant succession and vegetation health would continue." This does not account for the recent drought or the anticipated effects of climate change. The LGCA encourages the BLM to add a discussion with recent climatic and vegetative trends.	2033
10262	10262-308	The RMP/EIS states that disturbed shrublands will regain "pre-disturbance structure and density for more than 20 years." This statement is grossly underestimated, not referenced, and is in direct contradiction to the RMP/EIS. On page 3-87 the RMP/EIS states, "Many reclamation efforts performed 20 or more years ago still do not have shrubs established..." There is a wealth of research available concerning this issue. The LGCA requests that the following be incorporated into the RMP/EIS: removal of the 20-year figure, citation of literature, and reanalysis of the environmental consequences. Following intense fire or other disturbances that completely remove canopy cover, herbaceous species will dominate the ecological site, and recovery to 20% big sagebrush canopy cover may take 40 years (Young and Evans 1989) or longer (West and Yorks 2002). Canopy cover is defined as the percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants, including small openings within the canopy (Butler et al. 1997). Evidence of long-term stable grass communities for sagebrush sites in Wyoming are illustrated by models developed for the LANDFIRE project (USDA and USDI	2033

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		2010). Model R2SBWY is designed for a Wyoming big sagebrush semi-desert site and it estimates that it will take 20 years for natural succession after a fire for shrubs to achieve 10% cover. Model ROSBDW (Low sagebrush shrubland) estimates that following fire it will take 20 years for shrubs to have greater than 5% cover (USDA et al. 2011). Watts and Wambolt (1996) estimated that it will take approximately 30 years for big sagebrush cover to reach 13.5% in southwestern Montana after fire. In Montana, Eichhorn and Watts (1984) did not find seedling recruitment in a former Wyoming big sagebrush /bluebunch wheatgrass site 14 years post-fire. Similarly, Wambolt and Payne (1986) found less than 2% canopy cover of Wyoming big sagebrush 18 years post-fire (Watts and Wambolt 1996). Blaisdell et al. (1982) noted the effective use of prescribed fire could reduce cover for 25 to 50 years.	
10262	10262-309	The RMP/EIS states, "Grassland and shrubland communities would be maintained with a mix of species composition, cover, and age classes." The RMP/EIS does not disclose these data. The LGCA requests that the RMP/EIS present a table outlining the current cover type, cover, and age classes. LANDFIRE data suggest that the current conditions across the Bighorn Basin are not well distributed, but are instead dominated by late-seral stands of shrubs (USDA and USDI 2010).	2033
10262	10262-310	The LGCA appreciates the discussion of the benefits of grazing and fire to rangeland resources. This section presents the same discussion on reestablishing grassland and shrubland communities, stating that they "... would not reestablish to pre-disturbance structure and density for more than 20 years." The LGCA requests that this section be reworked to account for all relevant scientific research on this matter.	2033
10262	10262-311	The riparian/wetland resource section loosely describes the implications of management actions on this resource. This environmental consequences section lacks the quantity and distribution information needed to adequately portray the anticipated effects on this resource. As it presently stands, this environmental consequences section is inadequate for readers or decision makers to quantify effects or to compare alternatives.	2033
10262	10262-312	This section states, "In addition, efforts at conserving species, such [as] the Ute ladies-tresses (a wetland species), can directly benefit riparian condition." Section 3.4.7 of the RMP states that Ute ladies-tresses could occur, but are not know to occur within the Planning Area. It is unclear how management actions can focus on conserving species that are not known to occur in the Bighorn Basin. The LGCA requests that this section be reworked and updated to contain acres affected by alternative.	2033
10262	10262-314	1. Prior to any proposed modification of AMPs or elimination of livestock grazing allotments in the Planning Area as a protective measure for vegetation protection, the BLM will design and implement a comprehensive monitoring study based on state-of-the-art methods that evaluates vegetation cover type, percent cover, age/size classes, structure, habitat quality and quantity, and the effects of livestock grazing in the Planning Area. At the conclusion of the study, the BLM will coordinate with livestock grazing permittees and local governments in the Bighorn Basin preceding any proposed modification of AMPs or elimination of livestock grazing allotments in the Planning Area. If disagreements arise, they shall be settled through a conflict resolution and mediation process.	2033
10262	10262-315	2. Prior to any proposed modification of AMPs, elimination of livestock grazing	2033

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		allotments, or adjustments to fire use plans in the Planning Area as a protective measure for vegetation protection, the BLM will design and implement a comprehensive noxious weed inventory. A complete awareness of the noxious weeds in the Bighorn Basin is necessary for proper management of the vegetative, and wildlife habitats, in the Bighorn Basin.	
10262	10262-316	3. The vegetation discussions will be updated by reviewing available science and incorporating the research, complete with citations, in the Final RMP/EIS. The vegetation discussions, as they stand now, do not offer the reader a full understanding of the resources, existing conditions, or how they differ from historic conditions. Prior to any project level NEPA analyses, the BLM shall update the vegetation dataset for the Bighorn Basin. This dataset will include vegetative components (vegetation cover type, percent cover, age/size classes, and structure), ecological site, fuels, and fire regime information. New LANDFIRE data that provides the aforementioned data requirements is available and is more detailed than GAP data, which is currently employed by the BLM.	2033
10262	10262-317	4. The BLM shall provide baseline data when disclosing sensitive plants, especially when sensitive plants are rationale for management actions. The BLM shall use the Wyoming Natural Diversity Database (WYNDD) GIS data for plant Species of Concern as baseline occurrence/presence data, but not as proof of absence. The BLM shall conduct a full inventory, providing field verified occurrences of sensitive plants to substantiate any future management actions.	2033
10262	10262-318	Overall, the vegetation discussion in the RMP/EIS is significantly flawed; there is insufficient data, incomplete inventories of existing conditions, generic effects analyses, and discrepancies in acreages both within the RMP/EIS and between the RMP/EIS and BLM provided GIS data. Throughout the RMP/EIS, there is a lack of best available science and citations are very scarce. The lacking disclosure of existing conditions adds to the confusion of how management will work to attain desired conditions. The effects analysis provided by the RMP/EIS is inadequate and filled with vague descriptions of how management action might or might not affect resources in a positive or negative manner.	2033
10262	10262-319	Before the RMP/EIS is finalized, the vegetation section must be substantially improved. The Affected Environment must compare historic and current vegetation conditions and habitat quality and quantity. The connection must be made from historic vegetation conditions to existing conditions, facilitating connections between desired conditions and management actions. Until a thorough vegetation NEPA analysis is constructed, the LGCA cannot support any management actions taken by the BLM for the protection of vegetation resources in the Bighorn Basin.	2033
10262	10262-87	The vegetation sections of the Draft Bighorn Basin RMP/EIS are consistently incomplete, contradictory, and unclear. An Affected Environment chapter should comprehensively disclose resources, spatially and tabularly, describe historic vegetative processes and conditions, and then make the case for management affecting current conditions. With this foundation set, the Environmental Consequences section can clearly describe how management will direct resources towards desired conditions. This is not the case with the Bighorn RMP/EIS. The LGCA feels very strongly that the RMP/EIS vegetation section is inadequate as a basis for making management decisions with far-reaching, both spatial and temporal, ramifications.	2033
10262	10262-107	Of particular concern in the RMP/EIS is the change in travel restrictions that would limit motorized use from the current management standard of "existing	2034

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		roads and trails" to the proposed "designated roads and trails," which will have a significant adverse impact on energy development, grazing, and recreation uses by stifling access. While the issues that precipitate restrictions in renewable energy development, general rights-of-ways, or travel management are covered under the relevant resource sections, the LGCA requests that more information be included in the Land Resources section that cross-references the rationale for proposed change. With expanded descriptions of decisions which affect land resources, a fuller understanding can be reached concerning the variations between alternatives and, ultimately, the future actions undertaken in the Planning Area.	
10262	10262-132	Under Alternative A, Travel Management GIS data document 1,052 acres of "open to motorized use." This figure does not match the 1,320 acres reported in Table 2-2 of the RMP.	2034
10262	10262-133	There is a second Alternative A Travel Management GIS file that the LGCA received from Mr. Caleb Hiner, BLM RMP Project Lead, named Travel Management A1. Based on cursory review it appears to be associated with Wild and Scenic Rivers designations. This data should have been incorporated into the Travel Management Alternative A file.	2034
10262	10262-134	Travel Management A1 reports 56,661 acres of "closed to motorized use." This figure is inaccurate because acres were not recalculated when creating this file. The actual addition of "area closed to motorized use" under Travel Management Alternative A1 is 2,379 acres.	2034
10262	10262-135	The Travel Management GIS data documents 2,332,505 acres "limited to existing roads and trails" which does not match the reported 2,332,355 acres in the RMP.	2034
10262	10262-136	The TravelMngt column contains one blank record of 4,468 acres.	2034
10262	10262-137	The Alt_D column matches the "closed to motorized use" restriction for all records except one, where the "closed" designation in the TravelMngt column was not transferred to Alt_D column.	2034
10262	10262-138	There are four blank records in the Alt_D column totaling 13,908 acres with no direction as to their relevance in Alternative D Travel Management decisions.	2034
10262	10262-139	The total acreage of "closed" records in the TravelMngt column is 61,001 acres and the total of "closed" records in the Alt_D column is 53,396 acres. Neither description of closure matches the reported acres of "closed to motorized use" reported in Table 2-2 in the RMP of 60,681 acres.	2034
10262	10262-140	GIS data for areas where motorized use is "limited to designated roads and trails" covers 1,057,318 acres which does not match the 1,055,257 acres reported in Table 2-2 of the RMP.	2034
10262	10262-141	There is one blank record in the Alt_D column for the "designated roads and trails" designation that contains a designation under the TravelMngt column. When removing the blank record, the total is reduced to 1,054,942 acres, which still does not match the RMP reported acres.	2034
10262	10262-142	Seasonal restrictions on travel management are only briefly discussed in the Travel Management section of Chapter 3 and acres of changes to seasonal restrictions are not reported in Tables 2-2 or 2-5 in the RMP. A list of the areas in which the seasonal restrictions will apply is the only detail reported.	2034
10262	10262-159	Travel Management GIS data conflicts with RMP reported acreages. There are two GIS files for Travel Management Alternative A, an Alternative A file and an	2034

Table B-1. Individual Comments and BLM Response Index (Continued)

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		A1 file. Mr. Sanford posed the question as to whether or not A1 was incorporated into A. Mr. Hiner did not know if it was incorporated or why A1 was created. A1 appears to be travel restrictions associated with the Wild and Scenic Rivers exclusively based on an on screen review of polygon shapes.	
10262	10262-160	Some tables are missing attributes in the Travel Management Alternative D file which was acknowledged by Mr. Hiner to be a mistake. He noted that if the "seasonal" acres are added into the "designated" category, the acres should match for the category of "limited to designated" roads and trails. This solution is not a solution to the matter of the "closed to motorized use" GIS acres not matching the RMP acres and is involved in the missing attribute data problem.	2034
10262	10262-161	The LGCA tried the solutions posed by Mr. Hiner on June 9, 2011, adding seasonal designation into "limited to designated" designation. This solution did not correct the acreage differences between the GIS and RMP Table 2-2.	2034
10262	10262-51	Travel Management: Blank records in the GIS attribute table for Alternative D. RMP vs. GIS acres do not match.	2034
10262	10262-300	This affected environment section lacks the quantity and distribution information needed to adequately portray the existing condition for these species. Each of the 11 species is first discussed in a table and second in a short paragraph that describes general accounts of physiology, growth requirements, associated species, and occasionally a general locality of presence. The Wyoming Natural Diversity Database contains 252 presence locations for special status plants in the Bighorn Basin, this dataset could have been used to portray a generalized distribution of these species. As it presently stands, this affected environment section is inadequate for readers or decision makers to quantify effects described in Section 4.	2042
10262	10262-304	The RMP states, "No current forest or woodland inventory or age and species classifications are available for the Planning Area." The LGCA argues that there are data sources readily available that would portray the current forest conditions. LANDFIRE data and the national inventory system called Forest Inventory and Analysis were not investigated.	2042
10262	10262-305	In this section it is stated that, "Aspens generally are declining due to advancement of ecological conditions and succession. The advancement of ecological conditions also leads to encroachment of evergreen species into aspen stands; for example, shade-tolerant conifers invade and eventually shade out aspen stands, contributing to their decline." The LGCA argues that this statement is incorrect and not tied to best available science. Aspen are in decline due to lack of fire, which would equate to a degradation of ecological condition (Bradley et al. 1992). The LGCA requests that this section be rewritten to take into account best available science and to fully describe the ecological dynamics and fire regimes of these communities.	2042
10262	10262-10	Designation of LWCs could potentially erase $1.9 billion of total potential output (gross present value) and 434 jobs annually during the drilling and completion process.	2046
10262	10262-118	The BLM failed to conduct the required economics workshop, which allows the public to "identify desired economic and social conditions" and to "collaborate with BLM staff members to identify opportunities to advance local economies and social goals through planning and policy decisions." This failure has lead to a disconnect between the concerns of the communities of the Planning Area and the BLMs socio-economic analysis.	2046

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10262	10262-119	The impact analysis does not satisfy Table D-3 of Appendix D. In particular, the impact analysis does not describe or quantify impacts to particular communities (the geographic dispersion of impacts).	2046
10262	10262-127	Economically, an underestimate at such a scale would have impacts that ripple throughout and beyond the Bighorn Basin. At minimum, the oil and gas development sections of the RMP/EIS must be updated to reflect true potential	2046
10262	10262-20	The BLM did not conduct a public Economic Strategies Workshop, which allows the public to "identify desired economic and social conditions" and to "collaborate with BLM staff members to identify opportunities to advance local economies and social goals through planning and policy decisions."	2046
10262	10262-6	Beneficial economic impacts from Mowry Shale extraction would bring thousands of jobs and billions of dollars in revenue to the Bighorn Basin.	2046
10262	10262-210	Further, it is requested that additional mitigation measures be implemented for project-specific impacts when necessary, rather than an increase in stipulated restrictions across a larger area.	2047
10262	10262-227	Loss of leasing opportunities, closure to exploration, or NSO restrictions would effectively end future exploration of this possible significant shale gas and oil resource play.	2047
10262	10262-211	2007 - Any management decision implemented through the guidance outlined in record #2007 must be based on sound science and monitoring/field data at the project level. In addition, when considering drilling densities, please consider the projected timeline for each project activity.	2049
10262	10262-213	The RMP/EIS (pg. 3-40) discloses "Disturbed areas must be reclaimed after exploration and mining activities are completed." Please clarify this statement by adding that comprehensive reclamation plans are required for all project-level activities that exceed casual use and result in surface disturbance.	2049
10262	10262-214	Additionally, include guidance from the BLM Solid Minerals Reclamation Handbook and state that reclamation plans will fulfill federal, state, county, and other local agencies requirements.	2049
10262	10262-216	It is stated in the RMP/EIS (pg. 3-42) that: Critical thresholds relevant to continued development of locatable minerals in the Planning Area have not been specifically determined under the existing management scenario. However, using the Geographic Information System (GIS), the BLM might be better able to determine threshold levels of disturbance in relation to locatable mineral (primarily bentonite) mining, and be better able to make future decisions because of these capabilities. The LGCA requests that if future thresholds are considered, that they are made available for review and discussion.	2049
10262	10262-222	In order to qualitatively understand how restrictions in the RMP/EIS would affect future development, and by using Alternative 4 as an example, the LGCA conducted a risk analysis for the total area of the USGS Mowry Shale/Muddy Frontier Sandstone AUs that do not directly correlate to the RMP/EIS mineral constraints.	2049
10262	10262-232	In order to accurately characterize oil and gas activity in the Planning Area, the LGCA requests that data and trends be provided for the following comments: The RMP/EIS states (pg. 3-47) "There are 82 operators actively exploring for or producing oil and gas resources in the Planning Area." Please disclose the number of operators actively holding leases that are not conducting active	2049

Table B-1. Individual Comments and BLM Response Index (Continued)

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		operations in the Planning Area.	
10262	10262-233	The RMP/EIS discloses (pg. 3-48) "At the close of 2008, there were 4,544 active oil and gas wells in the Planning Area (BLM 2009c)." Provide the start date of operations for all active wells in the Planning Area in order to determine an increase or decrease in activity	2049
10262	10262-234	The RMP/EIS states (pg. 3-48) "There has been an overall upward trend in the number of APDs approved on federal oil and gas leases in the Planning Area since 2002, particularly after passage of the National Energy Policy of 2001 and the Energy Policy Act of 2005. However, starting in 2008 there was a decrease in APD submissions, which was primarily driven by market conditions for oil and natural gas." Provide data by year for these trends in order to portray how changes in policy and market conditions have affected oil and gas activity in the Planning Area.	2049
10262	10262-235	The above statement acknowledges that there are cycles when it comes to oil and gas production, yet the RMP/EIS completely dismisses the fact that there could be an upward trend in production during the 20-year planning period. Characterizing the affected environment to be in a constant decline or static state limits the impact analysis and prevents successful planning and management.	2049
10262	10262-253	In regards to interim and final reclamation, the BLM shall include guidance in the RMP/EIS from the Solid Minerals Reclamation Handbook H-3042-1 and state that reclamation plans will fulfill federal, state, county, and other local agencies requirements.	2049
10262	10262-256	The RMP/EIS states (pg. 3-41) "The six mines in the Bighorn Basin employ 132 persons, and another 360 persons are employed at the milling processing facilities at six different mills (one in the Worland area, two near Greybull, and three near Lovell, Wyoming)." The stated number of employees in the Bighorn Basin provided from the bentonite industry is higher than the number disclosed in the Plan. For example, Bentonite Performance Minerals, LLC has four full-time contractors (stripping overburden, hauling bentonite, drilling/blasting and conducting environmental activities) totaling over 60 employees (Scott pers. comm.). The number stated in the Plan is the number of employees who work "in-house" for the bentonite companies, i.e. not contractors. Please include the number of people employed as contractors for the bentonite industry in the RMP/EIS.	2049
10262	10262-260	Moreover, it is requested that BLM modify the description of Alternative C in Record # 2029 (Table 2-5) as follows: Delineate Oil and Gas Management Areas (Map 21) (592,983 acres) around intensively-developed existing fields and existing fields with potential for EOR, using a buffer zone of up to 2 miles from the outer boundary of the existing field and incorporating all Federal surface and minerals within the boundaries of ROZ Potential Sites. Within these areas, manage primarily for oil and gas exploration and development (including EOR) and carbon sequestration; consider all other surface uses secondary. The oil and gas management areas would be allowed to be developed at the well spacing and surface densities (for all surface disturbing activities) of the existing fields.	2049
10262	10262-267	It is also requested that the BLM modify Record # 6033 in Table 2-5 (p. 2-111) as follows: Designate ROW corridors as shown on Map 53. No limit will be placed on the width of these corridors as long as new linear facilities are constructed adjacent to existing linear facilities recognizing the need for adequate separation for operating system integrity, safety (construction and operations),	2049

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		appropriate federal, state and local statutes, regulations and policies, and land use constraints. Where BLM determines that a linear facility should be moved away from an adjacent utility to avoid a resource conflict, the new linear facility will still be considered to be within the RMP corridor.	
10262	10262-240	The LGCA agree with WEORI's position that large reserves of oil will be realized with the implementation of CO2 EOR in the Planning Area, and as such, the need for additional infrastructure. In agreement with the State of Wyoming, the LGCA request that the BLM fully evaluate the potential for significant EOR development in the Final EIS to facilitate and expedite EOR.	2051
10262	10262-241	It is anticipated that the Final RMP/EIS will provide sufficient analysis and candid public disclosure to allow EOR development to proceed using EAs, rather than lengthy EISs with significant Plan Amendments. Accordingly, the LGCA supports the proceeding statement provided by the State	2051
10262	10262-247	The LGCA believes this to be a flawed premise considering the probable advances in technology over the 20-year life of the plan; technological advances are a reasonable assumption that should have been used in forming the baseline unconstrained projection in the RMP/EIS.	2051
10262	10262-258	The LGCA agree with WEORI's position that large reserves of oil may be realized with the implementation of CO2 EOR in the Planning Area, and as such, the need for additional infrastructure, including additional wells, may have been greatly underestimated in the RMP/EIS. The LGCA agrees that this is a significant oversight and also encourages the BLM to develop a management plan that encourages and facilitates delivery, utilization, and sequestration of CO2 in the Planning Area related to EOR operations. Thus, please update and include information pertaining to EOR implementation, including the effects of ROW constraints on CO2 delivery, and incorporate those revised projections in the RMP/EIS.	2051
10262	10262-3	There is no treatment or consideration of enhanced oil recovery potential in the Bighorn Basin. New drilling techniques and the use of CO2 could significantly change the potential of the Basin to develop energy resources.	2051
10262	10262-81	The RMP/EIS should thoroughly address the likely increase in demand over the 20-year planning period and the increase in development that recent advances in technology will yield.	2051
10262	10262-83	Yet, recent oil and gas discoveries and comparisons of past assessments indicate that there needs to be an accounting of advances in technology.	2051
10262	10262-128	Realistically, the RMP/EIS should be entirely revised and impacts from increased development should be analyzed across all affected resources.	2054
10262	10262-31	In total, the key findings and issues identified lead the LGCA to firmly assert that the RMP/EIS is inadequate in its current form. Of great concern to the LGCA is the overwhelming lack of both historic and current condition quantitative data in the RMP/EIS. A common theme commented on by the LGCA throughout the revision process has been, and continues to be, that the BLM is proposing management actions with associated constraints and restrictions on domestic livestock grazing, oil and gas development, and the travel management infrastructure without demonstrating cause and/or need. If the BLM can substantiate management challenges via data collection and analysis, then the LGCA, stakeholders, and the general public will have an opportunity to evaluate the accuracy of findings and results. Should field data and corroborating research validate the need for an alteration of uses to protect the natural	2054

Table B-1. Individual Comments and BLM Response Index (Continued)

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		environment, the LGCA and stakeholders are willing to collaborate with the BLM to identify adaptive management strategies that are in the interest of all parties and Planning Area resources. Unfortunately, the BLM has largely ignored numerous requests by the LGCA, following review of previous iterations of the RMP/EIS and Analysis of the Management Situation (AMS), to increase the amount and use quantitative data and scientific literature in BLM-produced documents.	
10262	10262-32	Accordingly, the LGCA reached out to the BLM to strengthen the definition of stakeholder in the RMP/EIS. Presently, the definition of stakeholder in the RMP/EIS (Glossary-37) is as follows: An individual or group (such as local government) with a "stake" or interest in the success of delivering or maintaining the viability of a business's products and services. Stakeholders influence programs, products, and services (BLM 2009a). On August 19, 2011, Caleb Hiner (Bighorn Basin RMP/EIS Project Lead) corresponded with the LGCA and propositioned the inclusion of a second definition of stakeholder in the RMP/EIS. The addition, which will become part of the current definition, reads as follows: Federal, state, or local governments and agencies, or other entities where a Memorandum of Understanding, Cooperative Agreement, Interagency Agreement, or other such agreement has been executed with the BLM, or an applicant for a BLM authorization or permit.	2054
10262	10262-33	The LGCA supports the revised definition of stakeholder and finds that the BLM shall update the RMP/EIS with the new definition. Stakeholder is used throughout this comment document. It use and meaning is compatible with Mr. Hiner's proposed revision with one exception. Record #6268, commensurate with Goals/Objectives LR:10.1 and LR:10.3, in the RMP/EIS (2-160) states the following: In cooperation, consultation, and coordination with permittees/lessees, cooperators, and other stakeholders, develop and implement appropriate livestock grazing management actions to enhance rangeland health, improve forage for livestock, and meet other multiple use objectives by using the Wyoming Guidelines for Livestock Grazing Management, other appropriate BMPs (see Appendices L and W), and development of appropriate range improvements. The LGCA strongly urges the BLM to delete the word "stakeholder" from this Record #6268 and add the words "interested public." Interested public is an established term used in the livestock grazing portions of the Code of Federal Regulations (CFR) and this RMP must be consistent with existing regulations. CFR 4100.0-5 includes a specific definition for interested publics. It is important to cite these regulations in the RMP: CFR 4100.0-5 Interested public means an individual, group, or organization that has:(1)(i) Submitted a written request to BLM to be provided an opportunity to be involved in the decision making process as to a specific allotment, and(ii) Followed up that request by submitting written comment as to management of a specific allotment, or otherwise participating in the decision making process as to a specific allotment, if BLM has provided them an opportunity for comment or other participation; or(2) Submitted written comments to the authorized officer regarding the management of livestock grazing on a specific allotment. Even though there is a definition of stakeholders in the glossary, stakeholders are not included in the grazing portion of the regulations and cannot be used in this RMP. The definition of stakeholders in the glossary can include anyone holding U.S. citizenship. The CFR regulations cited above require U.S. citizens to actively request involvement before being consulted on grazing management decisions and allotment management plans (AMP).	2054

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10262	10262-67	It is our contention that the RMP/EIS in its present iteration is incomplete in numerous capacities. Chapter 3 - Affected Environment describes the current condition in such general terms it leaves the LGCA questioning the existing state of the natural environment. Is it above average with minor problems or below average condition with significant issues? The stated problem with Chapter 3 is that it lacks critical scientific substantiation through data and research. This is true for both current and historic conditions.	2054
10262	10262-70	A concurrent dilemma with having insufficient methods is that Chapter 4 does not divulge measurement indicators. Both methods and measurement indicators are indispensable in an EIS. Measurement indicators define the variable(s) most likely to impact, negatively or positively, a resource upon plan implementation. Sans methods and measurement indicators, an EIS is ineffectual.	2054
10262	10262-72	The RMP/EIS does not adequately describe the environment of the area. Baseline and historical condition descriptions are not found within the RMP/EIS.	2054
10262	10262-19	Measurement indicators are missing for all resources, making it infeasible to conduct an effects analysis.	2055
10262	10262-47	In reviewing the RMP/EIS, as well as maps and data disseminated by the BLM during the RMP revision process, it is clear that there are several issues with data and information presented as fact by the BLM. The hierarchy of federal requirements, as existing in statutes, rules and regulations, case law, and agency handbooks and manuals was reviewed and, in fact, corroborates that the BLM inaccurately used and presented data and information. It is for this reason that the LGCA asserts that the BLM must recognize and correct factual errors as required by the Data Quality Act (DQA) of 2000.	2055
10262	10262-57	It is for the highlighted examples of data quality issues in the RMP/EIS provided above that the LGCA asserts that the BLM must recognize and correct factual errors as required by the DQA. The DQA was enacted by Congress to ensure that federal agencies disseminate and use accurate information. The BLM, in preparing the RMP/EIS, failed to abide by the provisions of the DQA.	2055
10262	10262-58	LGCA members believe that the BLM has ignored in the RMP/EIS numerous stated policies and goals included in the Big Horn, Hot Springs, Park, and Washakie Land Use Plans and Meeteetse, Cody, Hot Springs, Powell-Clarks Fork, Shoshone, South Big Horn, and Washakie County Conservation District Land Use Plans. In not addressing inconsistencies between the RMP/EIS and County and Conservation District Land Use Plans, the BLM is in violation of CEQ Section 1506.2 - Elimination of Duplication with State and Local Procedures. The counties and conservation districts have consistently stated that they favor continued multiple use and disfavor reducing access to public lands for a variety of purposes.	2055
10262	10262-60	Implementation of multiple uses through a combination of elements selected from Alternative A, B, C, and D, which would work to strike an appropriate balance between traditional and non-traditional resource uses and recreational use/conservation, is the goal of the LGCA. Alternative B and D, in particular, restrict certain multiple uses (e.g. resource extraction, grazing, and travel management designations) across much of the Planning Area, which is contradictory to the stated goals of the BLM, as well as the policies set forth in the county and conservation district land use plans.	2055
10262	10262-71	The previously identified issues regarding lack of data and analysis to support	2055

Table B-1. Individual Comments and BLM Response Index (Continued)

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		management actions in the RMP/EIS, which are based on lack of baseline or historical conditions, violate CEQ Section 1502.15 Affected Environment	
10262	10262-74	Information missing from the RMP/EIS is extensive and varying in degrees of absence (from wholesale nondisclosure of historic, baseline, and existing conditions and quantitative effects analysis to repeatedly not referencing with citation(s) what is portrayed as statement of fact). CEQ regulations speak directly to the inclusion or exclusion of "incomplete or unavailable information" in Section 1502.22	2055
10262	10262-75	Because cost to obtain a significant majority of the missing information in the RMP/EIS would not be exorbitant, Part A of CEQ 1502.22 is relevant. By violating CEQ1502.22, the BLM produced a NEPA document out of compliance and ineffectual in guiding management action in the Planning Area. As such, the LGCA is gravely concerned that management actions in the future will unduly restrict or prohibit multiple uses in the Planning Area for the next 20 years.	2055
10262	10262-130	Inconsistencies were found in GIS shapefiles related to the Recreation Management Areas (RMA), Travel Management, Withdrawals, Geothermal Constraints, Rights-of-Way (ROW) Avoidance and Exclusion Areas, and Mineral Constraints.	2057
10262	10262-131	When differences are in the hundreds and thousands of acres, these differences reflect mistakes and demonstrate that the results of the RMP/EIS cannot be duplicated.	2057
10262	10262-17	Historic and current condition data for the Planning Area are undisclosed and necessary for proper analysis of the alternatives.	2057
10262	10262-171	The analysis processes, shapes, and acreages contained within the RMP GIS data should be complete, accurate, and highly reproducible. They are not.	2057
10262	10262-172	The definition queries for selection processes should have been thoroughly tracked in GIS or in a text document. They were not.	2057
10262	10262-173	At least one of the two options for documenting GIS analysis should be included in the project's administrative record.	2057
10262	10262-50	It is not possible to recreate maps and information based on information provided in the RMP/EIS. Therefore, the BLM must better describe and disclose methodologies and correct GIS data issues.	2057
10262	10262-62	It is disconcerting to see significant inconsistencies and inaccuracies in GIS data in an RMP/EIS that will guide management on 5.6 million acres for 20 years. The Bighorn Basin RMP will have major impacts to the local communities and stakeholders in the Bighorn Basin. Inaccuracies in the RMP/EIS need to be acknowledged and fixed prior to the release of the Final RMP/EIS.	2057
10262	10262-63	The analysis processes, shapes, and acreages contained within the RMP/EIS GIS data should be complete, accurate, and highly reproducible. The DQA (Public Law 106-554, Â§515) requires Federal agencies to ensure that influential information, such as that used in the preparation of resource management plans, be characterized by reproducibility and transparency. The RMP/EIS GIS data does not meet these requirements.	2057
10262	10262-64	A number of issues were resolved, but many major data issues remain unresolved. Coordination by ERG's highly skilled GIS staff should not be required to use data to recreate acreages and analysis. The definition queries for selection processes should have been thoroughly tracked in GIS, or at the least in a text document. Again, this did not occur.	2057

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10262	10262-65	GIS data sets and methodologies should be in the administrative record for the RMP/EIS. GIS files that match the acreages in the RMP/EIS also need to be included in the administrative record. The files that the BLM supplied to ERG do not match information in the RMP/EIS. Proper documentation of GIS methodologies is required to recreate analyses and acreages reported in the RMP/EIS.	2057
10262	10262-66	Two options to document GIS analysis and definition query processes when conducting GIS analysis surrounding public land use policies and projects are as follows: A complete library of the original GIS data sets with completed geometry and attribute information is required. The library would be supplemented by a text document clearly outlining the definition queries and selection processes documented in order to recreate the analysis processes performed by ICF International (BLM contractor working on the RMP/EIS) to arrive at the acreages and conclusions reported in the RMP/EIS. Metadata for all GIS files should be complete according to the Federal Geographic Data Committee (FGDC) guidelines. A more common and simplistic approach is to set the definition queries or selection process, run the analysis processes, and export them into new, final analysis GIS files and disseminate those to the public or cooperating agencies. All appropriate metadata needs to be completed under the FGDC metadata guidelines for all original and final analysis files. At least one of the two options for documenting GIS analysis should be included in the project's administrative record.	2057
10262	10262-8	Geographic Information Systems (GIS) files provided to the LGCA include blank attribute table records, overlapping polygons of disparate management actions, and datasets that cannot be used to reproduce numbers in the RMP/EIS.	2057
10262	10262-36	Regrettably, in the seven meetings held by the LGCA (attended by 360 individuals (meeting sign-in sheets available upon request)), beginning May 24th in Thermopolis and ending June 1st in Cody, at only one meeting (Worland May 25th) did one BLM employee (Caleb Hiner, Bighorn Basin RMP/EIS Project Lead) attend. Only recently has it come to the LGCA's attention that BLM employees were instructed by the BLM Regional Director Eddie Bateson to not attend any of the meetings sponsored by the LGCA (pers. comm. Shockley Siggins). By intentionally not attending the cooperating agency public meetings on the Draft RMP/EIS review, the BLM has breached much of the inclusive guidance in the manuals and regulations (e.g. Federal Land Policy and Management Act (FLPMA), NEPA, CEQ, BLM Planning Handbook, Final Land Use Planning Rule in the Federal Register (Vol. 70, No. 55), and the BLM Contractor's Public Participation Plan).	2060
10262	10262-37	The signed Cooperating Agency MOUs state under the "responsibilities of the BLM" (5) that: "the BLM will utilize the (County or Conservation District name) input and proposals to the maximum extent possible consistent with legal requirements and its responsibility as lead agency." By intentionally ignoring the seven public meetings (Thermopolis, May 24th, 58 attendees; Ten Sleep, May 25th, 41 attendees; Worland, May 25th 32 attendees; Greybull 78 attendees; Powell May 31st, 51 attendees; Meeteetse, June 1st, 26 attendees; and Cody, June 1st, 74 attendees) sponsored by the LGCA to review the RMP/EIS, the BLM violated the intent if not the letter of the MOUs. Section 6 of the MOU states: parties will cooperator in the development and review (emphasis ours) of any operating guidelines or agreements between (County or Conservation District name) or BLM and other entities involved in the EIS for Bighorn Basin RMP	2060

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		effort which might affect the environmental analysis and writing of the EIS. BLM and (County or Conservation District name) agree to meet on issues concerning the EIS at the request of either party.	
10262	10262-38	By deliberately neglecting public concerns discussed at the local government sponsored meetings, the BLM violated the coordination, cooperation, consultation, and collaboration requirements.	2060
10262	10262-39	It would have been in the best interest of the agency and the public if the BLM would have attended, as the meetings were highly objective, informative, and civil. The 360 attendees of the LGCA meetings had and have valid interests and concerns unlikely captured in the BLM content and comment analysis. The fundamental planning concerns by interested attendees were dismissed by the BLM and clearly articulated by the Regional Director's decision to forbid BLM from observing and listening to stakeholders in local meetings. The fact that the BLM sponsored meetings were round tables, without the benefit of presentations or available forums to publically comment, made the BLM meetings unnecessarily confusing. One participant in the Worland meeting, while waiting for BLM personnel to finish a non-stakeholder discussion, left a note which read "this is confusing."	2060
10262	10262-126	In addition to the expressed concern the LGCA has with the primacy given to wildlife species and habitat protection (e.g. CSU, NSO, and TLS constraints and LWC and ACEC designations) is the apparent understated oil and gas development potential presented in both the RMP/EIS and RFD. Marathon Oil has stated that in their professional opinion the RFD is understated by a factor of 25 to 50. Using a conservative estimate that the RFD is understated by a factor of 10, well potential in the Mowry Shale currently under lease would increase exponentially. In the entire Mowry Shale formation, both leased and non-leased, the well potential would increase even more.	2061
10262	10262-215	If there are known commercially viable minerals associated with rare earth elements in the Planning Area, please provide an inventory per FLPMA Sec. 201. An evaluation of economically viable quantities should include fluvial placer deposits.	2061
10262	10262-218	it is thought that a review of the regional geology provides opportunities for discovering new oil and gas reserves along the western boundary of the basin that were not adequately evaluated or had understated potential (i.e. low to no potential) in the Bighorn Basin RFD.	2061
10262	10262-219	In at least 16 Bighorn Phosphoria fields, stratigraphic variation contributes greatly to the structure of the Phosphoria trap and is essential in at least three fields (Cottonwood Creek, Manderson, and Water Creek) (Stone 1967). Considering this stratigraphic variation and that one petroleum system in the basin is sourced from the Phosphoria Formation, it is probable that there are opportunities for discovering new reserves in this formation (USDI 2008a).	2061
10262	10262-220	Further, one of the understated areas that may have potential for new discoveries is the Mowry Fractured Shale as defined by the USGS (USDI 2008b).	2061
10262	10262-221	The USGS evaluated the Mowry Fractured Shale play in their recent assessment of undiscovered oil and gas resources of the Bighorn Basin (USDI 2008b). The Mowry Fractured Shale was included in the Cretaceous-Tertiary Composite Total Petroleum System Muddy-Frontier Sandstone and Mowry Fractured Shale Continuous Gas assessment unit (AU) and was also evaluated separately as the Mowry Fractured Shale Oil AU. The extents of the two assessment units are	2061

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		shown in Figure 5. Estimated undiscovered continuous oil and gas reserves were five million barrels of oil in the Mowry Fractured Shale AU and 348 billion cubic feet of gas in the Muddy-Frontier-Mowry AU. It is interesting to note that the Crosby 25-2, Crosby 25-3, and the Ainsworth 13-35 wells discussed above were drilled outside both AU boundaries, therefore indicating Mowry production throughout the basin cannot be overlooked.	
10262	10262-223	In further support of the RMP/EIS being understated, according to Marathon Oil Company (Marathon Oil Company 2010): Table 4 of the RFD (the U.S, Geological Survey's Undiscovered Reserve Estimates) understates the probability of significant discoveries in these resource plays.	2061
10262	10262-224	Upon there being a successful discovery of these gas plays, the recovery for each could easily be between 25 to 50 times the projected mean amounts. For planning purposes, it would be best to include the potential of each of these plays, since a successful discovery would generate activity and a significant positive economic impact on the affected county(ies) and the state.	2061
10262	10262-225	Another area that may have been overlooked in the RMP/EIS is the Sub-Absaroka play. The Sub-Absaroka play was evaluated by the USGS in their 1995 national assessment of oil and gas resources (Fox and Dolton 1995) but it was not included in their more recent 2008 assessment of undiscovered oil and gas potential for the Bighorn Basin. It was also not included in the 2009 draft BLM's Bighorn Basin RFD analysis.	2061
10262	10262-226	According to the 1995 USGS assessment, the Sub-Absaroka is a "demonstrated" oil play located along the western side of the basin beneath Eocene-age volcanic rocks. That study stated that the potential for significant new field discoveries was considered to be "good." Oil was predicted to be trapped in Laramide-age anticlines and domes, similar to producing structures successfully developed elsewhere in the basin. In the 2009 RFD, this area is considered to have low or no potential.	2061
10262	10262-228	The oil and gas potential within the Bighorn Basin Planning Area is shown in Figure 40 of the Bighorn Basin RFD. A similar projection for oil and gas potential in the western portion of the planning area was forecast in the Shoshone National Forest (Shoshone) RFD (Figure 9 of (USDA 2011)). Those two potential projections were overlain and discrepancies were observed. As shown in Map 1[BLM RFD Compared to Shoshone National Forest RFD], there are several areas where the Shoshone RFD projects a high potential for the occurrence of oil and gas and the Bighorn Basin RFD projects a very low to low potential. There are also areas where the Shoshone RFD projects moderate potential and the Bighorn Basin RFD projects very low potential. The BLM should reevaluate the discrepancies observed on overlapping areas of the Shoshone and BLM RFD and incorporate this information into the RMP/EIS if determined necessary.	2061
10262	10262-236	Table 3-16 in the RMP/EIS lists the projections of the amount of oil, gas and natural gas liquid resources in the Planning Area. The list does not include an estimate of the Sub-Absaroka play.	2061
10262	10262-238	Since the Bighorn Basin shares many geologic characteristics with these basins, it is thought that a number of stratigraphic and structural plays remain to be found in the under-explored central and far west portions of the Bighorn Basin (Herrod 2010a). As such, the future drilling activity may be much greater than that predicted in the RFD.	2061
10262	10262-239	Also, the methods used to calculate surface disturbance from projected new-	2061

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		well counts in the RFD are insufficiently described and the LGCA supports the following comment provided by the State of Wyoming: the BLM is not as clear on how impacts are treated and how disturbance is calculated from these well counts. It is my understanding that disturbance and impacts projected using the RFD well counts is also provided solely for the purposes of comparing impacts between alternatives and that it is not BLM's intention that any of the estimates of disturbance or impacts provided in the RMP or EIS represent "analysis thresholds" for determining what actions may require a plan amendment. The relationship between disturbance estimates and impacts and what constitutes an analysis threshold is not clear in the Draft RMP and DEIS and BLM needs to provide a clear statement that exceeding the estimates of disturbance or impacts in the EIS will not result in the need for an RMP amendment. For instance, in Appendix T of the draft RMP/EIS BLM calculates short- and long-term surface disturbance from leasable oil and gas for each of the alternatives. Short-term disturbance during the 20-year projection period ranges from 1,527 (Alternative B) to 3,771 acres (Alternative C) on public lands. The projection for fee and state surface is 1,533 acres for all alternatives. BLM needs to clarify in the Final RMP and EIS that these estimates are provided for analysis purposes only to demonstrate the difference between alternatives and that disturbance or impacts beyond the analysis assumptions does not require a plan amendment.	
10262	10262-246	This suggests that the impact analysis is based on an RFD that does not take into account the potential for high oil and gas occurrence and the known geologic and engineering assumptions associated with the Bighorn Basin. Please disclose the percent for high potential occurrence in the Planning Area in the RMP/EIS.	2061
10262	10262-250	The RMP/EIS (pg. 4-77) states "However, because sand and gravel are the principal salable minerals found in commercial quantities in the Planning Area, wherever possible, this analysis describes specific impacts to the disposal of sand and gravel. Acreages of occurrence potential of other mineral materials were not available at the time of analysis." There is a discrepancy between this statement and what has been included in the findings (ex. limestone occurrence potential) of the Bighorn Basin Solid Mineral Occurrence and Development Potential Report. Please disclose occurrence potential acreages when possible in order to ensure that the impacts analysis for salable minerals materials is correct.	2061
10262	10262-254	If there are known commercially viable minerals associated with rare earth elements in the Planning Area, please provide an inventory per FLPMA Sec. 201.	2061
10262	10262-261	The RMP/EIS understates unconventional oil and gas potential in the Mowry Shale and the Muddy Frontier Sandstone/Mowry Shale, and therefore, the potential reserves are not accurately depicted in the baseline development projections in the RMP/EIS. The BLM should include additional discussion in the RMP/EIS to accurately reflect unconventional oil and gas potential in the Mowry Shale and the Muddy Frontier Sandstone/Mowry Shale.	2061
10262	10262-262	The correlation between RFD surface disturbance estimates and what constitutes an impacts analysis threshold is not clear in the Draft RMP and DEIS. The BLM needs to provide a clear statement that exceeding the projected new-well counts and estimates of disturbance or impacts in the EIS will not result in the need for a Plan Amendment.	2061
10262	10262-263	Given the concern that the projected new-well numbers disclosed in the RMP/EIS could be perceived as a limit, the LGCA requests the following addition	2061

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		provided from the Wyoming Rawlins Field Office RMP Record of Decision: "The number of wells projected in the RFD scenario for oil and gas does not limit or cap the number of wells that can be drilled, nor the amount of surface disturbance that will be allowed during the period covered by the Proposed RMP/Final EIS. This clarification reaffirms that the RFD is intended for analysis purposes only. Individual implementation level project proposals will be subject to site-specific NEPA analysis to ensure conformance with the Approved RMP."	
10262	10262-264	Given the importance of the baseline unconstrained projection for oil and gas in the Planning Area, the BLM should reevaluate the discrepancies observed on overlapping areas of the Shoshone and BLM RFD.	2061
10262	10262-271	It is of great importance to the LGCA that the aforementioned mitigations be implemented, because only an accurate prediction of likely energy development and exploration will lead to proper and effective management and planning. It is also essential that the impacts to mineral resources be analyzed thoroughly and accurately, especially since the disclosed impacts for many other resource areas are coupled with these results.	2061
10262	10262-4	Mineral potential in the Bighorn Basin is significantly underestimated in the RFD scenarios.	2061
10262	10262-5	Mowry Shale energy potential is not evaluated in the RMP/EIS.	2061
10262	10262-82	The RMP/EIS states under Section 4.2.5 Leasable Minerals - Oil and Gas (pg. 4-55) the following: The potential for oil and gas occurrence in the Planning Area ranges from high to low, depending on location, as documented in the Reasonable Foreseeable Development Scenario (RFD). The RFD for oil and gas in the Planning Area analyzed the potential for anticipated drilling activity over the next 20 years. Lands in the Planning Area are classified as having moderate to no potential for development of oil and gas resources, depending on location and based on projected drilling densities (BLM 2009u). Drilling in existing fields accounts for a large proportion of the growth, with a lesser share attributed to additional new discoveries in both conventional and unconventional reservoirs. However, it is documented in Figure 40 of the Draft Bighorn Basin RFD, and cited in the RMP/EIS, that 92 percent of the Planning Area is classified as high occurrence potential for oil and gas (USDI 2009a). While it is appropriate to use past drilling densities in part to establish a baseline for development potential, it is incorrect to disregard the high occurrence potential throughout the Planning Area.	2061
10262	10262-84	The RMP/EIS posits that management direction for oil and gas leasing be based on past drilling densities disclosed in the RFD and, in doing so, may significantly underestimate the development potential of recoverable oil and gas resources within the Bighorn Basin. Therefore, the impacts to oil and gas resources are most likely miscalculated, which in turn leads to insufficient analysis from many other resources listed in the RMP/EIS.	2061
10262	10262-149	The Alternative A and D GIS data supplied by the BLM for RMAs are incomplete. Shapes and records for Worland Caves Special Recreation Management Area (SRMA), Beck Lake Extensive Recreation Management Area (ERMA), and Newton Lake Ridge ERMA are missing from the Alternative A GIS data, but are listed in Table 4-15.	2062
10262	10262-150	The Bighorn Basin ERMA is accounted for in Alternative D but not in Alternative A, which is a misrepresentation of current management.	2062
10262	10262-151	The SRMA portion of the South Bighorn's RMA, listed in Alternative D Table 4-15	2062

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		as containing 14,668 acres, is missing from the Alternative D RMAs GIS files.	
10262	10262-152	Maps 59-62 of the RMP do not display all SRMAs, ERMAs, and RMZs located on BLM lands in the Bighorn Basin. They only display selected RMAs, misrepresenting the on-the-ground management to the public. That may be due to the missing data in the RMA GIS Files.	2062
10262	10262-153	The Canyons RMZ is reported, in Table 4-15, as containing 141,793 acres. The GIS data reports the Canyons RMZ as containing 127,268 acres.	2062
10262	10262-162	The RMAs for both Alternative A and D are missing records and shapes for multiple RMA designations. Mr. Hiner acknowledged that in fact the files are incomplete and is attempting to track them down. He offered a solution as to how the LGCA can create the shapes and records. This is not the LGCA's responsibility. These shapes and records should have been completed before they were disclosed in the RMP and the RMP was released.	2062
10262	10262-55	Recreation Management Areas (RMAs): Both Alternative A and D GIS files do not show a complete data set of all RMAs included in the RMP.	2062
10262	10262-22	Rights-of-way (ROW) avoidance/mitigation areas are immense (941,778 acres - 2,717,617 acres), economically irresponsible, and not proven to be necessary or effective in protecting resources.	2066
10262	10262-147	The LGCA discovered that the BLM Rights-of-Way (ROW) GIS files for both Alternative A and D contained overlapping polygons resulting in a double counting of acreages. Also, the attribute table had multiple miss-spellings for both ROW categories.	2067
10262	10262-148	The ROW Avoidance Areas acreage for Alternative A reported in the RMP Table 2-2 is 941,778. The acres in GIS are 973,467. The ROW Avoidance Areas for Alternative D in Table 2-2 is 2,512,202 and the GIS acres are 2,536,211. These differences cannot be rectified with the GIS data supplied by the BLM.	2067
10262	10262-54	Rights-of-Way Avoidance and Exclusion: GIS file contained overlapping areas resulting in conflicting management in the same areas. This also results in incorrect acres.	2067
10262	10262-95	The discussion of greater sage-grouse in the RMP/EIS Affected Environment is deficient, rendering impossible proper analysis of impacts disclosed in Environmental Consequences. First, management challenges are not isolated, but amalgamated.	2071
10262	10262-96	Again, as with big game, the RMP/EIS does not include predation as a management challenge facing greater sage-grouse. Certainly predation is one of many factors affecting greater sage-grouse in the Bighorn Basin.	2071
10262	10262-97	Finally, as it pertains to greater sage-grouse, guidance in Executive Order 2011-5, issued by Wyoming Governor Matthew Mead on June 2, 2011, which recognizes only Core Areas, not arbitrary Key Areas constructed by the BLM, and provides adaptive management principles for the species, shall be implemented by the BLM.	2071
10262	10262-113	according to the RMP/EIS, the direct impacts to livestock grazing result from management actions that change AUM allocations or restrict livestock grazing. Yet, the only disclosure of impacts is for surface disturbing activities and closures. There are no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations	2074
10262	10262-14	Reductions in animal unit months (AUMs) are a result of management actions that change AUM allocations or restrict livestock grazing. Yet, the only	2074

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		disclosure of impacts is for surface disturbing activities and closures. There are no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations.	
10262	10262-174	potential impacts on grazing that are not explicit in the RMP. The RMP states that the current AUMs of 305,887 will only be reduced by 1-2% over the life of the Plan. However, according to the Plan, direct impacts to livestock grazing will result from management actions that change AUM allocations or restrict livestock grazing. Yet, the only disclosure of impacts is for surface disturbing activities and closures.	2074
10262	10262-175	There are no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations. There are also several areas in the management action Table 2-5 (RMP/EIS pg. 2-160 - 162) that state management must be consistent with "other resource objectives," but does not disclose which resources or objectives.	2074
10262	10262-122	the following mitigation/corrective action was devised by the LGCA for wildlife and grazing: Prior to any proposed modification of an AMP or elimination of livestock grazing allotments in the Planning Area as a protective measure for greater sage-grouse and/or other wildlife species, the BLM must design and implement a comprehensive monitoring study based on state-of-the-art methods that evaluates species population density and viability, habitat quality and quantity, and the effects of livestock grazing in the Planning Area. At the conclusion of the study the BLM will coordinate with livestock grazing permittees and local governments in the Bighorn Basin preceding any proposed modification of AMPs or elimination of livestock grazing allotments in the Planning Area. If disagreements arise, they shall be settled through a conflict resolution and mediation process.	2076
10262	10262-243	Therefore, the boundaries of the Alternative D VRM Class II encompassing the Sheep Mountain Anticline ACEC should be modified to provide an additional ¼-mile buffer of the adjacent Alternative D VRM Class IV to more fully encompass the bentonite potential areas depicted in the BLM-developed bentonite potential GIS file.	2077
10262	10262-244	The RMP/EIS (pg.4-51) states "Under Alternative D, withdrawals are pursued on the second-fewest acres of ACECs, after Alternative C, but the alternative includes the most acreage that can be withdrawn in ACECs on a case-by-case basis for resource protection." Yet it is unclear if the aforementioned ACEC acres are included in the already disclosed areas or if they would be additive. Please clarify this statement and identify proposed ACECs that would be withdrawn on a case-by-case basis.	2077
10262	10262-251	The RMP/EIS (pg. 4-75 to 4-76) states "As a result of specific stipulations for ferruginous hawks, lands where greater sage-grouse and raptor habitats overlap could be subject to development restrictions for most of the year (9 months)." Without population data on raptors, coupled with the fact that golden eagle and osprey "appear to be increasing throughout the Planning Area," the TLS and CSU restrictions are too restrictive (see Wildlife Corrective Actions).	2077
10262	10262-255	Correct the boundaries of the Alternative D VRM Class II for the Sheep Mountain Anticline ACEC to provide a ¼-mile buffer of the adjacent VRM Class IV to fully encompass the bentonite potential areas depicted in the BLM-developed bentonite potential GIS file.	2077
10262	10262-61	With respect to projections of oil and gas development in the RMP/EIS, the	2077

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		LGCA believes that the BLM significantly underestimated the potential for recent and upcoming technologies to develop existing resources. This position is backed up by letters and comments from those in the industry (see Mineral Resource discussion and comments). The number of acres administratively unavailable to oil and gas leasing increases from approximately 155,000 under current conditions (Alternative A) to over 290,000 acres under the BLM-preferred alternative (Alternative D). This is not consistent with the goals and policies of any of the county and conservation district land use plans.	
10262	10262-190	Names of Class I and Class II areas in or near the Planning Area are presented on page 3-19. Please provide a map of the Class I and Class II areas in or near the planning area.	2009_1
10262	10262-191	The RMP/EIS asserts that visibility conditions are excellent at the North Absaroka site, and standard visual range values are presented. Please provide the metric, in standard visual range or otherwise, for designating the visibility conditions as excellent.	2009_1
10262	10262-192	The USFS and NPS have established Level of Concerns for total deposition of nitrogen and sulfur compounds in Class I Wilderness Areas. These Level of Concerns are 1.5 kilograms per hectare per year of total nitrogen deposition and 5.0 kilograms per hectare per year of total sulfur deposition. Please include the USFS/NPS Level of Concern guidelines on the graphs in this section.	2009_1
10262	10262-193	The air quality environmental consequences section describes the expected impacts of each alternative using a qualitative analysis. In order to accurately determine impacts to air quality, comprehensive monitoring should be performed by the WDEQ. Limited monitoring data and inaccurate qualitative methods may result in decisions that negatively affect the Planning Area and management of its resources.	2009_1
10262	10262-194	If estimates for activity data change (for example, if the reasonably foreseeable development projections are updated), impact analysis should be revised.	2009_1
10262	10262-195	A method on page 4-6 states that "only emissions from permitted activities that would occur on federal lands within the Planning Area" are included in the analysis. Please provide a reference that, while only emissions from permitted activities that would occur on federal land within the planning area are included, the cumulative effects of activities occurring off federal land and outside of the planning area will be considered and incorporated into the appropriate planning documents and project-specific assessments.	2009_1
10262	10262-196	Please justify the exclusion of fugitive VOC and prescribed fire emissions from the analysis.	2009_1
10262	10262-197	Please justify the exclusion of activities related to the management of cultural resources, paleontology, recreation, and fish and wildlife.	2009_1
10262	10262-198	Please correlate the annual emissions summary presented in Table 4-2 to the applicable national and state primary air quality standards presented in Table 3-3. Quantitative air quality monitoring, by the WDEQ, using an expanded array of monitoring sites, is necessary to provide an accurate characterization of air quality impacts during the life of the Plan.	2009_1
10262	10262-178	On Page 2-12, the RMP/EIS states that Certain management actions specify conformance with Wyoming DEQ regulations (e.g., smoke management rules for prescribed burns and meeting water quality standards), or specify enforcement and remediation actions. Please include a statement that these nondiscretionary laws and regulations are presented in Table 2-5.	2009_2

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10262	10262-179	Within Table 2-5 Detailed Alternatives, Record 1000 states that Goal PR:1 is to "Minimize the impact of management actions in the Planning Area on air quality by complying with all applicable air quality laws rules, and regulations." Please expand Goal PR:1 and its associated management actions to include basic descriptions of all applicable air quality laws, rules, and regulations, as well as how compliance will be achieved. Management actions that are currently presented only specify compliance with Wyoming DEQ Air Quality District smoke-management rules and regulations.	2009_2
10262 part2a	10262 part2a-10	Record #4055 - Alternative A uses the terms "intensively managed intermittent streams" on a "case by case" basis. Without defining "intensively" or the "case by case basis" decision criteria, any action might be proposed on an intermittent stream. The impact to intermittent streams and other uses could be substantial. Alternative B does define which streams might be chosen, but chooses to use the term "intensively manage" without specifics. Could this mean an exclusion of cattle or no stream crossings or other uses? Alternative C uses the same language as Alternative A. Alternative D references no surface occupancy within ¼ mile of a Class 1 or 2 fisheries and a 500-foot fisheries buffer elsewhere. Does this mean any intermittent stream contributing to a fishery could be deemed subject to a ¼ mile or 500-foot buffer? Would intermittent streams contributing to a class 1 or 2 fishery be subject to a ¼ mile avoidance of surface disturbing activities? Is the use of the term "avoid" meant as a guideline subject to interpretation as to how it would be applied or is it a NSO restriction similar to Alternative A? We propose that this language not be applied to Record #4055, but rather only to Record #4056.	2002
10262 part2a	10262 part2a-11	Record #4058 - Alternative A forms the basis for comparison of alternatives. Several commonly used techniques are listed including vegetation manipulation and planting, installing sediment and erosion control structures, fencing, and acquiring, developing, and maintaining water sources. However, there is little evidence in the document to support either the need for nor the benefit of the techniques listed. Alternative B indicates that there are implied management practices, but none are specifically listed. What management practices would be implemented in addition to those listed in Alternative A? Are there additional practices proposed in addition to "acquiring, developing, and maintaining land and water sources?" There are no references or assessments to determine where or if such acquisitions are necessary, nor beneficial for native fish or fish species of concern.	2002
10262 part2a	10262 part2a-12	Record #4059 - Alternative A is unclear as to whether existing reservoirs will be encouraged to have minimum pool depths. Please clarify as to whether the Bighorn Basin RMP encourages the establishment of minimum pool depths. Both Alternative B and D reference the term "managing existing reservoirs." What is meant by "managing existing reservoirs," as well as "encouraging minimum pools?"	2002
10262 part2a	10262 part2a-13	Record #4060 - Alternative B proposes to retrofit or design new culverts to "allow fish passage, both upstream and downstream." Is this alternative proposing to retrofit or design new culverts that allow for fish species of all size classes to have passage? Will fish have passage at all potential streamflows (including bankfull)? Will fish passage be provided on ephemeral or intermittent streams? In most cases, culverts are not capable of passing all species and size classes of fish at any flow level. Bridges spanning bankfull width or fords would be required for such wide-ranging passage requirements. Bridges or fords are	2002

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		not mentioned in this alternative. Alternative C proposes to design culverts and crossings to current standards. What are current standards? What fish species and size classes are provided passage with the current standards? Why are such current standards not listed in Alternative A? Alternative D proposes to use Alternative B practices on a priority basis. What are the priorities? How extensive are the practices expected to be applied?	
10262 part2a	10262 part2a-14	"Campgrounds are not developed under Alternative B, resulting in less adverse impacts due to recreation access than Alternatives A and C." Does this statement apply only to land within ¼ mile or 500 feet of a stream or will no more campgrounds be built in the Bighorn Basin? Also, why would not well located and designed campgrounds be less impactive than dispersed camping that could occur on streambanks?	2002
10262 part2a	10262 part2a-15	Resources Paragraph four, page 4-163 of the Bighorn Basin RMP/EIS states that: Alternative B maintains natural flow regimes in streams supporting fish, providing the greatest beneficial impacts to water quantity compared to the other alternatives. Fencing of wetlands and riparian areas reduces potential bank degradation and sedimentation from other activities and resources uses, resulting in greater indirect beneficial impacts to fish than Alternative A. This paragraph implies that Alternative B maintains natural flow regimes. However, there are existing alterations due to water and diversion projects and acknowledgement that oil and gas development may provide produced water surface discharge, thereby changing natural flow regimes. Due to this, please clarify the term natural flow regimes.	2002
10262 part2a	10262 part2a-1	Within the Invasive Species and Pest Management section there is nearly nonexistent disclosure of relevant field-verified data. The most glaring deficient within this subject area is that only 10% of the Worland Field Office (WFO) has been inventoried for invasive nonnative annual bromes. Clearly an EIS cannot accurately analyze the impact of invasive species when only 10% of the WFO has been inventoried. Prior to finalization the BLM must conduct a new, expanded inventory and reanalyze impacts.	2012
10262 part2a	10262 part2a-2	In section 2.5 Alternatives Summary it states that the section describes only the key elements of the alternatives (those with the greatest potential to affect resources). This table should include invasive weeds and cheatgrass since this resource has the greatest potential to affect resources if not managed properly. Please include acres of invasive weeds and cheatgrass by alternative.	2012
10262 part2a	10262 part2a-3	The Affected Environment section for Invasive Species and Pest Management is inadequate and contradictory. Acreages are not consistent as explained below, there is no information provided on the species types and acres infested by species, nor is there a location map. Noxious weeds were identified as an issue early in the planning process, however they are given minimal treatment and there have been no indicators identified to compare the difference in alternatives.	2012
10262 part2a	10262 part2a-4	This section states that in 2007 "...the WFO estimated that approximately 57,000 acres in the field office were infested with nonnative annual bromes." This inventory is stated to only cover 10% of the Bighorn Basin so, "actual infested acreage might vary." We argue that the inventory is far too minimal and must be conducted at a much greater scale.	2012
10262 part2a	10262 part2a-5	The Environmental Consequences section does not disclose what the indicators are for measuring impacts. This section has very detailed information on surface disturbing activities, is it to be assumed that every acre of surface disturbing	2012

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		activity is going to be infested with weeds? Please identify what indicators were used to compare alternatives and provide a table that displays the differences between alternatives so that the impacts can be understood.	
10262 part2a	10262 part2a-6	There are no methods detailed on how environmental consequences of invasive species were analyzed. There is no quantitative information provided to assess impacts.	2012
10262 part2a	10262 part2a-107	Predators, including gray wolves and grizzly bears, have adverse impacts to big game in the Bighorn Basin. Note that predators and predation are not listed as a management challenge for big game. The BLM must acknowledge, account for, and analyze the predation of big game species in the RMP/EIS.	2020
10262 part2a	10262 part2a-128	METHOD/ASSUMPTION: Forest management actions replicating natural historical disturbance regimes and managing wildlife habitats instead of, or in addition to, managing forest products are anticipated to benefit wildlife habitats. COMMENT: Describe how forest management actions differentiate from managing forest products. The RMP/EIS frames the latter management regime as less ideal than the former.	2020
10262 part2a	10262 part2a-16	However, the Wildlife sections of the Draft Bighorn Basin RMP/EIS are consistently incomplete, contradictory, and unclear. An Affected Environment chapter should comprehensively disclose wildlife habitat needs and available habitat for all species analyzed in the EIS Planning Area. Additionally, when management challenges are noted for individual species (e.g. greater sage-grouse) or groups of species (big game), such challenges should be disclosed quantitatively with data and research. Rather than doing so, the Affected Environment chapter provides little to no historic, baseline, and/or current data on wildlife species, habitat availability and quality, and substantiation via data and research to document that the management challenges are in fact real and accurate as described.	2020
10262 part2a	10262 part2a-26	BR:6.1 " In minimizing, avoiding, and mitigating environmental risks to fish and wildlife, all decisions and management actions must be substantiated with field-verified data and best science. The BLM is required, according to case law, to take a hard look at best science before implementation of management actions.	2020
10262 part2a	10262 part2a-31	4063 - Define as appropriate, casual use, and vegetation manipulation.	2021
10262 part2a	10262 part2a-100	What the RMP/EIS does not bring to the discussion is how the overpopulation of elk has negatively affected BLM permittees. As affected parties, the LGCA asks that the RMP/EIS qualify and quantify how the increase in elk has: Complicated grazing for BLM permittees; Compromised the economic viability of permittees; Disrupted attaining utilization standards	2025
10262 part2a	10262 part2a-103	Suggesting that elk have possibly fared better sans reference by footnote to the scientific and other sources relied upon for conclusions in the statement is an issue the BLM must correct before the publication of the Final RMP/EIS (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	2025
10262 part2a	10262 part2a-104	To begin and end the Affected Environment discussion of moose, the RMP/EIS determines that moose are both distributed in low densities and below WGFD-objective numbers. In determining such statements, the LGCA is perplexed why the BLM does not provide causation for such, nor how the Agency proposes to improve moose prospects in the Planning Area. The Affect Environment should provide a setting for disclosing effects to moose from project activities in the	2025

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		Environmental Consequences. A cursory summary of moose needs and population numbers is contextually insufficient, which requires the LGCA to request additional information for moose so that in the future, if resource uses are restricted under the auspices of protecting moose they can be fairly assessed and justified (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	
10262 part2a	10262 part2a-105	Without question domestic sheep and goat interactions with bighorn sheep lead to population decreases in the species. Information disclosing such is readily available and at least one comprehensive review has been created with a five-plus page reference list of scientific research pertaining to disease-related conflicts between domestic sheep and goats and bighorn sheep (Schommer and Woolever 2008). It is the obligation of the BLM, in asserting the conflict between domestic sheep and goats and bighorn sheep, to provide basis for such statements. Yet, the RMP/EIS goes further in stating (pg. 3-97): Bighorn sheep populations in the Planning Area have increased due to the establishment of native core areas in occupied bighorn sheep habitat and because of habitat augmentation and improvement through burning and livestock permit changes. Does the preceding suggest that the elimination of domestic sheep and goat allotments in bighorn sheep habitat in the Bighorn Basin has increased population numbers? Presently, there are no domestic sheep or goat allotments in bighorn sheep designated habitat. In suggesting that "livestock permit changes" have facilitated an increase in bighorn sheep, please provide historic grazing allotment and bighorn sheep population data. Correlation between the reduction of domestic allotments and increases in bighorn sheep should be evident.	2025
10262 part2a	10262 part2a-106	The assertion is made that habitat augmentation is the other factor allowing for an increase in bighorn sheep. What does habitat augmentation entail? A definition of this term is requested by the LGCA. The literature does show a positive response to bighorns from prescribed burning (Bentz and Woodard 1988; Bleich et al. 2008; Dibb and Quinn 2008; Smith et al. 1999). Brown et al (2010) found that bighorn sheep exhibited increased vigilance around cattle and thus spent extra energy being alert rather than feeding, which could be interpreted to negatively impact sheep. Ganskopp and Vavra (1987), however, indicate that the overlap where bighorn sheep and cattle occur on the same site was only about 20% due to bighorn sheep's affinity for steep slopes. If the RMP/EIS is going to conclude that cattle use is incompatible with bighorn sheep, data on the distribution of steep versus gentle land and amount of land where cattle can physically interact with bighorn sheep is needed (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	2025
10262 part2a	10262 part2a-108	The statement that habitat conditions, fire management, drought, increased development and urbanization, habitat fragmentation, motorized vehicle misuse, disease, hunter access, and the impacts of livestock grazing management on the frequency, quality, and composition of key forage species may be to varying degrees true. However, the preceding paragraphs, as well as the inadequate Affected Environment summaries of individual species, provide an egregious lack of data and research to support such conclusions. For instance, if woody plant communities for pronghorn, mule deer, or moose have indeed declined, the Affected Environment should identify the key variables and provide quantifiable data to show baseline conditions, compared against	2025

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		historic conditions, which support that contention and are comparable to historic conditions, which are also not disclosed in the RMP/EIS. Under CEQ 1502.22, the BLM has a duty to provide relevant information unless it is proven to be unattainable or the agency would incur exorbitant costs to obtain the information. Neither of those are the case in this circumstance.	
10262 part2a	10262 part2a-109	According to the RMP/EIS furbearing animals in the Planning Area have decline due to drought conditions (pg. 3-99): Beaver, mink, and muskrat populations have likely declined across much of the Planning Area due to drought conditions. Water volumes have decreased in many riparian systems from a loss of water storage capability and from a lack of precipitation. The distribution of mink and muskrat populations has shrunk due to a loss of water in some riparian systems. Beaver depend on aspen, willow, and cottonwood trees to build and maintain their dams and lodges. Conifer trees have invaded many riparian areas adjacent to streams due to drying of these sites from a drop in the water table. Conifers take up available water and space, both surface and subsurface, choking out aspen, willow, and cottonwood communities. The conclusion regarding the effect of conifer encroachment on the water table and riparian vegetation may in fact be accurate. Yet, the RMP/EIS fails to make that case with its lack of current and historic comparative data. A comparison could be made between present and past conditions through means as simple as aerial photos. It would seem that the BLM has conducted field surveys of riparian areas for decades. Why is that data not presented? Further, provide a temporal scale of drought conditions that has brought about this change in riparian corridors. Recognizing the mandate outlined in CEQ 1502.22, the LGCA requests that the BLM quantify the change in riparian vegetation structure that has presumably facilitated a decline in furbearing animals (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	2025
10262 part2a	10262 part2a-120	Generally, the effects of alternatives upon individual species (e.g. elk) or species groups (e.g. special status species) are intuitive and comparative, rather than data- and science-based. For instance, note the conclusion under Alternative B regarding wildlife species (in particular big game) (p. 4-168): Under Alternative B, restricting motorized vehicle use and surface-disturbing activities in the Absaroka Front Management Area provides the greatest beneficial impacts to wildlife species, especially big game The preceding may be true, but the conclusion for beneficial impacts to wildlife species, especially big game, for Alternative B is not supported by cited research, data on existing conditions, or identification of what variables affecting big game (e.g. hunting season security, habitat effectiveness, etc.) would be impacted beneficially.	2025
10262 part2a	10262 part2a-124	METHOD/ASSUMPTION: For each alternative, changes to vegetation types, either in quantity, quality, or increased fragmentation, are compared to baseline conditions. Adverse and beneficial impacts to vegetation types (i.e., wildlife habitats) are assumed to have a corresponding adverse or beneficial impact on wildlife species. COMMENT: Describe and disclose vegetation type quantity, quality, and baseline conditions. ? At what scale, temporally and spatially, and to what degree and how will adverse and beneficial impacts to wildlife habitats have equal and corresponding adverse/beneficial impacts to wildlife?	2025
10262 part2a	10262 part2a-125	METHOD/ASSUMPTION: Disturbance impacts to wildlife are evaluated by comparison to current management practices in the Planning Area; increased	2025

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		protection in time or space are beneficial, whereas reduced protection result in adverse impacts. COMMENT: Elaborate and provide measurable indicators for the statement increased protection in time or space is beneficial.	
10262 part2a	10262 part2a-126	METHOD/ASSUMPTION: Habitat fragmentation adversely affects wildlife. COMMENT: Describe if habitat fragmentation adversely affects all wildlife species equally, regardless the scale/type of fragmentation.	2025
10262 part2a	10262 part2a-127	METHOD/ASSUMPTION: Prescribed fire, where historical fire regimes occurred, is a tool used to manage vegetative communities and can result in short-term adverse impacts with long-term beneficial impacts to wildlife, certain wildlife habitats, and in some cases to forage productivity and availability. Explain if prescribed fire only causes short-term adverse impacts with long-term beneficial impacts to wildlife? Is this true for all wildlife species?	2025
10262 part2a	10262 part2a-129	METHOD/ASSUMPTION: Management actions aimed at benefiting specific wildlife species can have adverse or beneficial impacts to other wildlife species. COMMENT: Provide substantive examples in Chapters 3 and 4 and refer back to this assumption.	2025
10262 part2a	10262 part2a-130	METHOD/ASSUMPTION: Surface disturbance generally causes adverse impacts to wildlife habitats. Lesser amounts of surface disturbance in wildlife habitats have a corresponding lesser adverse impact to wildlife compared to more surface disturbance. The extent of adverse impacts due to surface disturbance depends on the precipitation zone. COMMENT: Mitigations are available to limit adverse surface disturbance effects to wildlife habitats. This assumption should include a statement in that regard. The extent of adverse impacts from surface disturbance does not depend solely on the precipitation zone. Include in this assumption all factors that affect the extent of adverse impacts from surface disturbance.	2025
10262 part2a	10262 part2a-131	METHOD/ASSUMPTION: Prohibiting surface disturbance or occupancy is more restrictive and provides more protection for wildlife than avoiding surface disturbance or occupancy. COMMENT: Mitigations are available to limit adverse surface disturbance effects to wildlife species and habitats. This assumption should include a statement in that regard. Prohibition of surface occupancy is not the only method of avoiding disturbance.	2025
10262 part2a	10262 part2a-132	METHOD/ASSUMPTION: The more surface disturbance that occurs on steep slopes or on highly erosive soils, the greater the potential for adverse impacts to wildlife habitats. Adverse impacts from surface disturbance also increase in areas that receive less precipitation. COMMENT: Mitigations are available to limit adverse surface disturbance effects to wildlife species and habitats on steep slopes or on highly erosive soils. This assumption should include a statement in that regard. The extent of adverse impacts from surface disturbance does not depend solely on the precipitation zone. Include in this assumption all factors that affect the extent of adverse impacts from surface disturbance.	2025
10262 part2a	10262 part2a-133	METHOD/ASSUMPTION: The higher the road density and the frequency of use in the Planning Area, the greater the potential to degrade adjacent wildlife habitat quality in the Planning Area. COMMENT: Define adjacent quantitatively.	2025
10262 part2a	10262 part2a-134	METHOD/ASSUMPTION: The BLM utilizes the best available information, management and conservation plans, and other research and related directives, as appropriate, to guide wildlife habitat management on BLM-administered lands. COMMENT: The LGCA agrees completely with this method/assumption.	2025

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		However, the RMP/EIS does not incorporate at an adequate level the mentioned methods. Additional information is needed throughout the RMP/EIS to substantiate BLM findings as they relate to wildlife.	
10262 part2a	10262 part2a-135	METHOD/ASSUMPTION: The quality and quantity of seasonal ranges and migration corridors are generally considered to be the limiting factors on big game populations in the Planning Area. The ability of these areas to support populations is a factor in determining population levels. COMMENT: Provide historic and current vegetation data that validate the claim that quality and quantity of seasonal ranges and migration corridors are generally considered to be the limiting factors on big game populations in the Planning Area.	2025
10262 part2a	10262 part2a-136	METHOD/ASSUMPTION: Wildlife habitats being protected are generally in desired natural condition and those being managed are being managed toward a more desirable condition. COMMENT: Define qualitatively and quantitatively generally in desired natural condition.	2025
10262 part2a	10262 part2a-137	As noted in comments for Chapter 3 " Big Game, the LGCA ardently disagrees that the challenges facing big game were properly described. While it may be true that the BLM does identify the aforementioned challenges, the RMP/EIS fails to disclose, both qualitatively and quantitatively, poor habitat conditions, habitat fragmentation, disease, increased development and urbanization, hunter access, and impacts to key forage species from livestock and wild horse grazing. For proper analysis in Chapter 4, the variables must be segregated and measurement indicators constructed for each variable so that effects can be properly analyzed. Merely identifying challenges is inadequate. As the RMP/EIS is currently written, the LGCA cannot find a means of understanding and evaluating current big game challenges, how they differ from historic conditions, or how if any of the alternatives will work to make conditions better or worse for big game.	2025
10262 part2a	10262 part2a-138	the LGCA can find no science-based rationale to support the RMP/EIS conclusion that big game behavior or populations may be altered in the long term at some level of development given that winter disturbance is precluded in all alternatives by a TLS or a NSO (Alternative C).	2025
10262 part2a	10262 part2a-141	Unlike the Bighorn RMP, most management agencies in the west do not spatially allocate elk parturition areas. So, a logical question is whether those (few) elk populations in which calving areas were protected performed better than other populations? The LGCA sincerely doubts that the BLM will find any strong data-based correlation. Data from most western states indicated elk populations increased substantially in the 1990s through the early 2000s. While biologists from the state wildlife management agencies do not necessarily agree upon the reasons for the increase, the only variable common across the west that might best explain those increases is milder-than-normal winter weather. As wolves have re-colonized the west, elk and other big game behavior seems to no longer follow predictable patterns, including well-published seasonal use preferences. One thing biologists, ranchers, and hunters all agree upon is that elk and other big game do not react as they have for the past century. If wolves are pushing elk and other big game into unusual areas at different times of the year, how will allocating elk and other big game parturition areas provide improved protection to cows and calves if wolves do not allow animals to use the areas for extended periods? Consequently, the inference that parturition areas are somehow at risk in Alternative A is without scientific merit. More importantly, even if there is a relationship between calf survival and TLSs in	2025

Table B-1. Individual Comments and BLM Response Index (Continued)

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		parturition areas (that has not been disclosed in the RMP/EIS), the TLSs in Alternative A preclude disturbance during the late spring on parturition areas. Thus, the RMP/EIS has no basis for inferring that ungulate parturition will be affected by Alternative A.	
10262 part2a	10262 part2a-142	Given that elk herds have been substantially above WGFD population goals for many years, it is difficult to conclude that existing levels of motorized disturbance (as allowed in Alternative A) has had any demonstrated effect on elk populations. There is research connecting winter disturbance to impacts on elk populations (Toweill and Thomas 2002), but no citations were proffered in Chapter 3 or in the aforementioned RMP/EIS discussion. It is suggested that the BLM add the relevant scientific references and conclude something to the effect that although the current high elk populations show no obvious adverse effects from road-related disturbance, the literature does suggest that negative effects from road use in the winter are possible.	2025
10262 part2a	10262 part2a-143	Additionally, no research suggesting vehicle disturbance in elk parturition areas has any documented effect on elk calving success or calf survival. We suggest that unless the BLM offers some pertinent research that the BLM should remove the conclusion that unrestricted roads may affect elk parturition.	2025
10262 part2a	10262 part2a-25	BR:6 - Please define environmental risks and associated impacts and describe how they are measured temporally and spatially.	2025
10262 part2a	10262 part2a-42	4074 - Define appropriate wildlife needs.	2025
10262 part2a	10262 part2a-44	4077 - Alternative A, B, and D "There is no scientific research that suggests that livestock grazing affects parturition areas during the birthing season. Further, the parturition area concept is archaic due to predatory expansion. The LGCA does not support livestock grazing restrictions in parturition areas. Alternative C "The LGCA supports livestock grazing in parturition areas.	2025
10262 part2a	10262 part2a-45	If Record #4077 was developed to address potential brucellosis impacts, the LGCA recommends the following language, "BLM would consider implementation, on a case by case basis, management actions jointly recommended by wildlife managers, grazing permittees, and animal health officials that would control the transmission of brucellosis."	2025
10262 part2a	10262 part2a-50	4083 - The LGCA strongly disagrees with Alternative B restrictions. Alternative A and D - Define case-by-case basis.	2025
10262 part2a	10262 part2a-51	4084 - The LGCA disagrees with any parturition habitat designations. However, if Record #4084 was developed to address potential brucellosis impacts, I recommend the following language, "BLM would consider implementation, on a case by case basis, management actions jointly recommended by wildlife managers, grazing permittees, and animal health officials that would control the transmission of brucellosis."	2025
10262 part2a	10262 part2a-92	The discussion in the RMP/EIS on habitat fragmentation is overly simplified and explicitly claims that (pg. 3-70): a contiguous 100,000-acre block of sagebrush habitat is considered fragmented when a major highway is constructed within the habitat, thereby bisecting the block. If, in this example, the highway bisects the 100,000-acre block in half, the result of this fragmentation is two 50,000-acre blocks of sagebrush habitat bisected by a highway. In making such a statement, the RMP/EIS fails to provide a single reference that the construction of a major highway through a 100,000 acre block will result in two separate parcels of wildlife habitat. Additionally, the RMP/EIS could have cited many	2025

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		pieces of literature that cogently discuss the effects of fragmentation on wildlife (Dobkin 1994; Faaborg et al. 1993). Instead, the RMP/EIS has not one citation regarding fragmentation.	
10262 part2a	10262 part2a-93	The RMP/EIS needs to quantify the degree to which the preceding statement is true (what percentage of wildlife populations in the Planning Area are supported by private land). While it is true that wildlife is affected by management of these non-BLM-administered lands, the inverse is also true that habitat on private lands is affected by BLM actions. Interestingly, while the RMP/EIS discloses that when large working ranches are convert(ed) to subdivisions to smaller ranchettes wildlife suffer habitat fragmentation and loss of habitat, the RMP/EIS makes no attempt to quantify how BLM actions affect the economic viability of working ranches. The BLM must disclose all connected actions of how changes in grazing management plans affect the viability of working ranches (Map 2).	2025
10262 part2a	10262 part2a-95	The tone of the pronghorn discussion is typified by sweeping generalizations, identification of problems without supporting data, and viability characteristics in the Planning Area without supporting data. An example of such is found on pg. 3-96 of the RMP/EIS: Population projections for pronghorn generally have been below objectives for several years, except where herds have access to large areas of irrigated fields. This is partly due to adverse effects on the quality of the shrub component of their pronghorn habitat in many ranges. Habitat condition of many of the Wyoming big sagebrush communities associated with pronghorn winter ranges is declining due to poor productivity, plant recruitment, old age, and cheatgrass invasion that has out-competed native herbaceous and sagebrush species. Declines in habitat quality also have affected the reproduction and survival rates for pronghorn. Lower reproduction and lower recruitment of young into populations has inhibited the ability of herd populations to recover from declining numbers. The statement that pronghorn have done well "where herds have access to large areas of irrigated fields" lacks supporting data derived from field-verified surveys and monitoring. For how long has this been occurring? Since the conversion of native land to farmland? In the last 10, 20, or 30 years?	2025
10262 part2a	10262 part2a-96	Further, the RMP/EIS must disclose where, how many acres, and to what degree pronghorn populations are thriving as a result of irrigated private lands. It is also necessary to describe if this phenomenon is exclusive to the Planning Area or occurring throughout the West and why is it occurring. The statement that the "(h)abitat condition of many of the Wyoming big sagebrush communities associated with pronghorn winter ranges is declining due to poor productivity, plant recruitment, old age, and cheatgrass invasion that has out-competed sagebrush species" needs to be substantiated with data gathered in a scientifically-accepted manner to support the conclusion. Specific data needed, both historic and existing, include: How many acres of sagebrush have been lost to dry and irrigated farming? Of lands still in sagebrush, how has the coverage and age class distribution of sagebrush changed due to fire suppression?	2025
10262 part2a	10262 part2a-98	The BLM, in their discussion of mule deer in the RMP/EIS, states the following (pg. 3-97): (b)ecause of seasonal dependence on woody plant communities, mule deer are generally declining in numbers due to a decline in habitat quality and quantity. It is unclear how the BLM can make a statement such as the preceding without providing evidence? Not only does the statement need supporting data and scientific literature, but an explanation that this is the only	2025

Table B-1. Individual Comments and BLM Response Index (Continued)

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		variable negatively affecting mule deer. Data requested for inclusion in the final RMP/EIS include: How many acres of sagebrush have been lost to dry and irrigated farming? Of lands still in sagebrush, how has the coverage and age class distribution of sagebrush changed due to fire suppression?	
10262 part2a	10262 part2a-99	it is unclear how the RMP/EIS can conclude with certainty that mule deer are generally declining in numbers due to a decline in habitat quality and quantity, particularly without providing any data on habitat conditions (see Wildlife Mitigations " Grazing, Travel Management, and Mining and Energy Development).	2025
10262 part2a	10262 part2a-119	While it is appreciated that the BLM is in compliance with the Consent Decree, the LGCA's stated position is that wild horse populations should be further reduced to a total head that is at or near the minimum AML.	2030
10262 part2a	10262 part2a-82	4124 - Alternative B - The LGCA does not support 1- and 2-mile TLS restrictions to protect raptors. There is no available science/research to suggest such a buffer is necessary. Alternative D - The LGCA does not support a 1-mile buffer around ferruginous hawk nests. Recognized science does not support such a restrictive buffer as well. The BLM must provide and take a "hard look" at scientific research before implementing such an extensive buffer zone.	2036
10262 part2a	10262 part2a-116	On May 11, 2011, the USFWS determined that the mountain plover does not warrant listing as a threatened or endangered species throughout all or a significant portion of its range. The RMP/EIS was compiled prior to the determination and states (pg. 3-113): The mountain plover inhabits shortgrass prairies and shrub-steppe habitats, both for breeding and wintering. This species prefers areas with little vegetative cover for nesting, particularly prairie dog towns. The species is now included on the BLM sensitive species list and is a proposed threatened species under the ESA.	2041
10262 part2a	10262 part2a-117	In describing the vegetative nesting cover required, the dependency of mountain plovers on disturbance including prairie dogs and grazing (Beauvais and Smith 2003; Dechant et al. 2002b; Knopf and Wunder 2006; Manning and White 2001) is understated in the document. As a disturbance-dependent species, the RMP/EIS should acknowledge that mountain plover co-evolved with heavy grazing by large bison and prairie dog populations. The RMP/EIS should propose to promote heavy grazing regimes and to maintain or enhance prairie dog populations, in areas identified as appropriate, to encourage mountain plover sustainability (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	2041
10262 part2a	10262 part2a-83	4125 - The BLM has failed to recognize that the mountain plover co-evolved with grazing ungulates. Mountain plovers are dependent on over-grazed environments. Acknowledgment of such is requested by the LGCA and programs should be implemented that incorporate grazing methods to promote mountain plover.	2041
10262 part2a	10262 part2a-118	Where a position is taken is in the fact that the BLM fails to sufficiently describe white- and black-tailed prairie dog life history in the Bighorn Basin. Due to this failing, the LGCA declares that the BLM must revise the white- and black-tailed prairie dog section with the following information and data: Current habitat condition and population density; Historic habitat condition and population density; National distribution; Plague and predation and its effects on white- and black-tailed prairie dog; Relationship to obligate species (e.g. burrowing owls and black-footed ferrets); Distribution and connectivity of prairie dog towns in the Bighorn Basin; Relationship with grazing (positive and negative) To	2042

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		address the white- and black-tailed prairie dog issue, the LGCA has developed a mitigation that instructs the BLM on how to proceed going forward in consideration of these two species met (see White- and Black-tailed Prairie Dog Mitigation - Grazing).	
10262 part2a	10262 part2a-121	Again, the conclusion may be true, but no supporting data showing existing conditions, desired conditions, measurement indicators, or site-specific actions to be taken are disclosed in 2.5 - Alternatives Summary, 2.6 - Detailed Descriptions of Alternatives by Resource, and/or Chapter 3 - Affected Environment.	2042
10262 part2a	10262 part2a-122	As with big game and greater sage-grouse, there is no discussion of predation and predators.	2042
10262 part2a	10262 part2a-57	BR:7.3 - Define "environmental hazards, risks, and impacts." Management should be compatible with multiple uses and stakeholder interests.	2042
10262 part2a	10262 part2a-58	BR:7.4 - The LGCA fully supports "providing multiple use management." Define "sufficient undisturbed" and "minimally disturbed" habitats.	2042
10262 part2a	10262 part2a-77	4114 - Describe and define activities that will "promote the maintenance and improvement of habitat quantity and quality."	2042
10262 part2a	10262 part2a-9	3. The BLM will change the definition of surface-disturbing activity to remove disturbance of endemic vegetation. Surface-disturbing activities should only include uses that remove non-renewable resources such as top soil, sand and gravel etc. This definition implies that use of herbivory is a surface disturbing activity. Ecosystems evolved with herbivory use which is a renewable resource and its use should not be considered surface-disturbing activities. Surface Disturbing Activities: These are Public Land resource uses/activities that disturb remove the endemic vegetation, surface geologic features, and/or surface/near surface soil resources beyond ambient site conditions. Examples of surface-disturbing activities include: construction of well pads and roads, pits and reservoirs, pipelines and power lines. and most types of vegetation treatments (e.g., prescribed fire, etc.). NOTE: Some resource uses, commodity production and other actions that remove vegetative growth, geologic materials, or soils (e.g., livestock grazing, wildlife browsing, timber harvesting, sand and gravel pits, etc.) are allowed, and in some instances formally authorized, on the Public Lands. When utilized as a land use restriction (e.g., No Surface Disturbing Activities), this phrase prohibits all resource use or activity, except those uses and activities that are specifically authorized, likely to disturb the endemic vegetation, surface geologic features, and surface/near surface soils.	2054
10262 part2a	10262 part2a-115	Additionally, as it pertains to greater sage-grouse, guidance in Executive Order 2011-5, issued by Wyoming Governor Matthew Mead on June 2, 2011, which recognizes only Core Areas and provides adaptive management principles for the species, shall be implemented by the BLM. Unequivocally, the LGCA supports Executive Order 2011-5. It is the firm opinion of the LGCA that the BLM will adopt Executive Order 2011-5 as management guidance for greater sage-grouse in the Bighorn Basin.	2069
10262 part2a	10262 part2a-74	4107 - The LGCA does not support BLM-designated Key Areas. Guidance in Executive Order 2011-5, issued by Wyoming Governor Matthew Mead on June 2, 2011, which recognizes only Core Areas, shall be implemented by the BLM.	2069
10262 part2a	10262 part2a-79	4120 - Alternative A - The lek buffer should be extended to 0.6 mile. Alternative D - The LGCA does not support BLM-designated Key Areas. Guidance in Executive Order 2011-5, issued by Wyoming Governor Matthew Mead on June	2069

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		2, 2011, which recognizes only Core Areas, shall be implemented by the BLM.	
10262 part2a	10262 part2a-80	4121 - Alternative D - The LGCA does not support BLM-designated Key Areas. Guidance in Executive Order 2011-5, issued by Wyoming Governor Matthew Mead on June 2, 2011, which recognizes only Core Areas, shall be implemented by the BLM.	2069
10262 part2a	10262 part2a-81	4123 - Alternative B - The LGCA does not support BLM-designated Key Areas. Guidance in Executive Order 2011-5, issued by Wyoming Governor Matthew Mead on June 2, 2011, which recognizes only Core Areas, shall be implemented by the BLM. Further, the LGCA does not support restrictions of motorized access. Alternative C and D - The LGCA does not support BLM-designated Key Areas. Guidance in Executive Order 2011-5, issued by Wyoming Governor Matthew Mead on June 2, 2011, which recognizes only Core Areas, shall be implemented by the BLM.	2069
10262 part2a	10262 part2a-113	The discussion of greater sage-grouse in the RMP/EIS Affected Environment is deficient, rendering impossible proper analysis of impacts disclosed in Environmental Consequences. Again, as with big game, the RMP/EIS does not include predation as a management challenge facing greater sage-grouse. Certainly predation is one of many factors affecting greater sage-grouse in the Bighorn Basin. In the opinion of the LGCA it is disingenuous of the BLM to not include predation in the list of stressors affecting greater sage-grouse. The contention of the LGCA is that failing to segregate the variables and identify data-based quantifiable outputs makes it unattainable to quantitatively identify effects.	2071
10262 part2a	10262 part2a-114	Also, please disclose that greater sage-grouse co-evolved with intensive and extensive grazing from bison and that greater sage-grouse populations were high during the 1950s and 1960s, a period when domestic livestock were grazed at much higher stocking levels and under less-restrictive (season-long) grazing systems then those applied in the Planning Area today. Thus, attributing declines in greater sage-grouse to grazing is disingenuous. Failing to disclose the ecological relationship between greater sage-grouse and natural disturbance processes (bison grazing) severely biases the analysis for assessing effects on greater sage-grouse from grazing (see Wildlife Mitigations - Core and Key Areas, Grazing, Travel Management, and Mining and Energy Development).	2071
10262 part2a	10262 part2a-68	4096 - Define restore and the effects to multiple uses and permittees	2071
10262 part2a	10262 part2a-69	4098 - Define “manage.” Describe in detail the method used in determining “ecological site descriptions.”	2071
10262 part2a	10262 part2a-70	4101 - Disclose those areas with less than 5% sagebrush cover that will be restored. What temporal scale is being used to determine historic levels?	2071
10262 part2a	10262 part2a-75	4109 - Disclose where strategic locations are in the Bighorn Basin. How are strategic locations determined?	2071
10262	10262-18	Resource management challenges identified by the BLM are subjective and overly qualitative. Consequently, groundless management challenges may lead to unnecessary constraints that adversely impact local governments, stakeholders, and multiple uses.	2054
10262	10262-69	To be factual and accurate, the RMP/EIS should title the sections Assumptions and remove Methods. The term method suggests that it is a standard operating procedure carried out numerous times previously in the biological, physical, and social sciences for deriving an endpoint. As such, the method has	2054

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		been published, tested by researchers and scientists, and substantiated as a best method. In the case of the RMP/EIS, the endpoint should be an effects conclusion. Yet, the supposed methods in the RMP/EIS are not clear, referenced, or appreciably used to make effects determinations.	
10263	10263-37	With respect to Carter Mountain ACEC, management proposed under Alternative D is confusing, inconsistent and unnecessary. On one hand, surface disturbing activities would be allowed provided they can be mitigated under Record 7054 while the area would be administratively unavailable to oil and gas leasing under Record 7058. Given the fact that surface activities would be allowed provided the alpine tundra can be protected and mitigated, there is no justification for withdrawing the area from mineral leasing	2001
10263	10263-19	The DEIS improperly reflects a single reference point, monitoring Yellowstone National Park Carbon Monoxide (CO) levels, during 2005, (Ref. Chapter 3, Table 3-3). It is incongruous that Yellowstone National Park was chosen to monitor CO emissions for the Bighorn Basin because conditions couldn't be more dissimilar	2009
10263	10263-20	Additional questions that arise from the use of Yellowstone National Park for this data point: What time of year did this monitoring occur? Was it during winter time when automobile exhaust is nearly non-existent? Was it during the summer months when the Park has an estimated 3 million visitors and their associated transportations visit the park? Future air standards, alternatives, or future applications of monitoring must be based on actual science that includes statistically relevant, quantitative data obtained within the planning area itself	2009
10263	10263-1	Page ES-1, 1.2.2 Purpose, et al., the DEIS indicates in that valid existing rights will be recognized. Comment: We are concerned that no explanation of what constitutes valid existing lease rights and how they relate to new land use decisions has been provided. We recommend that BLM clearly state in the Final EIS that the new restrictions proposed in the Preferred Alternative will not apply to lands already under oil and gas lease. Moreover, it must be made clear that BLM has no authority to impose these new restrictions through Conditions of Approval (COA) on applications for permit to drill (APD) if they would abrogate the valid existing lease rights. These principles are particularly important given the fact that discussions about new protections for national historic trails and expansion of Areas of Critical Environmental Concern (ACEC) could very much impose significant limitations on existing leases that were not anticipated at the time the leases were acquired from the federal government in good faith. Such qualifiers are consistent with current rules and policies of the BLM and must be clearly disclosed in the planning documents. An acceptable example of appropriate language is included in the Rawlins RMP adopted in 2008, page 20.	2013
10263	10263-2	Page 4, Chapter 4, Assumptions Common to All Analyses - An oil and gas lease grants the lessee the "right and privilege to drill for, mine, extract, remove and dispose of all oil and gas deposits" in the leased lands, subject to the terms and conditions incorporated in the lease (BLM Form 3100-11, Lease for Oil and Gas). Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, the BLM imposes restrictions on the lease terms.Comment: We recommend clarification of this language to recognize the fact that lease stipulations are only subject to change prior to lease issuance. Once a lease has been issued, stipulations may not be legally modified absent voluntary agreement by the lessee. Therefore, in accordance with 43 CFR 3101 and federal court case law, we recommend that BLM clearly disclose its limited authority to add conditions of approval to a	2013

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		drilling permit, i.e., conditions must remain consistent with the terms of the issued lease.	
10263	10263-3	The DEIS ignores BLM policy that states "the least restrictive stipulation that effectively accomplished the resource objectives or uses for a given alternative should be used." Therefore, it is necessary to demonstrate that less restrictive measures were considered but found insufficient to protect the resources identified. A statement that there are conflicting resource values or uses does not justify the application of restrictions. Discussion of the specific requirements of a resource to be safeguarded, along with a discussion of the perceived conflicts between it and oil and gas activities must be provided. Clearly, an examination of less restrictive measures must be a fundamental element of a balanced analysis and documented accordingly in the draft EIS.	2013
10263	10263-38	Page 2-54, Record 2014, "On lands with an NSO restriction, allow only casual use geophysical exploration."Comment: Acknowledging the fact that geophysical operations have very low to zero impacts on the environment, in August 2007 the Department of Interior included in its NEPA Manual a categorical exclusion (CX) for geophysical operations that do not involve road construction. All such geophysical activities are categorized as "casual use." This distinction should be clarified in the FEIS and provision should be made to grant CXs in these circumstances.	2013
10263	10263-15	Record #4082 allows BLM to apply discretionary seasonal wildlife protections on a case-by-case basis. As discussed above, some maintenance and operation of developed projects must not be subject to seasonal wildlife protections under any circumstances. The term case-by-case basis is used throughout the DEIS pertaining to the application of additional conditions or restrictions. As previously explained, under some circumstances (e.g. certain areas or certain activities) the application of conditions or limitations is not appropriate (e.g. Record #4082). As such, we recommend BLM specifically identify areas where BLM will be able to apply seasonal wildlife protections on a case-by-case basis, and limit the use of case-by-case determinations to areas where application of protections is warranted and appropriate	2020
10263	10263-12	A comparison of big game crucial winter range and parturition habitat identified in the RMP to WGFD Big Game CHPAs reveals that the BLM's habitat areas are much more expansive throughout the Project Area, especially along the eastern, western (including the Absaroka Front Management Area), and southern boundaries of the Project Area. We understand the value of protecting crucial wildlife habitat. However, in light of this discrepancy it is difficult to justify the extent of big game crucial winter range and parturition habitat under all alternatives in the BHB RMP. As such, we suggest BLM re-evaluate the designation of big game crucial winter range and parturition habitat locations, and reduce the size of these areas such that they are consistent with WGFD Big Game CHPA's. A map and narrative description of WGFD Habitat Priority Areas in the Cody Region is available on-line at: http://gf.state.wy.us/habitat/PriorityAreas/Cody/index.asp	2022
10263	10263-31	All references to Wild Lands must be removed from the planning documents in view of Congress's 2011 Continuing Resolution which prohibited BLM from moving forward with designations of any Wild Lands	2027
10263	10263-26	BLM fails to recognize the beneficial impact of produced water discharges in stabilizing ephemeral and intermittent stream channels through creation of riparian zones, thus reducing natural erosion. Good examples of this	2031

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		phenomenon are very evident in the Cottonwood, Gooseberry, Kirby Creek, and Dry Creek drainages. We believe BLM has overemphasized the potential erosion problems in ephemeral drainages caused by produced water. BLM has omitted the fact that, in most instances, the presence of produced water has actually stabilized stream banks on ephemeral and intermittent waters by creating and enhancing riparian zones and wetlands. Surface water discharges create thousands of acres of wetlands in the Bighorn Basin. These wetlands and riparian zones provide tremendous benefits to wildlife and waterfowl in the arid interior of the Basin.	
10263	10263-27	The WEPP model estimate that with no disturbance there would only be trace amounts of runoff, seems to disregard the amount of natural runoff experienced in the interior of the basin during snow melt or precipitation events. The badland topography and the clay content of soils in the Bighorn Basin can result in significant amounts of natural runoff and erosion from areas like McCullough Peaks, 15 Mile and other badland areas of the basin, which have very minimal human disturbance.	2031
10263	10263-28	Chapter 4, Part 4.1.4.3, Page 4-30 "Water management plans for surface discharges of produced water would include reclamation strategies, mitigation, and monitoring to track changes in receiving channels and to minimize adverse impacts to watershed health." COMMENT: Does this statement mean that the BLM intends to start requiring Water Management Plans for WPDES discharges in the Bighorn Basin? If so, would this requirement be for existing surface discharges, or only for proposed new surface discharges?	2031
10263	10263-29	Chapter 4, Part 4.1.4.3 Page 4-31 "Adverse impacts on surface water quality from the introduction of these components of produced water would be minimized, but not eliminated, under all alternatives by following standard practices, BMPs, and guidelines for surface disturbing activities. The properties of produced water can vary depending on the location of the producing well and the oil and gas formation, which will influence the application of BMPs and other measures intended to safeguard water quality." COMMENT: How does the BLM plan to minimize impacts on surface water quality from components of produced water? As previously stated the Wyoming DEQ permits WPDES discharges and promulgates and enforces water quality standards. It is not the duty, nor the legal authority of the BLM to set water quality standards or to issue WPDES permits	2031
10263	10263-30	Chapter 4, Part 4.1.4.3 Page 4-32 "Stormwater Discharge Plans to reduce impacts; restoring healthy plant communities and vegetative cover after surface disturbance in a timely fashion; conforming BLM actions to Wyoming DEQ water quality standards, enforcement, and remediation; and participating in the development and implementation of local watershed management plans and/or total maximum daily loads (TMDLs) with interested stakeholders and the Wyoming DEQ." COMMENT: What is meant by "conforming BLM actions to Wyoming DEQ water quality standards, enforcement, and remediation?" As previously stated the Wyoming DEQ permits WPDES discharges and promulgates and enforces water quality standards.	2031
10263	10263-36	Page 3-139, Types of Intrusions The DEIS points out, "Visual intrusions on BLM-administered lands in the Planning Area include oil and gas fields, bentonite mining, the network of roads and highways, powerlines and various facilities needed to support mineral development, recreation, range improvements, and other facilities and infrastructure. Overall, development in the Planning Area	2032

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		has left a small footprint and has not substantially changed the visual character of the area." Page 2-103, Records 5052Comment: Despite the "small footprint" left by the variety of development activities that have occurred within the planning area, BLM proposes to substantially revise its Visual Resource Management (VRM) categories to be excessively restrictive under Alternatives B and D. However, none of these proposed management changes are warranted as evidenced by BLM's analysis summary noted above.	
10263	10263-13	Based on the USFWS's recent findings and determination regarding the mountain plover, the stipulations and protections imposed for the mountain plover under the Management Action #4125 and the Chapman Bench ACEC is no longer warranted or scientifically justified. The USFWS has determined that the mountain plover is not threatened or endangered, has widespread habitats, has adapted to many human activities, and likely will not be impacted by human land use changes in the foreseeable future. The common occurrence of mountain plover in existing oil fields indicates that this species has adapted well to oil field conditions. As a result, special management and protection of the mountain plover under Alternative D (implement conservation measures and manage for the retention and success of mountain plover), Alternative C (apply TLS to protect mountain plover habitat), Alternative B (implement conservation measures and manage Chapman Bench ACEC to protect mountain plover), and Alternative A (implement conservation measures for mountain plover) is not justified. Therefore, we advocate the elimination of special management and protection for the mountain plover as currently proposed under Management Action #4125 and the Chapman Bench ACEC.	2041
10263	10263-14	By definition the sensitive species designation includes species that could easily become endangered or extinct in the state (BLM Manual 6840). Criteria for designating sensitive species include species: under status review, numbers are declining so rapidly that Federal listing may be necessary, populations are small or widely dispersed, or that inhabit ecological refugia or other specialized or unique habitats (BLM Manual 6840). The mountain plover does not meet any of these criteria. As such, it is essential for BLM to remove the mountain plover from the sensitive species list and eliminate protections afforded to the mountain plover in the BHB RMP based on its status as a sensitive species.	2041
10263	10263-23	Chapter 4, Part 4.1.3.1, Page 4-14 Both the Disturbed WEPP and WEPP Road modules are limited to four soil textures (clay loam, silt loam, sandy loam, and loam). The WEPP analysis used a loam soil texture for all erosion predictions. COMMENT: Is loam soil the best soil texture to use for WEPPP modeling in the Bighorn Basin (BHB). Since most soils in the interior of the BHB contain a lot of clay (bentonite), should clay loam be used for modeling purposes rather than a loam soil?	2045
10263	10263-24	It is unclear whether the WEPP model, which is used to predict erosion rates and runoffs, is calibrated to account for installation and implementation of Best Management Practices required by the Wyoming DEQ under the Stormwater Construction Permitting Program, which essentially requires no discharge of pollutants (including soil) from the construction site.	2045
10263	10263-34	The Impact Analysis for Planning Model (IMPLAN) is a model using regional analysis. However, the Bighorn Basin would be better analyzed using a more geographic specific approach. For example, in Table X-1, IMPLAN identifies regional oil and gas well numbers including coalbed natural gas. There has been very limited exploration and marketable sales from coalbed natural gas	2046

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		development in the Bighorn Basin. It appears the model may be using the entire state of Wyoming for a regional model. It is precisely because of the use of data like this that has no bearing on oil and gas development in the Bighorn Basin and makes the reported information and findings flawed.	
10263	10263-5	Alternative C exempts OGMAs from discretionary wildlife seasonal stipulations, including big game and sage grouse stipulations. However, under Alternative D, OGMAs are only exempt from discretionary big game seasonal stipulations. Other wildlife stipulations (i.e. non-big game stipulations), such as sage grouse stipulations will still apply within OGMAs. As a result, under Alternative D, OGMAs located within Key Habitat Areas (KHA) will still be subject to KHA stipulations for sage grouse protection and other non-big game stipulations, which may be very limiting on existing oil and gas units. This is inconsistent with BLM's intent to manage OGMAs primarily for exploration and development of oil and gas resources	2050
10263	10263-6	BLM defines OGMAs as areas containing existing fields that are already disturbed by development. EO 2011- 5 states that "areas already disturbed or approved for development within Core Population Areas prior to August 1, 2008 are not subject to new sage-grouse stipulations with the exception existing operations may not initiate activities resulting in new surface occupancy within 0.6 mile perimeter of a sage-grouse lek (EO 2011-5, Attachment B, paragraph 11)." EO 2011-5 further states that "[i]t is assumed that activities existing in Core Population Areas prior to August 1, 2008 will not be managed under Core Population Area stipulations. Examples of existing activities include oil and gas, mining, agriculture" and other uses that were in place prior to the development of the Core Population Areas. Provided these activities are within a defined project boundary (such as a recognized federal oil and gas unit, drilling and spacing unit, etc.) they should be allowed to continue within the existing boundary, even if the use exceeds recommended stipulations recognizing that all applicable federal actions shall continue (EO 2011-5, pg. 2, Item 2). As such, existing fields within the BHB Plan Area (including those within KHAs) that were disturbed or approved for development prior to August 1, 2008, must not be subject to sage grouse stipulations if BLM desires to achieve consistency with EO 2011-5. Application of KHA sage grouse stipulations to pre-2008 fields conflicts with EO 2011-5.	2050
10263	10263-11	Based on the statistics quoted above, there are 136,433 more acres administratively unavailable for oil and gas leasing under Alternative D than Alternative A (i.e. under current management). However, no discussion or justification has been provided in the DEIS for this discrepancy. Increasing the acreage administratively unavailable will decrease management flexibility in the Plan Area.	2054
10263	10263-16	BLM cites the West Tavaputs Plateau Natural Gas Full Field Development Plan Draft EIS (2008), Glossary for the definition of disruptive activity in the BHB Draft RMP. However, disruptive activity is not defined in this document.	2054
10263	10263-32	For nearly a century, oil and gas has a favorable history of responsible environmental operations that have been well-managed by both industry and the BLM - something in which the oil and gas community takes pride. Despite these efforts, the four alternatives for the RMP could result in moderate to drastic changes socially and economically. The Bighorn Basin Resource Alliance (BHBRA), an affiliate of the Natural Resource Growth Coalition (NRGC), as part of this coalition compiled detailed information to assist with determining the	2054

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		best alternative. The information produced by the BHBRA is contained in the Bighorn Basin Resource Alliance Economic Revenue Report (BHBRA-ERR) and comes mostly from the Wyoming Department of Revenue, the Wyoming Department of Employment and the U. S. Bureau of Labor Statistics. This report can be accessed here: Bighorn Basin Resource Alliance Economic Revenue Report. By way of this letter, we formally incorporate the report in our comments by reference, and further request that the BLM review the report as part of the comments analysis process	
10263	10263-33	The quality of life for all citizens in the Bighorn Basin is enhanced by employment opportunities, many of which are found from public land use. The Coalbed Natural Gas Alliance (NRGC's predecessor) hired Moore Information in November of 2008 to better understand how Wyoming viewed oil and gas development. 400 registered Wyoming voters were sampled with a 95 percent confidence interval and a plus or minus 5 percent confidence ratio. Please click here to access the CBNGA poll. By way of this letter, we formally incorporate the poll results in our comments by reference, and further request that the BLM review the poll results as part of the comments analysis process.	2054
10263	10263-35	Alternative D is not much of an improvement in that it proposes to limit surface disturbing activities within either three or five miles of cultural sites. The DEIS provides no information to justify the need for the excessive management proposed, especially since the BLM's proposal greatly exceeds the ¼ mile buffers required by federal law.	2054
10263	10263-25	It appears reclamation plans will be required under Alternative D for surface disturbing activities associated with minerals development. Will this require submission and approval of a reclamation plan, prior to APD approval? If so, we question the need for a reclamation plan for all oil and gas wells. Moreover, if a reclamation plan is necessary in certain areas with highly erosive soils and limited reclamation potential; it is necessary for BLM to have consistent standards and a formal review period with a mandatory approval/rejection timeline.	2060
10263	10263-4	The RFD also fails to contemplate and plan for the utilization of Enhanced Oil Recovery (EOR) via CO2 injection that is anticipated to occur in existing oil fields within the BHB. The use of EOR/CO2 injection is expected to occur in existing oil fields within the BHB over the next several years as some fields initiate tertiary recovery. Consequently, oil production in existing fields within the BHB is also anticipated to increase due to the efficiency of EOR. EOR is, and will be an important element of oil production in the BHB and should be properly accounted for in the BHB RMP.	2061
10263	10263-10	EO 2011-5" For activities outside of Core Population Areas, no more than a ¼ mile NSO standard and a 2-mile seasonal buffer should be applied to occupied leks. Additionally, incentives to enable development of all types outside Core Population Areas should be established, including stipulation waivers, even if it results in reduced numbers of sage grouse outside of Core Population Areas (EO 2011-5, pg. 3, Item 7). As such, EO 2011-5 merely establishes a maximum NSO standard and seasonal buffer for occupied leks that may be applied outside of Core Areas. It does not mandate the application of any stipulations outside of Core Areas. Alternative D " BLM applies much more restrictive stipulations outside of Key Habitat Areas, including: CSU within ¼ mile of leks, TLS within ¼ mile of leks March 1 to May 15, and TLS in connectivity habitat or within 2-miles of any lek in nesting/early brood rearing habitat (Table 2-5, pg. 2-84, 2-85).	2069

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10263	10263-7	KHAs designated by BLM are inconsistent with the State of Wyoming's Core Areas. If the intent of BLM is to obtain and maintain consistency between KHAs and the State of Wyoming's Core Areas, then why are KHAs identified in this RMP different than Core Areas provided for in Wyoming EO 2011-5, Attachment A (Sage-Grouse Core Breeding Areas Version 3)? Figure Q-1 of the RMP clearly illustrates the discrepancies between Sage-Grouse Core Breeding Areas Version 3 and KHAs.	2069
10263	10263-8	there are 71,241 more acres of KHA (1,857,485) than acres of Core Areas (1,786,244) located within the total planning area. What are the justification and scientific reasoning for expanding KHAs and changing KHA boundaries from Core Area boundaries?	2069
10263	10263-9	sage grouse stipulations Under Alternative D are not consistent with stipulations provided for under EO 2011-5: Core Areas/Key Habitat Areas - Seasonal Use: Leks. Under EO 2011-5 - Activity will be allowed from July 1 to March 14 (i.e. not be allowed from March 15 to June 30) outside of the 0.6 mile perimeter of a lek in Core Population Areas where breeding, nesting and early brood-rearing habitat is present (EO 2011-5, pg. 9, Item 3). Alternative D - BLM extends this seasonal use restriction by two weeks, placing TLS on surface disturbing activities on nesting/early brood rearing habitat from March 1 to June 30 (Table 2-5, pg. 2-84).	2071
10263	10263-18	Finally, as also recognized by the AQ MOU, the CEQ regulations implementing NEPA do not require agencies to develop information that is not reasonably available; see 40 C.F.R. Â§ 1502.22. Rather, when faced with a situation where there is incomplete information, the agency is only required to inform the public of the unavailability of these data and explain why it would not be practical to develop such data as part of the planning process. Given the lack of emissions data or other information regarding air quality in the Planning Area, we recommend that BLM provide the public with the reasons it would not be appropriate to develop an air quality model at this time.	2009_1
10263	10263-21	There are no scientific data compendiums in the form of graphs, tables, or otherwise within the proposed RMP/EIS to quantify or substantiate any data regarding HAPs in the planning area. The air pollution emissions listed therein are regulated by the WDEQ for oil and gas operators within the planning area.	2009_1
10263	10263-22	The air quality analysis implied in Alternatives B and D requires quantitative air quality modeling. However, the RMP used methods and assumptions regarding impacts for all alternatives using a qualitative emission comparison approach for this assessment (Appendix U, page 9).	2009_1
10264	10264-1	Page 2-29, 2-34, Table 2-5, Page 2-73, etc. Throughout this document, BLM refers to Class I and Class 2 trout fisheries for added protection. We support these proposals for added protection, but need to clarify our trout ranking system. A class number ranking is no longer used by the WGFD and is sometime confused with a numbering system used by the WDEQ. Our department ranks streams using a color system. Blue and Red ribbon streams are those that produce the highest quality trout fishery based upon biomass. These blue and red ribbon trout waters are considered of National and Regional importance, respectively. We suggest changing all references to Class I fisheries to blue and all class 2 fisheries to red ribbon trout fisheries.	2002
10264	10264-20	Page 3-90In paragraph 2, the reference to focused management on "Snake River Cutthroat" should be deleted. Our management of Snake River Cutthroat	2002

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		in BLM waters is very limited in the Cody Region.	
10264	10264-21	Page 3-92(top of page) "The effects of drought can be quickly reversed in streams with a return to more normal weather patterns, but higher flows will not remedy the continued siltation of reservoirs." We recommend changing the sentence to read "The effects of drought can be quickly reversed in streams with a return to more normal weather patterns, however higher stream flows may improve stream pool habitat but will not remedy the continued siltation of reservoirs."	2002
10264	10264-26	Page 4-159In the first bullet near the end of the sentence, we recommend adding the words "deep pools" after the word streamflows.	2002
10264	10264-27	Page 4-164Under Special Designations, reference is made to benefits to water quality by restricting surface-disturbing activities and pesticide applications for the Spanish Point Karst. We would like clarification as to the broad use of the word pesticide in this case. If pesticide application is to mean restricting the use of piscicides on streams with similar stream features, this action could greatly reduce our ability to remove non-native fish species for Yellowstone Cutthroat restoration. We suggest this be clarified by adding the words "(excluding fish piscicides) after the word "application" in the first sentence.	2002
10264	10264-4	Page 2-68, Record # 4036In alternative D we recommend changing "fishery" to "aquatic".	2002
10264	10264-17	Page 2-162, Record # 6281Appendix WÂ is an important component of the livestock grazing section of the RMP. We suggest adding the following language to this management action: "Grazing plans should use the utilization levels specified in Appendix W.	2011
10264	10264-29	Appx P Appendix P seems to show that no allotments failed Standards P and Guidelines (no "N" in the "Progress" column). This is not our understanding.	2011
10264	10264-5	Spatial habitat designations such as crucial ranges, migration routes, raptor nests, and sage grouse winter concentration areas are periodically reviewed and, if necessary, modified in response to changing wildlife use patterns or better data becoming available. We recommend that the RMP describe that management actions relating to areas within these designations will apply to modifications to crucial habitat designations made after the Final EIS.	2020
10264	10264-6	Page 2-76, Record # 4076, 4077If Record # 4077, Alternative D, was developed to address disruptive activities resulting from grazing in delineated elk parturition habitat, we are unaware of data that supports these restrictions. Therefore, we would not support restricting cattle grazing In parturition areas based on the premise of disturbance. However, if Record # 4077 was developed to address potential brucellosis impacts, we recommend the following language, "BLM would consider implementation, on a case by case basis, management actions jointly recommended by wildlife managers, grazing permittees, and animal health officials that would control the transmission of brucellosis."	2020
10264	10264-8	Page 2-77, Record # 4080We remain committed to our recommendation for the Absaroka Front Management Area, provided to BLM as agreed upon under the previous Governor's Administration. Our recommendation differs from Alternative 0 in having the following constraints on federal mineral estate: 149,335 acres unavailable for leasing, 65,366 acres NSO, 40,703 acres CSU, and 0 acres TLS) (see attached map).	2020
10264	10264-9	Page 2-79, Record # 4087Any seasonal closures should take into account that	2020

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		many big game hunting seasons extend beyond November 15. Some road closures could limit access and not allow for adequate harvest. The RMP should allow for this flexibility to effectively manage wildlife through harvest.	
10264	10264-2	Page 2-56, Record # 2024 Under the Leasable Oil and Gas - Map 20 shows three small polygons on the divide between Rose Creek and Rawhide (T48, RI03, sec. 3,4,10 & 11) that are classified as producing O/G fields. To the best of our knowledge, there are no active, producing wells in that area. Also, the area is identified as leasable with only standard constraints, yet it is very important crucial elk winter range, borders the proposed Absaroka Front Management Area, and is adjacent to the Carter Mtn ACEC. We recommend that these areas be changed to leasable with major constraints, due to their importance to wintering wildlife.	2022
10264	10264-7	Page 2-77, Record # 4079Under alternative 0 - Map 21 (2 mile buffers) is referenced as the oil and gas management areas being exempt from discretionary big game seasonal stipulations. This is a map reference error, and should reference Map 22.	2022
10264	10264-22	Page 3-99Skunks are not classified as furbearing wildlife in Wyoming, they are predatory.	2025
10264	10264-23	Page 3-100Quail and ptarmigan have not been documented in the planning area.	2025
10264	10264-3	We request that at least an NSO constraint be placed on the Medicine Lodge and Renner WHMA to protect wintering big game. Both of these WHMAs were acquired with federal funds for the purpose of providing habitat for wintering big game.	2025
10264	10264-14	Page 2-92, Record # 4144, 4145 Why are there two upper limits for each HMA when the objective (100) is the same?	2030
10264	10264-15	Page 2-114, Record # 6045The Medicine Lodge WHMA closure is June 30, not July 1.	2034
10264	10264-28	Page 4-214Under Methods and Assumptions, second bullet, we have concerns with the statement that Production water from CBNG activities will have negligible influence on surface water quantity and quality. It very much depends on the amount of salts and other minerals that may be harmful to fish contained in the production water and where this effluent production water is released. If it is released in high quality habitat for special status fish species it could be very detrimental. We suggest a rewording of this bullet to read the following: "Production water from CBNG drilling that is low in salts and other chemicals that may be detrimental to aquatic life forms is assumed to have negligible influence on surface water quantity and quality in the Bighorn River and the Clarks Fork of the Yellowstone River watershed due to the low likelihood that CBNG activities would occur at high levels in the Bighorn Basin. However, if CBNG activities are located near important habitat for special status fish species, it can be assumed there will be adverse impacts."	2042
10264	10264-16	6128, 6138, 6150, and other similar MAs The management actions related to Worland's RMZs are stated in a way that surface-disturbing activities will not be allowed if they are related to wildlife habitat or recreational facilities. This wording should be changed to be consistent with Cody's RMZs, which allows for surface disturbing activities related to wildlife habitat or recreational facilities.	2062
10264	10264-13	Page 2-86, Record # 4122We recommend re-writing this alternative to clarify its intent to the following, "Limit new noise levels, as measured at the perimeter of	2068

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		a lek, to 10 dBA above ambient noise ...from 6 PM to 8 AM.	
10264	10264-10	Page 2-82, Record # 4103: If this action is meant to protect springs and riparian areas in greater sage-grouse habitats it should also apply to activities that may alter or disturb those areas, beyond mining and mineral development. If this action is to address impacts of mining, other important habitats (e.g. winter, breeding, and nesting) should also be included along with springs and riparian habitat.	2071
10264	10264-11	Page 2-84, Record # 4120Although BLM's sage-grouse Key Habitat Areas provide more extensive protections, we recommend the BLM use sagegrouse Core Areas (version 3) as defined by the Governor's Sage-grouse Implementation Team. BLM's Instruction Memorandum No WY-2010- 012 stated that "WY BLM Sagegrouse Key Habitat Areas correspond to the State of Wyoming's Core Population Areas (Core Areas)." BLM personnel at the local, regional and state levels have had input on those Core Areas. Version 3 of the Core Areas was completed in 2010 and should have been included in this analysis.	2071
10264	10264-12	Page 2-84, Record # 4120"Undetermined leks" should not be provided the same protections as Occupied leks. As a result of the most recent Sage Grouse Executive Order, only Occupied leks should be stipulated. Therefore, Undetermined leks should receive priority to be accurately delineated and placed on the WGFD lek database, as necessary.	2071
10264	10264-25	Page 4-84Salable Minerals, Alternative D, Resources - Alternative D should include sage-grouse leks as sites that receive TLS or other restrictions from surface-disturbing activities.	2077
10262 2b	10262 2b-1	The conclusion that such designations would result in beneficial impacts to big game is purely speculative. The RMP/EIS has not sufficiently identified the research connection between human disturbance and elk, has not provided any baseline data on existing levels of human disturbance related to roads or road density, and has not identified any future disturbance levels that might be expected under Alternative A. It is recognized that anticipating levels of future disturbance from oil and gas is speculative, however, the RMP/EIS should have provided some range of possible disturbance levels in miles of road per square mile, pads per square mile, or other measurement indicators that would provide units for comparing effects by alternative.	2020
10262 2b	10262 2b-10	As written, the conclusions are purely speculative. The RMP/EIS has not identified any research connection between livestock grazing in parturition areas and adverse impacts to elk or any research connection between wind energy developments and adverse effects to elk. In fact, the papers cited in the RMP/EIS (Frisina 1992 and Anderson and Scherzinger 1975) only describe beneficial effects from grazing livestock on elk summer range, including parturition periods. Thus, the RMP/EIS provides no reason why “avoiding livestock grazing in elk parturition habitat” would be beneficial. The RMP/EIS conclusion that “avoid(ing) wind-energy projects in big game crucial winter range and parturition habitat under Alternative D would minimize the potential for disturbance and displacement” is without any supporting data, scientific citations linking wind energy projects with declining elk populations, or anticipated levels of disturbance that might accompany wind-energy projects (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	2025
10262 2b	10262 2b-	METHOD/ASSUMPTION: Impacts to special status wildlife species are based primarily on potential impacts to habitats managed by the BLM. COMMENT:	2039

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	12	Within the Planning Area, sagebrush and grassland obligate species use habitat on 730,321 acres of private and state land. The importance of private and state land must be considered, as well as how BLM management actions	
10262 2b	10262 2b-13	METHOD/ASSUMPTION: Precise quantitative estimates of impacts generally are not possible because the exact locations of future actions are unknown, population data for special status wildlife species are often lacking other environmental variables, or habitat types affected by surface-disturbing activities cannot be predicted. COMMENT: Oil and gas production and livestock grazing activities are common across BLM and other federal agency lands. At the least, the BLM must provide a comparative analysis using other similar projects to assess predicted effects. Prior to the development of the EIS/RMP, the BLM had an obligation to conduct comprehensive population surveys. In doing so, the accumulation of "other environmental variables" should have occurred. It is impossible, without population data and other environmental variables, to analyze Planning Area management actions undertaken by the BLM.	2039
10262 2b	10262 2b-14	METHOD/ASSUMPTION: Prohibiting all surface-disturbing and disruptive activities in greater sage-grouse seasonal habitats is more beneficial to greater sage-grouse than avoiding these activities, as avoidance provides discretion for each proposed activity and applies mitigations, where prohibition precludes all activity. COMMENT: The BLM must define qualitatively and quantitatively what "all surface-disturbing and disruptive activities" entail. Asserting that there are no mitigations available that are as effective as prohibiting activities is biasing.	2042
10262 2b	10262 2b-15	METHOD/ASSUMPTION: Within historical fire regimes, prescribed fire is used to manage vegetative communities and can result in short-term adverse impacts with long-term beneficial impacts to wildlife, certain desirable wildlife habitats, and in some cases to forage productivity and availability. COMMENT: Explain if prescribed fire only causes short-term adverse impacts with long-term beneficial impacts to wildlife? Is this true for all wildlife species?	2042
10262 2b	10262 2b-16	METHOD/ASSUMPTION: Measures to protect one species generally result in long-term benefits to other species in that habitat. COMMENT: Much greater detail is needed for this assumption. For instance, measures to protect a species that uses overgrazed or bare areas (e.g. mountain plover) would have detrimental effects to greater sage-grouse.	2042
10262 2b	10262 2b-17	METHOD/ASSUMPTION: Short- and long-term surface disturbance are assumed to occur in vegetation types in proportion to the availability of these vegetation types in the Planning Area. Impact acreage for vegetation types are not absolute, but serve as a relative comparison among alternatives. COMMENT: Clarify. As written, the assumption is unclear.	2042
10262 2b	10262 2b-18	METHOD/ASSUMPTION: Because of the migratory nature and relative mobility of some special status wildlife species (e.g., waterfowl, neotropical migrants, and raptors), these species are affected by actions on non BLM-administered land more so than other species. In the case of migratory species, impacts to winter and migration habitats could adversely impact the viability of some species. Winter and migration habitats are assumed to be at least as important to long-term viability of these species as breeding and nesting habitats. COMMENT: The assumption ignores the migratory nature of big game species that are significantly affected by actions on non-BLM land. Further, actions on BLM land can affect private land, thus displacing or disturbing wildlife.	2042

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10262 2b	10262 2b-2	According to BLM GIS data, black-footed ferret essential habitat occurs on 35,323 acres, representing only 0.6% of the Planning Area. The RMP/EIS provides no data on suitable habitat (occupied white-tailed and black-tailed prairie dog towns). Upon request, the LGCA received a BLM GIS data file for black-tailed prairie dogs that discloses 72,636 acres of suitable habitat. Significantly greater, the Wyoming Natural Diversity Database (WNDD) suggests there is approximately 200,000 acres of occupied prairie dog towns Basin-wide (Map 3). This may represent 3%-4% of the Bighorn Basin (depending upon how individual prairie dog towns were buffered by the WNDD) and compares with a range-wide occurrence of ~2% (Miller et al. 1994).	2042
10262 2b	10262 2b-20	The findings of Holloran et al. (2010) are pertinent to the aforementioned conclusion if future oil and gas activities were to be conducted in a conventional manner. The oil and gas industry, however, has endorsed measures, including directional drilling and seasonal constraints, in cooperation with the BLM that make future drilling activity anything but conventional. Thus, we argue that the conclusion that surface disturbance in sagebrush habitats under Alternative A is anticipated to result in adverse impacts to greater sage-grouse in the short and long term, be reevaluated to include state-of-the-art measures currently applied.	2071
10262 2b	10262 2b-21	The ¼ mile protective measure is no longer state-of-the-art and is obviously, based on the latest research (Holloran et al. 2010), insufficient to protect greater sage-grouse and avoid the risk of federal listing. In our estimation, limiting the standard to an archaic ¼ mile lek buffer makes Alternative A unfairly un-selectable. The LGCA recommends modifying Alternative A to extend the CSU stipulation to 0.6 miles to recognize the state-of-the-art mitigation	2071
10262 2b	10262 2b-22	No data on the amount of invasive weeds by species, spatial distribution, or infestation intensity is provided in the Affected Environment. The aforementioned discussion makes no reference to measures applied during oil and gas exploration, vegetation manipulation, or grazing to minimize the spread of invasive weeds. Without a more rigorous evaluation of the effectiveness of those measures, or lack thereof, we find no basis for concluding that continued expansion and spread of invasive species under Alternative A would result in adverse impacts to greater sage-grouse and sagebrush habitats.	2068
10262 2b	10262 2b-23	No data is provided in the Affected Environment on the availability of nest cover at any scale (e.g. by grazing allotment, Basin-wide, etc.). No scientific references are provided that correlate declines in greater sage-grouse specifically to limited nesting cover, without segregating that variable from other possible variables (weather, changes in sagebrush coverage, distribution of sagebrush size classes, invasive weeds, and oil and gas disturbance). Thus, the conclusion that management of livestock grazing under Alternative A may not improve the quality or quantity of habitats for greater sage-grouse, but should maintain current habitats is speculative and sans supporting data.	2068
10262 2b	10262 2b-24	Research (Connelly et al. 2000; Gregg et al. 1994; Wallestad and Pyrah 1974) does show a positive correlation between greater sage-grouse nest success and nest cover. If the RMP/EIS is going to suggest, as it does, that changes in grazing may or may not improve greater sage-grouse nest success, the conclusion must be based on Basin-wide allotment-by-allotment data that summarizes nest cover in a statistically meaningful manner that isolates the effects of limited nest cover from other variables. If data concludes that modifications to grazing in some allotments are warranted to recover greater sage-grouse, the BLM	2071

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		should engage stakeholders and permittees with a proposed solution. Making conclusions regarding the effects of grazing on greater sage-grouse without data, however, is improper. Management decisions based not on data but perceptions could have significant negative economic impacts on permittees and stakeholders. The LGCA strongly objects to Basin-wide modifications to grazing under the auspices of greater sage-grouse recovery that are not allotment-specific or based on field data and scientifically-sound analyses (see Wildlife Mitigations" Core and Key Areas, Grazing, Travel Management, and Mining and Energy Development).	
10262 2b	10262 2b-25	We challenge the conclusion that measures to protect greater sage-grouse as discussed under Game Birds (Greater Sage-grouse) would benefit all sagebrush and shrubland species. Brewer's sparrows, sage sparrows, and sage thrashers clearly prefer large tracts of late seral big sagebrush (Buseck et al. 2004; Hansley and Beauvais 2004a; Hansley and Beauvais 2004b; Wiens and Rotenberry 1981). Greater sage-grouse prefer a mosaic of young and old sagebrush interspersed with open grassy areas (Connelly et al. 2000; Connelly et al. 2004; Rowland 2004). Thus, the biological requirements for species in the sagebrush and shrubland species differ by species.	2042
10262 2b	10262 2b-26	it is unclear how the BLM concludes that current conditions are limiting to greater sage-grouse or if future conditions will be better or worse. Thus, the RMP/EIS conclusion (pg.4-181) that species that utilize or depend on sagebrush habitats (will) benefit from management actions for greater sage-grouse may or may not be accurate and reflect current conditions in the Planning Area.	2042
10262 2b	10262 2b-27	The conclusion that direction in Alternative A provided by Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming, may not create the vegetation heterogeneity needed for neotropical migrants is speculative. The RMP/EIS needs to determine whether grazing management does or not meet the needs of Neotropical migrants. If, grazing as currently conducted does not provide the needs for some species (e.g. heavily-grazed lands needed by mountain plovers), then the alternatives should be modified to meet those biological needs.	2042
10262 2b	10262 2b-28	The relationship between sagebrush-associated species and grassland-associated species needs to be segregated. First, the wildlife effects discussion needs to acknowledge that according to BLM biophysical setting data, most grasslands are the result of disturbance that removed sagebrush (fire, mechanical, herbicides, etc). Similarly, most sagebrush-dominated areas are the result of an absence of disturbance (e.g. long-term fire suppression). Secondly, the effects analysis needs to acknowledge that actions that benefit/favor sagebrush obligates (e.g. sage sparrows) will be detrimental to grassland obligates (Baird's sparrows) and contrariwise. Lastly, the degree to which alternatives provide for both sagebrush- and grassland-associated species must be based on comprehensive data that discloses the current mix of sagebrush and grasslands and changes in that mix that will occur by alternative. Referring simply to greater sage-grouse measures (Section 4.4.9 Special Status Species - Wildlife and Standards for Healthy Rangelands) or domestic livestock grazing measures (Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming) does not answer the fundamental questions of how Alternative A will affect sagebrush- and grassland-associated species in terms of how the Planning Area will be managed	2039

Table B-1. Individual Comments and BLM Response Index (Continued)

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		in either sagebrush or grassland coverage (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	
10262 2b	10262 2b-29	Where there is agreement with the preceding narrative is that appropriate grazing intensity and duration maintains suitable greater sage-grouse habitat (WGFD and BLM 2007). The following should be addressed under Alternative B: Greater sage-grouse co-evolved with bison and are therefore, generally tolerant of or benefit from livestock grazing; Some allotment-specific problems with limited nesting cover may exist, but issues can be resolved at the allotment-scale regardless of alternative selected; Removing 1.1 million acres of livestock is based on a perception that grazing is a major problem for greater sage-grouse, but that opinion is generally not validated by research. Removing livestock on 1.1 million acres will have greater negative effects on greater sage-grouse from increased fire severities, resulting in a loss of big sagebrush to a greater degree than any minor site-specific benefits from improved nesting cover. Elimination of 1.1 million acres of grazing allotments will have significant adverse impacts on permittees in the Planning Area. The BLM has an obligation to disclose the economic effects of removing 1.1 million acres of grazing.	2068
10262 2b	10262 2b-3	No analysis is found in the RMP/EIS that demonstrates that sustaining black-footed ferrets on 0.6% habitat is sufficient to recover black-footed ferrets to non-listed status. Nor, can we find any objectives for prairie dog towns that are needed to sustain black-footed ferrets, even though the WNDD data suggests prairie dog towns are reasonably abundant. Consequently, concluding that "adverse impacts from BLM actions to prairie dog populations are not anticipated under Alternative A" may be technically true, but it is not clear if Alternative A meets the ESA in terms of providing sufficient habitat over time.	2042
10262 2b	10262 2b-30	Mountain plovers require intensively grazed areas, either from domestic livestock, wild ungulates, or prairie dogs (Beauvais and Smith 2003; Dechant et al. 2002b; Knopf and Wunder 2006; Manning and White 2001). Removing 1.98 million acres of grazing allotments will drastically inhibit the ability of the BLM to provide suitable habitat for mountain plover. Consequently, concluding that "Alternative B may result in adverse effect to mountain plover(s)" is a gross inaccuracy.	2041
10262 2b	10262 2b-31	Furthermore, the conclusion that "managing areas to create preferred habitat for the mountain plover, would likely provide a net benefit for this species" lacks the essential discussion of "how" that activity would occur. Given that mountain plovers require intensively-grazed areas, how will non-disclosed management activities benefit mountain plovers when Alternative B removes grazing on 1.98 million acres? Will BLM crews be out mowing areas to create mountain plover habitat? Without some specific details on what those plover management actions will entail, the conclusion is baseless (see Wildlife Mitigations " Grazing, Travel Management, and Mining and Energy Development).	2041
10262 2b	10262 2b-32	As stated in comments for the effects of Alternative A, no data is provided in the Affected Environment on the availability of nest cover at any scale (e.g. grazing allotment, landscape, Basin-wide). No scientific references are provided that correlate declines in greater sage-grouse specifically to limited nest cover, without segregating that variable from other possible variables (weather, changes in sagebrush coverage, distribution of sagebrush size classes, invasive weeds, oil and gas disturbance). Thus, the conclusion that there may be more beneficial impacts to greater sage-grouse (from Alternative D), is speculative	2068

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		(see Wildlife Mitigations " Core and Key Areas, Grazing, Travel Management, and Mining and Energy Development).	
10262 2b	10262 2b-33	Based on previous comments regarding the effects of Alternative A, there is no data on existing acres of sagebrush age class distribution. While Alternative D infers there will be less acres lost to minerals extraction, there is no quantitative comparison of existing acres of habitat compared to acres remaining under Alternative A. It is understood there is uncertainty involved with minerals extraction, yet a general comparison is necessary to validate the conclusion advanced by the BLM.	2036
10262 2b	10262 2b-6	The RMP/EIS makes no disclosure of the amount of summer range acres withdrawn from oil and gas development, nor does it identify any benefits to summering ungulates on that winter range from withdrawal.	2022
10262 2b	10262 2b-42	Energy extraction activities can compromise hunting season security by adding roads that can reduce security or by creating a high level of noise and human disturbance during the hunting season that makes existing security areas unusable to elk. Generally, leasing with CSU would fully mitigate impacts on security. If, however, security areas overlap with crucial winter range, the combined seasonal restrictions (e.g. fall through late spring) might not leave a sufficiently reasonable operating season for energy extraction. In that situation, special security areas, not to exceed 30% of the AFMA (Edge et al. 1988), should be designated NSO..	2025
10262 2b	10262 2b-43	Bighorn sheep do not exhibit the same sensitivity to human disturbance that elk do (Papouchis et al. 2001). Bighorn sheep will routinely occupy habitat along freeways and other areas of high disturbance. Because of areas of de facto NSO (see previous paragraph) that comprise sheep habitat, it is unlikely that disturbance from energy extraction would have measurable effects upon sheep populations; therefore, no mitigation measures are necessary.	2025
10262 2b	10262 2b-44	Mitigation measures needed to protect wintering moose are assumed to be the same as for elk (e.g. minimizing the footprint of physical disturbance, aggressively controlling invasive weeds, and restricting activity during critical use periods). As important, prior to any constraints being placed on grazing, oil and gas development projects, or travel management designations in the AFMA, the constraints must be substantiated with monitoring data, research, and close coordination and cooperation with stakeholders	2025
10262 2b	10262 2b-45	Disturbance associated with roads probably outweighs all other threats. CSUs have the potential to fully mitigate impacts upon grizzly bears; however, determinations regarding the level of energy extraction activity allowed, number of roads to be temporarily constructed, and season of use allowed for drilling need to be carefully crafted to fit the needs of locally-studied bear populations. In areas with an absence of reliable data, NSOs may be warranted. Prior to any constraints being placed on grazing, oil and gas development projects, or travel management designations in the AFMA, the constraints must be substantiated with monitoring data, research, and close coordination and cooperation with stakeholders.	2025
10262 2b	10262 2b-5	The Affected Environment did not demonstrate with either data or scientific literature how making Carter Mountain and Little Mountain expansion unavailable to oil and gas leasing and withdrawn from locatable mineral entry would benefit big game. It is disclosed that the ACECs include 246,064 acres of crucial winter range. Those areas, however, are already protected from wintertime ungulate disturbance by a TLS. The RMP/EIS infers there will be a	2025

Table B-1. Individual Comments and BLM Response Index (Continued)

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		temporary loss of habitat from surface-disturbing activities, but no estimate of acreage lost is provided. Low to moderate intensity oil and gas development has a relatively tiny footprint (pad surfaces, access roads, pumping stations, etc). High intensity oil and gas developments (e.g. Jonah or Pinedale Anticline) have larger footprints. However, the percentage of habitat temporarily lost is still in the single digits. For the RMP/EIS to conclude that withdrawing lands from oil and gas will benefit big game, some estimate of lands temporarily lost as habitat to pads, roads, and pumping stations should be provided and a science-based assessment of the significance of that loss to wintering ungulates should be made.	
10262 2b	10262 2b-7	The LGCA strongly disagrees with the removal of domestic sheep grazing from crucial pronghorn winter range. In the RMP/EIS, the BLM fails to disclose, with peer-reviewed scientific studies or BLM field data, that cattle grazing has adverse effects on wintering pronghorn.	2025
10262 2b	10262 2b-8	Additionally, the conclusion that eliminating livestock grazing on crucial winter range for elk (Table 4-9) to increase forage availability, reduce forage competition, and prevent possible displacement of these wildlife populations (Scolvin et al. 1968; Coe et al. 2004; Stewart et al. 2002) has not been demonstrated as fact. Two critical variables discussed in two of the three aforementioned citations (Skovlin et al. 1968, Coe et al. 2004) are the level of utilization and season of use. Known conflicts between livestock and elk include these two variables. No data is provided in the RMP/EIS, however, that discloses season of use or level of utilization in the areas where benefits to ungulates are anticipated under Alternative B. Thus, the conclusion is groundless. The third citation (Stewart et al. 2002) makes no specific correlation between livestock grazing and elk.	2025
10262 2b	10262 2b-9	Furthermore, the RMP/EIS is using research indiscriminately to make the case that elk will benefit by removing livestock in Alternative B. The RMP/EIS earlier cited Anderson and Scherzinger (1975), which showed that summer livestock grazing benefitted elk on winter range when done in certain seasons and intensities. Yet, that finding is ignored in the effects on elk in Alternative B. If the RMP/EIS is going to disclose beneficial effects upon elk from Alternative B, it needs to demonstrate with allotment-by-allotment data that utilization is excessive (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	2025
10262 2b	10262 2b-35	METHOD/ASSUMPTION: The number of wild horses would increase by about 18 percent annually and be maintained by periodic removals. COMMENT: As an exotic species, the LGCA posits that an increase of 18% annually will be detrimental to the native vegetation and the economic interest of permittees and stakeholders in the Planning Area. If required by the WFRHBA, annual increases in wild horses in the Planning Area should be at the minimal allowable level allowed for under the WFRHBA.	2030
10262 2b	10262 2b-36	METHOD/ASSUMPTION: Wild horse removals (gathers) would occur about every 3 to 5 years in each HMA.COMMENT: Gathers must occur annually to decrease the environmental devastation wrought by wild horses in the Planning Area.	2030
10262 2b	10262 2b-37	METHOD/ASSUMPTION: Maintenance of wild horse populations at initial appropriate management levels in existing HMAs would be accomplished through removals and selected application of other population control practices. COMMENT: Define “appropriate management levels.”	2030

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10262 2b	10262 2b-38	The overall stocking level for both livestock and wild horses in the Fifteen Mile HMA is 5,670 AUMs (RMP/EIS pg. 3-120). Overall stocking levels for both wild horses and livestock in the McCullough Peaks HMA are not discussed in the RMP/EIS. Additions to Section 3.4.10, McCullough Peaks Wild HMA, should include the overall stock level AUMs.	2030
10262 2b	10262 2b-39	Until a comprehensive study of the affects of wild horses in the Fifteen Mile and McCullough Peaks Wild HMA areas is complete, and included in the RMP/EIS, there should be no reduction in livestock AUMs (see Wild Horses Mitigation - Grazing). The BLM must consider reducing wild horse numbers and wild horse AUMs in the McCullough Peaks and Fifteen Mile HMAs to restore rangeland health until drought conditions have receded. The reduction in excess wild horses and AUMs would be consistent with the WFRHBA, Section 2 Subpart (f) which states: excess animals" means wild free-roaming horses or burros (1) which have been removed from an area by the Secretary pursuant to application law or, (2) which must be removed from an area in order to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area.	2030
10262 2b	10262 2b-40	In Section 3.4.10, Management Challenges, McCullough Peaks HMA, fertility controls are used to control population growth to an expected 15% annual rate. Section 4.4.10.1, Methods and Assumptions, states that the number of wild horses would increase by 18% annually. The percentages do not match, obviously. The Methods and Assumptions percentage of annual growth should be changed to match the fertility control method percentage annual growth rate or clarify the differences in the percentages. Wild horse HMAs should be managed according to the contraceptive measures delineated previously in this comment section.	2030
10262 2b	10262 2b-41	The agency-preferred alternative (D) in this analysis withdraws leasing from much of the AFMA and allocates the remainder to a mix of NSO and CSU. While the alternative takes a no risk approach to protecting wildlife, the alternative goes beyond what the science (Holloran and Anderson 2005; Sawyer et al. 2007a; Sawyer et al. 2007b) says is needed to protect wildlife from energy extraction activities.	2036
10262 2b	10262 2b-4	Additionally, is it not clear that measures taken in Alternative A will provide sufficient acres of occupied prairie dog towns to maintain burrowing owls (and other prairie dog obligates) at a level sufficient to preclude federal listing. The RMP/EIS needs to provide information (goals, objectives, minimum acreages of suitable habitat, monitoring strategies, stakeholder involvement, etc) on a Basin-wide scale to demonstrate that Alternative A (and other alternatives) are indeed compatible with maintaining prairie dog populations to support black-footed ferret recovery and the ESA (see Wildlife Mitigations - Grazing, Travel Management, and Mining and Energy Development).	2039
10262 2c	10262 2c-19	Page 2-97, Record 5020 mentions avoiding surface disturbing activities and ROW authorizations in view within 5 miles of important cultural sites where integrity of setting is a contributing element of NRHP significance (Alternative B). Alternative D mentions a three-mile buffer. It seems that mitigation measures described in Appendix L could go a long way to mitigating impacts of surface disturbing activities within these three- to five-mile buffers. Stipulating significant restrictions in these buffers could potentially remove a 78 square mile (five-mile buffer) and 28 square mile area (three-mile buffer) from surface disturbing activities for a single cultural site.	2004

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10262 2c	10262 2c-20	The management prescriptions under Alternative D, as outlined in Record # 5020, 5022, and 5023 (pp. 2-97 and 2-98), use the word "avoid." The common legal definition of "avoid" is "to make void or of no effect; invalidate." The average person may be led to the conclusion that surface-disturbing activities are precluded within 3 miles of important cultural sites throughout the Planning Area. Rather, it should be interpreted "as a term used to address mitigation of some activity" consistent with the definition provided in the Draft RMP and DEIS (p. Glossary-4). Although the use of the word "avoid" seems a poor choice, given the definition provided in the Draft RMP and DEIS it seems reasonable to include "(see Glossary)" following "avoid" in each of the Record #s referenced above.	2004
10262 2c	10262 2c-22	Page 2-97, Record 5021 describes an NSO for leasable minerals within 3 miles and a CSU stipulation within 5 miles of important cultural sites for Alternative B. For Alternative D, the buffer would be 3 miles to protect the visual integrity of important cultural sites. Again, the mitigation measures described in Appendix L and others described under 5.0 mitigation measures could reduce or eliminate impacts associated with surface disturbing activities.	2004
10262 2c	10262 2c-23	Page 2-97, Records 5020 and 5021. Mike Beis, BLM cultural specialist, and the SHPO representative in the February, 2010 meetings in Cody said they have indentified up to 500 cultural sites that deserve protection. If 500 sites need to be protected by these three- and five-mile buffers, thousands of acres of land within the planning area could be removed from potential development.	2004
10262 2c	10262 2c-30	The LGCA is concerned about the nebulous nature of "setting" of a NRHP-eligible cultural site with respect to viewshed criteria. It is implied in the above text that a five-mile viewshed buffer might not be sufficient on a case-by-case basis if the development were a wind farm. There needs to be more explicit direction from the BLM in the plan with respect to buffers for protecting the setting of NRHP-eligible cultural resources.	2004
10262 2c	10262 2c-31	Page 4-265, 2nd paragraph - Clarify if limiting motorized use to designated roads and trails allows for dispersed camping and game retrieval off of roads.	2004
10262 2c	10262 2c-32	Again, the BLM and SHPO have stated in meetings that there may be 500 important cultural sites that need protected under the buffers proposed in Alternatives B and D. It should be noted that management of cultural resources for setting is only intended to apply to those properties where setting is an important aspect of the integrity of the site. As noted in the comments from the State Historic Preservation Office the majority of cultural resources (approximately 98%) recorded in the Planning Area are archaeological in nature and thus the integrity of setting is not an issue of importance. In fact, less than 1% of cultural resource properties in the Planning Area meet the criteria for the management of setting.	2004
10262 2c	10262 2c-38	The LGCA has several concerns with the treatment of cultural resources in the RMP. Most importantly, the LGCA is concerned about three- and five-mile buffers around important cultural resources within which NSO or CSU restrictions would apply under Alternatives B and D. Given that there may be as many as 500 important cultural sites in the planning area; these buffers could potentially preclude activities on thousands and thousands of acres within the planning area. The LGCA believes that mitigation measures in Appendix L of the RMP and additional measures described above can be applied that would protect these resources but still allow surface disturbing activities within the buffer zones.	2004

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10262 2c	10262 2c-21	This language would require mitigation of visual impacts for projects that impact the integrity of the subject cultural site or historic trails within the buffer but if the project does not impact the visual integrity of the subject cultural site or feature (is not within view of the site even though it is within the buffer), no mitigation would be necessary. According to the Wyoming State Historic Preservation Office (SHPO), the intact portions of the Bridger Trail comprise less than 15% of the length of the trail across the planning area as shown on BLM maps. The BLM should publish in the DEIS the known intact portions of the Bridger Trail as documented by Wyoming SHPO.	2010
10262 2c	10262 2c-39	Page 3-143 states that the small size of scattered parcels can result in increased difficulties in management. Please specify the acreages that correspond to these difficulties in management.	2013
10262 2c	10262 2c-47	Include reference citations for the assertion that land tenure adjustments and land use authorizations will increase over the life of the plan.	2013
10262 2c	10262 2c-48	Include more information about the metrics used in determining the priority or urgency associated with acquisitions benefiting varied resource programs.	2013
10262 2c	10262 2c-49	Include reference citations for the assertion that the number of land use authorizations will increase over the life of the plan.	2013
10262 2c	10262 2c-50	Include more information about the process of determining mineral development potential prior to a potential land disposal.	2013
10262 2c	10262 2c-51	Define "voluntary approaches" used to increase access to lands.	2013
10262 2c	10262 2c-52	Include reference citations for the assertion that consolidation of public lands would decrease the cost of public land administration in the Planning Area and enhance efficiency in management of the remaining public lands.	2013
10262 2c	10262 2c-53	Provide a description of the types of special designations that may qualify an acquisition area for a higher or lower priority.	2013
10262 2c	10262 2c-54	Please detail or reference the resource issues that drive differences in impacts between alternatives. Throughout the lands resource section of the RMP/EIS, effects from land designations on the operation of the lands and realty, renewable energy, rights-of-way, and comprehensive travel and transportation management resource areas. However, the resource issues that have precipitated those land designations are often not discussed in sufficient detail. In order to fully understand the implications of difference between alternatives for the land resources section of the document, more information must be included.	2013
10262 2c	10262 2c-55	Please clarify the methods used to identify parcels available for disposal. Areas considered for disposal due to difficulties in management but retained due to other resource concerns should be detailed under each alternative. For example, under Alternative D, 4,633 acres of BLM ownership in parcels of 160 acres or less are not considered for disposal under zones 1C, 2, 2A, 2B, or W.	2013
10262 2c	10262 2c-56	Please detail or reference the resource issues that drive differences in withdrawals, classifications, and segregations between each alternative.	2013
10262 2c	10262 2c-14	The preceding comments clearly illustrate that the BLM has failed to adequately describe historic wildlife habitat quality and quantity, population density, and viability of species analyzed in the RMP/EIS. In the Affected Environment chapter, the RMP/EIS insufficiently discloses the aforementioned variables. Given that the current condition does not properly disclose the population	2025

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		density and area of use of many species in the Planning Area, it is indiscernible to what degree a species or group of species is challenged by habitat conditions or availability.	
10262 2c	10262 2c-15	Complicating the wildlife section is the fact that the RMP/EIS does not provide measurement indicators for species. An EIS must provide measurement indicators so that management planning action effects can be applied to wildlife species and habitats. Only then can the action alternatives be accurately assessed and compared.	2025
10262 2c	10262 2c-16	Management challenges are provided for the Planning Area that describe in very nebulous terms adversities facing wildlife species. However, the management challenges are not substantiated with data gathered from the Planning Area. In fact, very little data is provided for either wildlife species or habitats. In addition, the RMP/EIS incorporation of recognized research and field studies on Planning Area species that were conducted outside the Bighorn Basin, but still relevant, are mostly absent.	2025
10262 2c	10262 2c-18	Before the RMP/EIS is finalized, the wildlife section must be substantially improved. The Affected Environment must compare historic and current wildlife species populations and habitat quality and quantity. Next, a description of how management actions and resource uses in the Planning Area, over the life of the current RMP(s), have impacted wildlife either beneficially or adversely should be provided. With a solid Affected Environment chapter, the Environmental Consequences chapter can effectively analyze proposed action alternatives. For proper evaluation, measurement indicators must be devised for each species.	2025
10262 2c	10262 2c-2	Alternative A takes the mitigation measures recommended in various publications and applies them where they overlap with key wildlife habitats. Alternative A assumes that wildlife populations are at some risk from energy extraction activities, but that the published mitigation measures will be sufficient to avoid any significant adverse effects. Alternative D, and to a greater extent Alternative B, largely ignore the current level of over-performance that elk populations are exhibiting. As noted previously, before constraints are placed on grazing, oil and gas development projects, or travel management designations in the AFMA, the constraints must be substantiated with monitoring data, research, and close coordination and cooperation with stakeholders.	2025
10262 2c	10262 2c-71	Inventory and subsequent confirmation inventory of LWCs performed by the LGCA, it is apparent that the BLM did not follow Manual 6301procedural guidelines when conducting the inventory. The LGCA believes that the lack of confirmation of procedural guidelines has led the BLM to publically release an inaccurate LWC inventory, leading to erroneous LWC designations.	2027
10262 2c	10262 2c-72	The BLM Cody Field Office did not produce maps of the inventoried LWCs. Section 1, Subsection 13, Part A, Subpart 2a, on page 6 of BLM Manual 6301 requires the BLM to produces a map of each LWC by stating: "a map of sufficient detail to determine specific boundaries of the area in question." The Manual refers to this as a minimum standard in the inventory. The Cody Field Office is in direct violation of this section of BLM Manual 6301.	2027
10262 2c	10262 2c-73	The BLM proposed multiple LWCs of roaded areas less than 5,000 acres in size. Section 1, Subsection 14, Part B, Subpart 1, on page 8 of BLM Manual 6301, discusses the size requirements of LWCs. Determination of the size criteria requirements is two-parted: 1) a roadless area of 5,000 contiguous BLM acres or 2) a roadless area of less than 5,000 acres if it is contiguous with lands such as	2027

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		wilderness, WSAs, etc. Some of the multiple BLM LWCs less than 5,000 acres are not adjacent to wilderness or WSAs. The LWCs that are adjacent to WSAs are not contiguous (Appendix A), containing roads separating the boundaries of the LWCs from the WSAs.	
10262 2c	10262 2c-74	The BLM did not inventory for man-made structures within LWCs. The BLM LWC Inventory occasionally refers to roads or structures on their inventory by hand drawing dots on LWC maps or drawing in roads with a highlighter. The BLM GIS library contains complete data sets for roads, range improvements, oil and gas fields, and other structures such as communication towers. It is clear that the BLM ignored their GIS data when preparing the LWC inventory.	2027
10262 2c	10262 2c-75	Other readily available GIS data sets ignored by the BLM are Wyoming Pipeline Authority oil and gas pipelines and Wyoming Oil and Gas Commission data for oil and gas wells. All of these structures are contained, to varying degrees, within all the BLM identified LWCs (Appendix A). Section 1, Subsection 14, Part B, Subpart 2, on page 9 of BLM Manual 6301, discusses naturalness, allowable structures, and cumulative effects of multiple structures on apparent naturalness. The BLM did not document in their inventory the structures that exist within the LWCs, nor did they document the cumulative effects of those structures on the apparent naturalness of the LWCs. This is a direct violation of the guidance set forth in BLM Manual 6301.	2027
10262 2c	10262 2c-76	Thresholds for the amount of allowable structures in LWCs should be set to create a measureable baseline. For example, a threshold should be established for the number of structures allowed per 1,000 or 5,000 acres. A second threshold may be setting minimum distance criteria between allowable structures. The process should take in account the Wilderness Act, which is quoted in BLM Manual 6301 as: A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. The first sentence of the preceding quote and points one, two, and three are violated on a continual basis in the BLM LWC Inventory as determined by the LGCA LWC Confirmation Inventory (Appendix A). The definition of a road has the most potential to impact LWC designations. Almost all LWCs contain roads (Appendix A).	2027
10262 2c	10262 2c-77	The inconsistencies in road terminology and classifications should require the BLM to adopt a standardized road classification methodology. The BLM Road and Terminology Report contain the most comprehensive attempt at this process. It contains a chart depicting route status levels and terminologies associated. Figure 17 clearly depicts single track as trails and high clearance (commonly associated with two-tracks) as primitive roads. This terminology	2027

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		should be adapted to the LWC inventory procedures. Therefore, two-tracks would be considered roads in an LWC inventory.	
10262 2c	10262 2c-13	Wild horses are a non-native species in the Bighorn Basin that deplete and denigrate native vegetation and water sources. If the BLM proposes to increase wild horse AUMs, which would result in the alteration, reduction, or loss of domestic livestock grazing AUMs, it will be preceded by the BLM designing and implementing a comprehensive monitoring study based on state-of-the-art methods that evaluates species population density and viability, as well as the impacts of wild horses on native vegetation, water quality/quantity, and domestic livestock grazing in the Planning Area. At the conclusion of the study the BLM will coordinate with livestock grazing permittees and local governments in the Bighorn Basin preceding any proposed modification of AMPs or elimination of livestock grazing allotments in the Planning Area.	2030
10262 2c	10262 2c-24	Page 3-136, paragraph 2 - Explain how sensitivity levels were determined.	2032
10262 2c	10262 2c-25	Page 3-136, 3rd paragraph - It would be helpful to the reader if a table or diagram was provided to show how inventory classes are determined. For example, a Scenic Class A rating and a Low sensitivity rating results in a ___ Scenic Class.	2032
10262 2c	10262 2c-26	Page 3-136 - Explain why foreground and background are lumped into one distance category (Foreground/Middleground). Seems the scenic class would be different for each distance zone.	2032
10262 2c	10262 2c-27	Table 3-35 - Table footnote 1 in the Foreground/Middle Ground cell is mislabeled. Footnote one refers to scenic classes on the previous page. Suggest including a footnote on Foreground/Middle Ground that would describe the distance zones for each. For example, foreground would be 0-1/4 mile from a travel route and middleground would be ¼ - 2-3 miles. Also visibility should be verified at the project level. This also could be considered a mitigation measure included later in the document.	2032
10262 2c	10262 2c-28	Page 3-139 - Explain how the VRM Classes in Table 3-36 was determined or what they are based on. The Source at the bottom of the Table only says "BLM 2009a" which is the GIS data base. Are these classes based on the existing RMP?	2032
10262 2c	10262 2c-29	Page 3-139 - Cite the "policy direction for renewable energy production on public lands" mentioned in the last paragraph.	2032
10262 2c	10262 2c-33	Page 4-283, 2nd paragraph under Visual Resources - The discussion about direct and indirect effects does not match the definition of direct and indirect effects on Page 4-1. Suggest that indirect effects for visual resources would be related to recreation use and economics as a result of diminished scenic quality.	2032
10262 2c	10262 2c-34	Page 4-286 - The effects analysis is written as if the impacts "would" occur as opposed to "could occur" if development were to take place. This may be a clarification needed for all resource effects.	2032
10262 2c	10262 2c-35	Page 4-288, Last sentence before Table 4-12 - Clarify why "applying VRM that is incompatible with an area's visual value would eventually alter these areas toward a higher visual inventory class." The visual inventory class is determined using the scenic quality rating (Classes A, B, and C) and the visual sensitivity level. The Forest Service visual inventory process uses inherent scenic attractiveness (Class A, B, and C) instead of scenic quality and it would not change as a result of management allocations or management actions. Alternative D.	2032

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10262 2c	10262 2c-36	Table 4-11 and Map 41: As an example of the concern raised on Page 3-139, why was the Sheep Mountain Anticline VRM Class expanded from Alternative A to Alternative D?	2032
10262 2c	10262 2c-37	1. With respect to visual inventory classes, the BLM will display in the RMP/EIS an appendix or cite the project file that explains how the visual resource inventory was completed. 2. Regarding Table 3-36 of the RMP/EIS, the BLM will explain the basis and determination of VRM Classes. It is also suggested that indirect effects for visual resources would be related to recreation use and economics as a result of diminished scenic quality. 3. The BLM will include in the RMP/EIS an appendix (or in the project file/administrative record) the process used to determine the Scenic Quality Rating.	2032
10262 2c	10262 2c-45	The RMP/EIS states that there are two fundamental tasks associated with comprehensive travel and transportation management. Both of these tasks require an accurate inventory of the existing transportation network. Please ensure that spatial inventories of the transportation network in the Planning Area accurately reflect current conditions prior to making decisions that would affect comprehensive travel and transportation management.	2034
10262 2c	10262 2c-46	Page 3-156 briefly describes five travel management plans that are currently implemented. Please include a more detailed description of these existing travel management plans, including their location, extent, goals, range of designations, and resource issues driving those designations.	2034
10262 2c	10262 2c-68	Please include reference citations for the assertion that demand for new rights-of-way or access is expected to decrease.	2034
10262 2c	10262 2c-69	Please detail or reference the resource issues that drive differences in travel management between each alternative. Inclusion of this information would be appropriate in Table R-1 as well.	2034
10262 2c	10262 2c-57	Please include reference citations for the assertion that wind energy is the most likely type of renewable energy to be developed in the Planning Area.	2065
10262 2c	10262 2c-58	Please include reference citations for the assertion that wind energy demand and development is expected to increase during the life of the plan..	2065
10262 2c	10262 2c-59	Please include reference citations for the assertion that increased development of wind energy turbines would increase the demand for ROW authorizations for transmission lines.	2065
10262 2c	10262 2c-60	Please detail or reference the resource issues that drive differences in management that limits or prohibits renewable energy development between each alternative.	2065
10262 2c	10262 2c-64	The RMP/EIS states that, overall, Alternative C has the lowest level of constraints applied to ROW authorizations. The RMP/EIS also states that Alternative A includes the fewest combined avoidance/mitigation and exclusion areas, as well as the most area of ROW corridors. These two factors would indicate that Alternative A has lowest level of constraints applied to ROW authorizations. Please clarify these apparently contradictory statements.	2066
10262 2c	10262 2c-65	Please detail or reference the resource issues that drive differences in management that limits or prohibits ROW corridors between each alternative. The process for identifying areas of designated ROW corridor is unclear. Please provide information concerning the process of designating ROW corridors.	2066
10262 2c	10262 2c-66	Please include discussion of the differences in ROW acquisition between designated ROW corridors, avoidance/mitigation areas, and areas with neither	2066

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		designation. The impact of expansion of avoidance/mitigation areas and reduction of designated ROW corridors on ROW applicants is unclear.	
10262 2c	10262 2c-70	Mitigations 1. The BLM shall ensure that spatial inventories of the transportation network in the Planning Area accurately reflect current conditions in the Final RMP/EIS. 2. In the Final RMP/EIS, the BLM shall include a more detailed description of the existing travel management plans. 3. In the Final RMP/EIS, the BLM shall detail the resource issues that drive differences in impact between alternatives for Lands and Realty, Renewable Energy, Rights-of Way and Corridors, and Comprehensive Travel and Transportation Management. If the detailed information is included elsewhere in the RMP/EIS, a reference to that location would be sufficient. 4. In the Final RMP/EIS, the BLM shall assess the percentage of ROW corridor capacity that is currently in use, and use that information to revise ROW corridor designations for all alternatives. 5. In the Final RMP/EIS, the BLM shall provide description of the methods used to designate ROW corridors, and detail the differences between alternatives. 6. In the Final RMP/EIS, the BLM shall provide discussion of the differences ROW acquisition between designated ROW corridors, avoidance/mitigation areas, and areas with neither designation. 7. In the Final RMP/EIS, the BLM shall clarify the assertion that Alternative C includes the lowest level of restrictions on ROW authorization, and revise if applicable.	2066
10262 2c	10262 2c-40	The RMP/EIS asserts that "If the current rate of development continues and current management remains in place, designated ROW corridors should adequately meet future needs over the next 10 to 20 years." Please provide supporting information for this statement, and assess the percentage of current ROW corridor capacity in use.	2067
10262 2c	10262 2c-41	Please reference the source of oil and gas production estimates, assumptions concerning their distribution, and include provisions should activity data from these sources.	2067
10262 2c	10262 2c-42	Please provide supporting information for the assertion that demand for public land for access roads and electrical or pipeline ROWs will remain moderate over 10-20 years.	2067
10262 2c	10262 2c-44	Given the potential of the Mowry Shale Formation and EOR and unconventional gas plays elsewhere in the Bighorn Basin, the proposed ROWs in Alternative D will not allow for necessary infrastructure to develop and produce these important resources. Upon comparison of Alternative A and Alternative D ROW corridors, it was discovered that a large majority of the corridors in Alternative A are removed in Alternative D. Certain oil and gas management areas (intensely developed oil fields) were no longer being served by ROW corridors. This results in an inability to expand operations and apply new extraction techniques, such as EOR. Appropriately, as public servants with the best interest of the citizenry in mind, the LGCA has designed and developed an Alternative D ROW corridors GIS polygon and accompanying map (Map 9) and GIS shapefile. Energy producers in the Bighorn Basin met with the LGCA to discuss their needs for ROW corridors. Being able to provide corridors for CO2 pipelines into oil and gas management areas and additional space in ROW corridors for removal and transportation of oil and gas is a necessity for energy producers. The proposed ROW corridors would allow for EOR and unconventional gas plays in the Bighorn Basin. Access to oil and gas previously unattainable is not only prudent in meeting the nation's energy demands, but will provide economic and employment benefits to the Bighorn Basin, Wyoming, and the U.S.	2067

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10262 2c	10262 2c-61	Please include reference citations for the assertion that ROW grants will be directly proportional to the development of other resources and resource uses in the Planning Area.	2067
10262 2c	10262 2c-62	Please include reference citations for the assertion that companies would focus first on the maintenance and upgrading of existing lines before undertaking new construction of major utility lines in the Planning Area.	2067
10262 2c	10262 2c-63	Please include reference citations for the assertion that if the current rate of ROW development continues designated corridors should adequately meet future needs over the life of the plan.	2067
10262 2c	10262 2c-9	BLM greater sage-grouse Key Habitat Areas in the Planning Area are arbitrarily designated and incompatible with the January 2010 Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands including the Federal Mineral Estate memorandum authored by the Wyoming BLM State Director (State Director). The memorandum states that "WY BLM sage-grouse Key Habitat Areas correspond to the State of Wyoming's Core Population Areas (Core Areas)." Greater sage-grouse Key Habitat Areas (1,857,477 acres) do not correspond with Core Areas (1,786,237 acres) in the Planning Area. To comply with the order of the BLM State Director, the agency-designated Key Habitat Areas in the Planning Area shall not be recognized, only the Core Population Areas designated by the State of Wyoming as described in Executive Order 2011-5.	2069
10262 2c	10262 2c-10	Management by state agencies should focus on the maintenance and enhancement of Greater Sage-Grouse habitats, populations and connectivity areas identified in Attachment A. Absent substantial and compelling information, these Core Population Areas should not be altered for at least five (5) years. Constraints on domestic livestock grazing, oil, gas, and mining development projects, and the travel management infrastructure due to the presence of greater sage-grouse core areas can be onerous to economic endeavors and recreational uses. In partnership with local governments and stakeholders, the BLM shall form an interdisciplinary team to review all greater sage-grouse core areas within the Planning Area every five years. In the event of "substantial and compelling information" that would include but is not limited to a considerable population increase or decrease, abandonment or deviation in use of one or more delineated core areas, and/or an alternation of vegetation (e.g. large-scale fire, invasive weed encroachment, plant disease) that removes minimum composition and cover requirements of greater sage-grouse, the interdisciplinary team shall convene within six months to review the core area(s) suitability and validity. Mitigations - Special Designations and Other Management Areas.	2071
10262 2c	10262 2c-17	As noted above, stated management challenges for greater sage-grouse are tantamount to a laundry list of problems facing the species throughout its range, not just the Planning Area. Challenges for the greater sage-grouse include: industrial development, livestock and wildlife grazing, mining, gravel pit operations, oil and gas activity, land exchanges and disposal, vegetation manipulation, fuel reduction projects, power lines and towers, and other activities. One or more of the preceding challenges may indeed be factual for greater sage-grouse. Without field-verified data it cannot be ascertained which are real or merely perceived challenges.	2071
10262 2d	10262 2d-1	The last paragraph on page 3-167 of the RMP/EIS, and continued on page 3-168, discusses Secretarial Order 3310. Revision is required in this paragraph by	2027

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		discussing the memorandum released on June 1, 2011 by Secretary of the Interior Ken Salazar, which states that there will be no public funding for Wild Lands. The memorandum directs the BLM to not designate any lands as Wild Lands. Either include the policy changes per the June 1 memorandum or remove all Wild Lands discussion from the entire RMP/EIS.	
10262 2d	10262 2d-10	The BLM shall cite the acreage difference used to calculate the percentage reported for long-term surface disturbance and the data and source of the acreage noted in the first paragraph of this section on page 4-359 of the RMP/EIS.	2027
10262 2d	10262 2d-11	The BLM shall cite the data source and methodology for determining the acres of long-term surface disturbance noted in the first paragraph of this section on page 4-361 of the RMP/EIS.	2027
10262 2d	10262 2d-12	Page 4-361 of the RMP/EIS uses the general term “management areas.” The BLM shall replace this generic term with the specific names of management areas.	2027
10262 2d	10262 2d-13	The BLM shall cite the acreage difference used to calculate the percentage reported for long-term surface disturbance noted in the first paragraph on page 4-362 of the RMP/EIS.	2027
10262 2d	10262 2d-14	As cooperating agencies, the LGCA respectfully requests direct involvement in the BLM’s re-inventory process of LWCs. The request is based on CEQ 1501.6 (a) 2., FLPMA Section 20, and the Federal Register (FR) Vol. 70, No. 55 from March 23, 2005 that amends 43 Code of Federal Regulations Part 1610.4-3 (pg. 14562): Section 1610.4â€“3 Inventory Data and Information Collection We revised the first sentence of this section to instruct Field Managers to collaborate with cooperating agencies in arranging for the collection of data and information. Other changes for this section are editorial, and do not affect the substance of this rule. Other than a minor word change (deleting “participating” from “participating cooperating agencies”), this section remains as proposed. The amended language is as follows (FR Vol. 70, No. 55, pg. 14566): 1610.4-3 Inventory data and information collection. The Field Manager in collaboration with any cooperating agencies, will arrange for resource, environmental, social, economic, and institutional data and information to be collected, or assembled if already available.*** Direct involvement of the LGCA in the BLM LWC re-inventory process of will be a two part process. Part one will involve a webinar review between the LGCA and Caleb Hiner (BLM Project Lead) of all 56 LWC GIS polygons to compare the BLM LWC Inventory to the LGCA LWC Inventory. Inclusion of additional BLM specialists designated by Mr. Hiner as essential to this review process will be welcomed. The comparison will consist of a detailed review of all GIS data sets available and the structures found in each LWC. Review discussions will focus on structures found within LWCs that detract from wilderness characteristics. Re-designation of LWCs by the BLM, derived from the review process, will be evaluated in part two of the process. Part two will include webinar reviews of the BLM re-designated LWCs with a Bighorn Basin county commissioner and/or conservation district representative from the county in which the LWC is located. The BLM will provide their methodology and cause of re-designation for discussion with the LGCA representatives. Based on local knowledge and input of the LGCA, the BLM shall be open to further re-designations. The LGCA asserts that the two-part process would conform to the laws set forth by the Federal Register Vol. 70, No. 55 Section 1610.4-3 from March 23, 2005. All discussions and re-designations shall conform to the BLM	2027

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		LWC inventory guidelines and the Wilderness Act of 1964.	
10262 2d	10262 2d-2	The second paragraph on page 3-168 of the RMP/EIS states that the inventory processes performed by the BLM is consistent with the process for conducting such inventories and the paragraph describes three points concerning the steps involved in the process. The LWC inventory performed is in conflict with this protocol and this is supported by the fact that the BLM did not inventory for roads and the Cody Field Office did not produce maps of the LWCs. Please remove these statements unless the inventory is corrected to reflect the guidelines set forth by BLM Manual 6301.	2027
10262 2d	10262 2d-3	The fourth paragraph on page 4-168 of the RMP/EIS discusses resource values including naturalness, solitude, and primitive recreation. Add the word "apparent" to read "apparent naturalness." The BLM inventory guidelines use "apparent naturalness," not "natural integrity."	2027
10262 2d	10262 2d-4	Further, the BLM does not assess naturalness from a biological, vegetative, or scientific standpoint. The BLM version of naturalness for their wilderness characteristics inventory is essentially defined by whether or not an area looks natural to someone who may not have knowledge of the difference between natural and human-affected ecosystems. This should not be the basis for any land use planning or scientific inventory. In the same paragraph it is stated that some smaller LWCs, less than 5,000 acres, are contiguous with WSAs or are of sufficient size to manage for wilderness characteristics. That is not the case. Most LWCs adjacent to WSAs are separated from the WSAs by a road, making them noncontiguous.	2027
10262 2d	10262 2d-5	Also, several LWCs are less than 1,000 acres, which likely make them unmanageable in size (See Appendix A).	2027
10262 2d	10262 2d-6	This paragraph also discusses that impairing wilderness characteristics is appropriate within applicable requirements. The BLM must add additional language concerning lawful valid existing oil and gas leases and mining claims and rights to clarify this statement.	2027
10262 2d	10262 2d-7	The second full paragraph on page 4-355 of the RMP/EIS states "adverse impacts to LWCs occur when natural conditions are compromised." The BLM shall add "apparent" in front of naturalness and remove the word "conditions."	2027
10262 2d	10262 2d-8	The first paragraph of this section discusses how motorized vehicle use disturbs vegetation and contributes to the spread of noxious weeds, resulting in the degradation of native vegetation and diminishment of wilderness characteristics. That statement is true. However, the BLM guidelines do not reference native vegetation in assessing apparent naturalness for the determination of wilderness characteristics. In fact, the BLM advises against it. The LGCA LWC Inventory did account for noxious weeds and their effects on naturalness in the inventory (Appendix A). It is contradictory for the BLM LWC Inventory to assess naturalness on a non-scientific basis and the RMP/EIS to discuss native vegetation effects on wilderness characteristics. The BLM should correct their LWC inventory and inventory procedures to reflect inventories based on ecological naturalness, not apparent naturalness.	2027
10262 2d	10262 2d-9	The BLM shall cite the data source and methodology for determining the acres of long-term surface disturbance noted in the first paragraph of this section on page 4-356 of the RMP/EIS.	2027
10262 2d	10262 2d-16	Absaroka Mountain Foothills SRMA - If the goal of the management in this area is for semi-primitive motorized and non-motorized recreation, the RMP/EIS	2062

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		should provide more access in Travel Management designations from "limited to designated roads and trails" to "limited to existing roads and trails" in areas outside special designations such as Wilderness Study Areas and ACECs. This will provide for a more balanced approach to management.	
10262 2d	10262 2d-17	Bighorn River SRMA - Provide the names and numbers of river access sites that are available to the public. Also include whether or not undeveloped access is available.	2062
10262 2d	10262 2d-18	The last paragraph of this section lists the ERMAs located in the Planning Area. Include the Bighorn Basin ERMA in this list. It is listed in the Alternative D GIS file but not in the Alternative A GIS file. According to Caleb Hiner, BLM RMP Lead, the Bighorn Basin ERMA is all the lands left over after the current designations have been made.	2062
10262 2d	10262 2d-19	On page 4-332 of the RMP/EIS in the second bullet, there is no citation listed to support the statement. Corrective Action: Please provide a reference that supports the statement "because of less interest by younger generations, the number of hunters will decrease."	2062
10262 2d	10262 2d-20	The last sentence on page 4-332 of the RMP/EIS states: Although Alternative D manages less acreage in SRMAs than Alternative A, by managing these areas for the realization of benefits by maintaining the desired RSCC, SRMAs under Alternative D would result in more beneficial impacts to recreation experiences than under Alternative A. A result in beneficial impacts to recreation is not clarified. Please clarify benefits. Do these changes benefit primitive or motorized recreationists? If primitive recreationists are benefitted by closing roads for example, then motorized recreationists are impacted, not benefitted, and vice versa. Change this sentence to clarify which type of recreation is benefitted or state how both forms of recreation is benefitted.	2062
10262 2d	10262 2d-21	Impacts Common to All Alternatives On page 4-333 of the RMP/EIS in the first paragraph under Resource Uses, there is no citation listed to support the statement. Please provide a reference to research that supports the second sentence, "The industrialized character"	2062
10262 2d	10262 2d-22	On page 4-333 of the RMP/EIS, the last sentence under Resource Uses states that mineral development would cause mostly adverse impacts to recreation. Please discuss the increase in access that may be provided by mineral production and the beneficial impacts to motorized recreation and access.	2062
10262 2d	10262 2d-23	The last paragraph on page 4-333 of the RMP/EIS under Resource Uses discusses the negative short-term impacts of mining on recreation and wildlife. There is no discussion of the long-term benefits of reclamation, post mining. Reclamation can provide renewed biodiversity. Reclamation can establish a native and natural setting that is superior, in some cases, to the surrounding landscapes. Please discuss the long-term benefits of reclamation to habitat and recreation.	2062
10262 2d	10262 2d-24	On page 4-334 of the RMP/EIS in the first sentence of the third paragraph, this statement could imply that only non-motorized recreation users are seeking solitude and allowing motorized use "degrades" the setting. Corrective Action: Edit last part of sentence. "while impairing those recreation users seeking a non-motorized recreation experience" at the end of the sentence.	2062
10262 2d	10262 2d-26	The paragraph further states that off-road motorized use for livestock support would create new trails causing new conflicts, contrast elements to the scenic characteristics, and would interfere with recreationists goals, experience, and	2062

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		benefits. The paragraph does not discuss the benefits of new trails to motorized recreationists. Clarify these impacts are to primitive recreationists and further, support the benefits of new trails to motorized recreationists.	
10262 2d	10262 2d-27	The third paragraph on page 4-335 of the RMP/EIS under Resources discusses the impacts of fire to recreation. It states that long-term wildland fire impacts may degrade and displace recreation but would also create new recreation opportunities. Please names these new opportunities resulting from wildland fires and cite references documenting these opportunities.	2062
10262 2d	10262 2d-28	The first paragraph on page 4-336 of the RMP/EIS discusses that the modification of the natural environment in VRM class III and IV may detract from recreational activities for the primitive recreationists. Please add discussion on how these alterations may benefit motorized recreationists from a new road and trail and access perspective.	2062
10262 2d	10262 2d-30	The first paragraph on page 4-340 of the RMP/EIS discusses the recreational use of the Spirit Mountain cave and the managing of cave and karst resources under the Worland Caves SRMA to provide recreation opportunities. According to Caleb Hiner, BLM RMP Lead, the Worland Caves SRMA location is sensitive information. The LGCA discovered this during a phone conversation with Mr. Hiner in an attempt to gather accurate, complete RMA GIS files. If the location of the Worland Caves SRMA is sensitive information and not divulged to the cooperating agencies, let alone the public, how does this area provide recreational opportunities? This needs to be clarified. If the Worland Caves SRMA is providing recreational opportunities then the location should be divulged and the GIS file provided to the LGCA or if the location is indeed sensitive then the Worland Cave SRMA would not provide for recreational opportunities and the statements should be removed.	2062
10262 2d	10262 2d-31	The third paragraph on page 4-340 of the RMP/EIS discloses that 30,000 acres will be affected from projected timber harvest. The BLM will cite the source and data for which this information was derived.	2062
10262 2d	10262 2d-32	On page 4-341 of the RMP/EIS, Table 4-15 in the first paragraph under RMAs identifies seven SRMAs rather than eight as noted in the text. Corrective Action: Please edit text to the correct number.	2062
10262 2d	10262 2d-33	On page 4-341 of the RMP/EIS, the second paragraph in the SRMAs section discusses applying NSOs on all or part of the listed SRMAs. The BLM will correct the paragraph by adding discussion of which SRMAs are all NSO and which are partially NSO, as well as list the acres or percentages of NSO for each SRMA.	2062
10262 2d	10262 2d-34	In the first paragraph on page 4-342 of the RMP/EIS, the last sentence discusses Rattlesnake Ridge health risks from high levels of H2S gas potential from OHV use in the area. The BLM will cite the data source of this information and what exposure ranges are considered high risk. Also the BLM must discuss the levels of H2S gas currently in the area.	2062
10262 2d	10262 2d-35	The first paragraph on page 4-342 of the RMP/EIS states 10,882 acres of long term disturbance. The BLM will cite the data and source of these acres.	2062
10262 2d	10262 2d-36	The first paragraph in this section, on page 4-342 of the RMP/EIS, states 5,000 acres of long term projected surface disturbance from mining. The BLM will cite the data and source of these acres.	2062
10262 2d	10262 2d-37	The second paragraph on page 4-345 of the RMP/EIS states a projected timber harvest of 20,000 acres. The BLM will cite the data and source of these acres.	2062
10262 2d	10262 2d-	The third paragraph on page 4-345 of the RMP/EIS discusses using vegetation	2062

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
	38	treatments to manage towards 75% Historical Climax Plant Community (HCPC). The BLM will cite the source of why 75% HCPC is desired. Also see vegetation comments concerning this issue.	
10262 2d	10262 2d-39	The fifth paragraph on page 4-345 of the RMP/EIS discusses how impacts of cultural sites are similar to Common to All Alternatives, but to a greater extent. The BLM will rewrite this sentence because the impacts from cultural sites by alternative would not be similar given the buffer for protection of cultural sites varies greatly by alternative	2062
10262 2d	10262 2d-15	2. In the Final RMP/EIS, the BLM shall assess the percentage of ROW corridor capacity that is currently in use, and use that information to revise ROW corridor designations for all alternatives. The LGCA will provide a map and GIS shapefile of proposed new Alternative D ROW corridors.	2067
10262 part 2a	10262 part2a-7	On page 5-514 it states that surface-disturbing activities (e.g., construction of well pads and roads, pits and reservoirs, pipelines and power lines, mining, and vegetation treatments), OHV use, fire and fuels management, some recreational activities, concentrated herbivory, and operation and maintenance of existing facilities and infrastructure in the Planning Area would cause fugitive dust, exhaust emissions, and smoke, thereby adversely affecting air quality through the release of HAPs, VOCs, CO, SO2, NO, and PM10 into the atmosphere. In addition, these activities would release CO2, CH4 (primarily from livestock grazing), and other GHGs into the atmosphere.	2009
10262 part 2a	10262 part2a-8	Additionally, please remove concentrated herbivory and (primarily from livestock grazing) as these activities are not considered surface-disturbing activities.	2011
10265	10265-2	The Draft RMP fails to sufficiently describe the width of the preferred ROW corridors. Each of the alternatives in the Draft RMP describes acreage available for ROW corridors. However there is no accompanying narrative that describes the actual width of any specific corridor. The calculation of the acreage available in the ROW corridors necessarily included an assumption of width and length of the ROW corridors but those assumptions are not stated. The WPA is concerned that without an explicit discussion of the width of the corridors that it is impossible for the WPA or other interested parties to analyze whether any given corridor is "used up" by existing infrastructure.	2066
10265	10265-3	The Draft RMP fails to include a ROW corridor along an existing large diameter natural gas pipeline currently providing critical service within and through the basin There is currently a 16-inch diameter interstate natural gas pipeline operated by Colorado Interstate Gas Company that trends along a north south axis through the middle of the Bighorn Basin. This existing line and ROW is acknowledged on Map 51. The Draft RMP states that at renewal, existing ROW agreements will be preserved and "allowed to continue without cost prohibitive restrictions where appropriate." (Emphasis added). 3(Footnote: 3"Draft"RMP,"Volume"II,"p."45311"). However, in spite of the recognition that activity will continue along that existing 16-inch diameter interstate natural gas transmission line, the ROW corridor associated with that existing 16-inch line is absent from alternatives B, C and D and maps 52, 53 and 54 respectively. No discussion is provided in the Draft RMP to account for the elimination of this specific existing ROW corridor from consideration as a corridor for future ROW demands.	2066
10265	10265-1	1. The Draft RMP fails to account for ROW that will be required for a carbon dioxide pipeline in the Bighorn Basin The analysis of the ROW requirements	2067

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		under the four alternatives is focused on the movement of oil and gas out of the Bighorn Basin. The focus of the Draft RMP on the movement of products out of the Bighorn Basin is evident from the statement in the Draft RMP: "Oil and gas production in the Planning Area is expected to continue to come from established fields that already have adequate infrastructure such as roads, power lines, and gathering/transmission lines" 1. The addition of a carbon dioxide pipeline to the Bighorn Basin requires an analysis of the ability of the ROW corridors in the various alternatives to support the addition of a carbon dioxide pipeline and the necessary lateral lines that would move carbon dioxide from a trunk carbon dioxide pipeline system to individual areas suitable for enhanced oil recovery activity. The development of a carbon dioxide pipeline in the Bighorn Basin is supported by an abundance of recent commercial activity related to carbon dioxide supply and pipelines in Wyoming. Denbury Resources Inc. ("Denbury") is currently constructing approximately 230 miles of 20-inch diameter pipeline to move carbon dioxide from the Lost Cabin Gas Treating Plant (the "Lost Cabin Plant") in Fremont County, Wyoming to locations in the Powder River Basin and beyond. The supply of carbon dioxide at the Lost Cabin Plant is approximately 50,000 thousand cubic feet ("mcf") per day.	
10262_part 3	10262_part 3-43	Chapter 3, in the Draft RMP/EIS needs to provide specific data in the existing condition section to support ACEC designation. The Chapter 3 information on ACECs is not adequate to justify the need for special management nor does it describe the detail noted in the CEQ requirements for the affected environment (Sec. 1502.15 Affected environment. "Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced." The LGCA believes that the ACEC designation is very important and the BLM needs the best data available to make these decisions. The BLM Planning Handbook notes: Designate ACECs and identify goals, standards, and objectives for each area, as well as general management practices and uses, including necessary constraints and mitigation measures (also see BLM Manual 1613). This direction should be specific enough to minimize the need for subsequent ACEC management plans. ACECs must meet the relevance and importance criteria in 43 CFR 1610.7-2(a) and must require special management (43 CFR 1601.0-5(a)) to: a) Protect the area and prevent irreparable damage to resources or natural systems; and, b) Protect life and promote safety in areas where natural hazards exist. Given the long term history of use of resources in the Bighorn Basin, we have not seen compelling rationale that these areas "require special management" as noted in the special area designation section of the BLM Planning Handbook.	2001
10262_part 3	10262_part 3-44	The first paragraph under the Big Cedar Ridge section lacks citations for the fossilized plants found within the area. The BLM will provide citations for the research documenting the fossilized plant communities found, and the rationale for, preservation of these plant communities.	2001
10262_part 3	10262_part 3-45	This paragraph also states that fossilized plant communities are very rare. The BLM must cite the source that discloses that the plant communities are very rare.	2001
10262_part 3	10262_part 3-46	The second paragraph, under the Big Cedar Ridge section, discusses the popular recreational activity of fossil collecting within this ACEC. It seems contradictory that the ACEC is designated to protect the intact fossil record but the public is allowed to collect and remove fossils. The BLM should either protect this area, with substantiated documentation, or remove the ACEC designation to allow for	2001

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		recreational fossil collecting.	
10262_part 3	10262_part 3-47	The first paragraph under the Red Gulch Dinosaur Tracksite section states that the tracksites are one of only a few found in the world. This is the first of three similar statements. Are the few that are found in the world all in Wyoming? The BLM shall cite the source of this information and identify the other known areas of dinosaur track occurrences in or outside of Wyoming.	2001
10262_part 3	10262_part 3-48	The Spanish Point Karst ACEC designation is proclaimed as needed because the area is an important recharge source for the Madison Aquifer. The Madison Aquifer is found beneath eight states in the U.S. and Canada: Montana, North Dakota, Wyoming, South Dakota, Nebraska, Alberta, Saskatchewan, and Manitoba. Limestone, Madison limestone in particular, rims the western flank of the Big Horn Mountains where Spanish Point Karst ACEC is found. Substantiate this ACEC designation by citing research that validates this area as of greater importance than other areas in the Big Horn Mountains with similar geologic and hydrologic settings or remove the ACEC designation.	2001
10262_part 3	10262_part 3-49	The Carter Mountain ACEC designation cites protecting fragile soils and alpine tundra. Why are these soils deemed fragile? Alpine tundra exists throughout the Beartooth Plateau and Absaroka Mountains. What makes this area of tundra more important and deserved of protection than other areas of alpine tundra? Cite the research that delineates these soils as fragile and the research separating the alpine tundra on Carter Mountain as more important than other areas of alpine tundra.	2001
10262_part 3	10262_part 3-50	The BLM cites the scenic value as well, as elk and mule deer winter ranges, for proposed expansion of the Carter Mountain ACEC. Scenic areas and winter ranges exist throughout the entire Absaroka Front. Cite the research that separates this area of scenic beauty from other beautiful areas on the Absaroka Front.	2001
10262_part 3	10262_part 3-51	Also, cite the research substantiating that this area of crucial winter range is more important than other crucial winter ranges. If the BLM cannot substantiate the scientific facts presented to expand the Carter Mountain ACEC, then the ACEC designation should be removed.	2001
10262_part 3	10262_part 3-52	The Carter Mountain ACEC proposed expansion cites the same fragile soils, alpine tundra, and crucial winter range without any references to validate this information. It also states that raptors, a BLM special status species, and special status species plants are found in the area. There is not a list of raptors or plants, or reference to data to support this claim. Provide the references to this information or remove the ACEC designation.	2001
10262_part 3	10262_part 3-53	The Five Springs Falls ACEC designation is based on four nearby endemic rare and sensitive plant species. The plant species are not listed and neither is a data source(s) for this information. Cite the source of the information used in the ACEC designation or remove the ACEC designation.	2001
10262_part 3	10262_part 3-54	The Little Mountain ACEC is proposed for expansion in part to protect potential lynx habitat. The area contains six lynx analysis units (LAU), three of which contain very little forested vegetation (2009 NAIP aerial photo review); one of which is an island of forested vegetation surrounded by open sage/grasslands, removing connectivity to other forested areas. The three forested LAUs appear to have multi-storied hare habitat on the northern and eastern aspects indicative of the thick coarse texture of the forest vegetation disclosed on the 2009 NAIP aerial photos. All forested areas within the LAUs are narrow stringers	2001

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		of forest, not large expansive forested areas typical of potential/suitable lynx habitat. Only 6,821 out of 89,145 acres are in LAUs, half of which are at best questionable. There are no known occurrences of lynx or critical lynx habitat in the Planning Area. Removal of the potential lynx habitat as one criterion for the ACEC expansion nomination must occur by the BLM. The BLM should consider reviewing expansion, only incorporating within the ACEC the curl-leaf mountain mahogany area for protection. Greater sage-grouse habitat and winter range can be found throughout the entire Planning Area, making the remaining motives for this ACEC expansion dubious. The BLM should either provide a solid science-based justification for this expansion or remove the expansion altogether.	
10262_part 3	10262_part 3-55	The Chapman Bench proposed ACEC rationale cites sagebrush habitat used by sensitive bird species and other wildlife. Sage grouse, mountain plover, and long-billed curlew are cited to use the area. The sensitive bird species have evolved over time to thrive in disturbed areas (Beauvais and Smith 2003; Dechant et al. 2002b; Knopf and Wunder 2006; Manning and White 2001). Why protect this area from surface disturbance when the sensitive species in the area thrive on surface disturbance? Remove the NSO and replace the constraint with a TLS for breeding/rearing seasons on Chapman Bench ACEC to allow surface disturbance commensurate with the disturbance regimes needed by these sensitive species.	2001
10262_part 3	10262_part 3-56	Also, there is no map, data, or references to show where the Audubon Society important bird area actually is located. The BLM must cite this information, as it is a rationale component for designating Chapman Bench an ACEC.	2001
10262_part 3	10262_part 3-57	The Rainbow Canyon is proposed for ACEC status due to the Cloverly Formation and scenic badlands. This designation seem arbitrary as there are large areas of badlands in the Bighorn Basin that are scenic, and the Cloverly Formation rims a significant portion of the foothills of the Big Horn Mountains (GIS Bedrock 500K map review). What makes this area outstanding compared to other areas of scenic beauty within the Cloverly Formation along the foothills of the Big Horn Mountains? There is no substantive rationale for this designation and the BLM should remove the proposed ACEC designation.	2001
10262_part 3	10262_part 3-58	Rattlesnake Mountain is proposed for ACEC designation by the BLM. Yet, the agency rationale for designation is generalized, without any supporting documentation. Winter ranges occur throughout the Absaroka Front, while elk parturition areas are an out of date concept. Parturition areas are ever changing with the reintroduction of wolves and an expanding grizzly bear population. The cold water fishery of the North Fork of the Shoshone River is misrepresented when considering that no reach of the river flows through the proposed ACEC. Sensitive plants species, cited as a portion of the designation, are not identified. Either cite the research, data, and analysis of these designation rationales or remove the ACEC designation.	2001
10262_part 3	10262_part 3-59	As with Rattlesnake Mountain, the criteria disclosed by the BLM for proposing Sheep Mountain as an ACEC is generalized and sans research, data, or analysis citations. Winter ranges are found up and down the Absaroka Front and parturition areas for elk are an out of date designation. Parturition areas are ever changing with the re-introduction of the wolves and the thriving grizzly bear population. The existence of potential lynx habitat is misleading since there are no LAUs within the area, it is almost completely lacking of forested vegetation, there is no defined lynx habitat, and no critical lynx habitat in the	2001

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		area. Are the visual alignments of the solstice not available in the Rattlesnake Mountain ACEC, which is only 3.5 miles away? Are there not other areas providing visual alignment of the solstice? The BLM shall remove the ACEC designation or properly substantiate the designations with research, data, and analysis.	
10262_part 3	10262_part 3-60	However, each proposed ACEC lacks references, data, and analysis to substantiate the claims extended by the BLM. CEQ Section 1502.15 mandates that data and analysis in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Along with ACEC designation, come major management actions or restrictions on multiple uses and resource development. Restrictions on resource development cause major socioeconomic impacts. CEQ Section 1502.15 states less important material are at the least referenced. ACEC designations are far beyond "less important," yet the BLM fails to cite or reference data or analysis for the ACEC designations. The BLM will cite all research, data, and analyses used for the ACEC designations or remove them from potential nomination.	2001
10262_part 3	10262_part 3-16	There are also several areas in the management action Table 2-5 (RMP/EIS pg. 2-160 - 162) that states management must be consistent with "other resource objectives," but does not disclose which resources or objectives. These other resource management actions could have significant impacts to livestock grazing but are not disclosed in the RMP/EIS. If management actions cannot be identified or disclosed that is not "consistent with other resource objectives" then this statement should be removed from all management actions.	2011
10262_part 3	10262_part 3-18	In Table 2-5 Objective LR10.2 provides for the establishment of voluntary reserve common allotments but they are not defined or locatable on any maps. Please provide a definition of reserve common allotments, where they are located, the AUMs available on these allotments, the management actions associated with these areas, who will qualify to use them, what are the impacts to AUMs and will grazing preference be maintained for these allotments?	2011
10262_part 3	10262_part 3-19	Record 6281 of Table 2-5 references Appendix W in Alternative A and carries this management action to Alternative D. However, Appendix W is Utilization Levels which is one component of an AMP. Change Alternative D to Same as Alternative C. This is more appropriate because it ties forage availability to Appendix W.	2011
10262_part 3	10262_part 3-20	Record 6283 Alternative D management action is confusing. Is livestock utilization not an appropriate use of produced water because of other resources? Please clarify what other resources would be considered or change the management action to the same as Alternative A.	2011
10262_part 3	10262_part 3-21	In Table 2-6 Summary of Environmental Consequences by Alternative it displays impacts to AUMs by closures or surface disturbing activities. There is no disclosure of impacts due to conflicts, inconsistencies or whether livestock grazing is compatible with other resource uses or changes in utilization levels. For example, on page 2-80 in Table 2-5 the Sage Grouse Objective BR: 9.1 states "Maintain large patches of high quality sagebrush habitats, with emphasis on patches occupied by greater sage-grouse." Is this objective compatible with livestock grazing? With 1.8 million acres identified as key sage-grouse habitat, the public needs to know what uses are in conflict, inconsistent or incompatible with livestock grazing in order to understand the impact this objective will have on livestock grazing.	2011

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10262_part 3	10262_part 3-22	In addition, in Appendix W - Utilization there is a footnote one to Table W-1 which states in part that where extensive wildlife use occurs utilization levels may need to be adjusted downward to ensure that total utilization of current year's growth following the use period of wildlife does not exceed the prescribed level of dormant use. Why is wildlife use being given priority over grazing? What are the impacts of this policy? Additionally, why did the BLM not analyze changing levels of utilization by alternative?	2011
10262_part 3	10262_part 3-23	Prior to any reduction in AUMs or adjustments in utilization levels due to wildlife use the RMP should direct the BLM to provide multiple year monitoring data to support the reductions and provide reasonable alternative areas to graze to replace the AUMs lost due to excess wildlife use. No AUMs will be reduced due to excessive wildlife use in areas where wildlife population objectives have been met or exceeded.	2011
10262_part 3	10262_part 3-25	Prior to any changes in grazing management because rangeland objectives are not being met the BLM must provide multiple year monitoring data (3 of 5 years) to document that grazing is the cause. If other resource uses are the cause of rangeland objectives not being met then that resource use will be changed. No changes in grazing management will be implemented as a result of other resources not meeting rangeland standards. Or if the resource has been used to a degree where livestock grazing is not available other reasonable areas will be provided to replace lost AUMs as a result of other resource use.	2011
10262_part 3	10262_part 3-26	Animal Unit Month Allocations The use of the terms active use, permitted use and authorized use are confusing. Is active and authorized use the same? For long-term planning purposes which use can operators plan on and why is there no mention of grazing preference and those AUMs? Please include a description of these terms, include grazing preference and AUMs held in suspension in the existing conditions so it is clear what is potentially allowed for grazing.	2011
10262_part 3	10262_part 3-27	In Appendix P the AUMs in column 7 are labeled Active Use however there should also be a column for Preference which includes active use and use held in suspension. This will disclose the total number of animal unit months on public lands apportioned and attached to base property owned or controlled by a permittee, lessee, or an applicant for a permit or lease.	2011
10262_part 3	10262_part 3-31	Please provide the AUMs that could be affected due to maintenance of sagebrush and understory diversity in crucial seasonal greater sage-grouse habitat. If DPC is going to be used to regulate livestock grazing please provide the number of acres that have achieved DPC (or not) and the impacts to grazing as a result of DPC.	2011
10262_part 3	10262_part 3-33	Please provide the policy, law, or regulation that allows preferential use by wildlife over livestock.	2011
10262_part 3	10262_part 3-34	Provide the impacts for management action that limit, reduce, or prohibit AUMs.	2011
10262_part 3	10262_part 3-35	Please provide the data and best available science to support the designation of elk parturition habitat to justify no grazing in these areas.	2011
10262_part 3	10262_part 3-36	Please provide information on reserve common allotments and the environmental consequences they will have on livestock grazing.	2011
10262_part 3	10262_part 3-39	1. The BLM must remove footnote 1 from Table W-1 in Appendix W.	2011
10262_part	10262_part	However, there are a few topics which are not yet adequately addressed. In particular, the communities of place, under social organization and institution,	2046

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3	3-62	states that "Local and regional population centers relative to planning area effects may differ by community."	
10262_part 3	10262_part 3-63	However, there are a few aspects which are not yet adequately addressed. The space aspect, for example, indicates that impact analysis should address impacts across multiple geographic scales. In particular, the impact analysis should assess how alternatives will affect individual communities within the Planning Area. However, the RMP/EIS describes impacts across the region as a whole, with no analysis of impacts to individual communities.	2046
10262_part 3	10262_part 3-64	The current alternatives of Chapter 2 contain little socioeconomic information. Section 2.3.7 Socioeconomic Resources in the RMP/EIS states that "None of the alternatives considered and subsequently eliminated from detailed analysis dealt with this resource." However, in Section 2.3 Alternatives Considered but not Carried Forward for Further Analysis, these alternatives include topics such as: No new oil and gas leasing; Emphasize the protection of resources by removing human resources; Prohibit or exclude wind energy, oil and gas leasing, off-highway vehicle use, and livestock grazing; Suspend or eliminate all existing federal minerals leasing Each of these has the potential to affect the local communities. As the alternatives described in this section were not carried forward for detailed analysis the inclusion of these under socioeconomics should not substantially alter the preferred alternative. However, we felt it was important to highlight the lack of effort applied to the topic of socioeconomics.	2046
10262_part 3	10262_part 3-65	Table 2-4 in the RMP/EIS Key Terms and Concepts by Resource Area also highlights the lack of socioeconomic consideration. The only term or concept that pertains to socioeconomics is mitigation. This carries the implication that socioeconomics will not be considered until after all other decisions are made and then the effects to the local communities will be mitigated. Socioeconomics should also be listed for the following concepts or terms: Cooperation with agencies/government/landowners/stakeholders; Geothermal; Livestock grazing; Migration corridors; Mineral Leasing/Lease; Motorized vehicles concepts and terms; Oil and gas; Public Access; Rangeland; Recreation; Renewable energy (wind, biomass, solar); Timber harvest/firewood (personal use)/poles; Well (oil and gas); Withdrawal; Wyoming Standards for Health Rangelands Each of these resource topics has a potential effect of the human communities of the planning area. Alternatives dealing with these concepts should be considered from a socioeconomic viewpoint.	2046
10262_part 3	10262_part 3-66	On page 3-204, this section states that it "concerns the custom, culture, and history of the area as it relates to human settlement, as well as current social conditions." However, the relevant sections simply refer the reader to a different section of the document, the Visual and Cultural Resources section. This referenced section does not contain economic and social history. This information is crucial to understanding the interconnectedness of the communities of the planning area to the lands under BLM management.	2046
10262_part 3	10262_part 3-67	On page 3-207, this section states that "at the local level, an aging population does not necessarily create substantial problems." This statement does not consider the implications of a smaller portion of the population being of working age. The smaller portion of people working, coupled with the wage disparity between jobs in the mining industries and those in service industries, create a situation in which it is often difficult for employers to find workers at a wage they can pay. This can become a challenge for communities, particularly if the mining industry experiences a boom.	2046

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10262_part 3	10262_part 3-68	Transient populations in the oil and gas industry, particularly during boom years, are difficult to quantify. Also, many oil and gas workers live in a population center in one county, but work in another county. This is an important aspect of the population and the analysis would benefit from a more detailed description of these occurrences.	2046
10262_part 3	10262_part 3-69	On page 3-211, this section refers the reader the Cultural and Visual Resources Section. However, the referenced section contains no history of how the communities in the planning region developed. The role that mining and ranching had in developing and shaping the communities of the communities, and the importance of the multiple-use aspect of public lands, is vital to understanding how the communities are affected by policies of the RMP/EIS. For instance, in part due to revenues obtained from activities on federal lands, Wyoming residents pay no personal, state income tax. In addition, the growing role of recreation and amenity ranches is also important to understand the present conflicts.	2046
10262_part 3	10262_part 3-71	On page 3-217, this section states that "Because the BLM manages subsurface minerals in excess of the surface lands it administers, its decisions can have a potentially large effect on mining in the Planning Area. From an economic perspective, mining is a key contributor to the economic well-being of the Planning Area and therefore the BLM's management decisions in this area could have a potentially large effect on economic conditions." For this reason, it is imperative that the RMP/EIS adequately describes and quantifies that mining industry.	2046
10262_part 3	10262_part 3-72	The communities of the Planning Area value the multiple-use characteristic of the public lands. The majority of their public infrastructure is funded by oil and gas development, but they realize that sustainable use is important to the future recreational enjoyment of the lands. It is important to the LGCA that the costs and benefits of oil and gas exploration and development under each alternative are presented as accurately as possible to decision-makers. In order to accomplish this, economic benefits from oil and gas and costs of stipulations and mitigation should be provided in the highest level of detail possible.	2046
10262_part 3	10262_part 3-73	This section would benefit from data on travel and tourism in Park County that is attributable to Yellowstone National Park. This would help the reader to assess recreation attributable to BLM.	2046
10262_part 3	10262_part 3-74	Table 3-62 on page 3-220 details the trend in the increase in number of farms, accompanied by a decrease in the acres. A narrative describing this trend, subdividing large commercial ranches into small amenity based ranchettes, would help the reader understand the current state of ranching.	2046
10262_part 3	10262_part 3-75	The impacts by alternative described in the Environmental Consequences section are based on the data inputs described in Appendix X of the RMP/EIS, Economic Impact Analysis Methodology. Unfortunately, the input data for oil and gas is considered vastly underestimated by the LGCA and those in the oil and gas industry. Also, the ambiguity surrounding the possible reductions in AUMs by alternative has created inaccurate input data and impacts for ranching. By vastly underestimating the potential output of oil and gas in the Planning Region during the next twenty years, the RMP/EIS fails to accurately capture the impacts on the social and economic resources of the planning region. Table 4-5 and 4-7 of the RMP/EIS provide that projections for oil and gas wells and production during the 20 years of the plan based on the RFD. Alternative C, the highest production alternative, is projected to have 1,257	2046

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		wells drilled and decreasing production amounts each year of the plan for both oil and gas. An analysis conducted on the 571,278 acres of Lands with Wilderness Characteristics in the BLM's original inventory, indicated the potential for 569 wells. These lands compose 18% of the surface area managed by BLM and 14% of the Federal Mineral Estate acres in the Planning Area. Carrying the potential to the remaining acres, our analysis indicates that the number of potential wells could be as high as 4,064 wells drilled.	
10262_part 3	10262_part 3-76	On the impact side, according to Table 4-23 of the RMP/EIS, the impacts on annual employment from oil and gas range from 505 jobs to 1,263 jobs. The LWC analysis indicated that the 14% of federal mineral lands have the potential to create 434 jobs annually from drilling and completion of wells (see Appendix C to this comment document - Economic Analysis of Lands with Wilderness Characteristics). If this is applied to the entire planning region the potential annual employment could be as high as 3,100 annual jobs. This is a vast difference from the RMP/EIS and according to industry experts may still be an underestimation.	2046
10262_part 3	10262_part 3-77	Neither the RFD nor the RMP/EIS analyzes the economic and employment potential of unconventional oil and gas plays in the Mowry Shale Formation of the Bighorn Basin. Additionally, the RMP/EIS does not adequately disclose the constraints associated with resources protections in the Mowry Shale Formation. To accurately assess constraints in the Mowry Shale Formation, the LGCA conducted a risk assessment (Map 1) (see Mineral Resources comments). Further, the LGCA used IMPLAN, an economic input-output model, to determine potential employment and tax revenue from the Mowry Shale Formation over the 20-year life of the RMP. The end product of modeling discloses that the Mowry Shale Formation could generate, depending on the level of constraints, from 1.2 million to 2.3 billion dollars in tax revenues (Table 16) and 632 to 11,499 direct employment opportunities (Table 17) over the estimated 20-year life of the RMP. The data included in Table 16 and Table 17 are estimates. Depending upon the actual volume of minerals in the Mowry Shale Formation, projections below could be lesser or greater. [Table 16 Potential Taxes Generated from the Mowry Shale Formation over the Life of the RMP] [Table 17 Employment Potential in Leased Acres of the Mowry Shale Formation over the Life of the RMP]	2046
10262_part 3	10262_part 3-79	2. The BLM will ensure that the data used from other resource areas is accurate. The BLM will consider an oil and gas boom scenario (based on new information such as Enhanced Oil Recovery) in the planning region and assist in the development of mitigation measures for oil and gas to follow should a boom occur. In addition, the BLM shall address the issue of the interconnectedness of large-scale ranches and BLM lands and how to mitigate should policies that result in reduction of useful AUMs occur.	2046
10262_part 3	10262_part 3-80	3. The BLM will include the social and economic history of the Bighorn Basin, in particular the interconnectedness of communities and public lands. This information is important to assess the social and economic role that the decisions of the BLM have on the communities.	2046
10262_part 3	10262_part 3-81	4. The BLM shall complete impact analyses for individual communities within the Planning Area. Each community is socioeconomically unique. Action alternative will have different impacts on individual communities.	2046
10262_part 3	10262_part 3-38	Upon review of the glossary definitions of surface disturbing activities, inconsistencies were discovered in the definitions between RMPs. According to	2054

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		Keith Grant and Dan Rice (LGCA members), Mr. Hiner reported that the definitions found within the glossary are policy and are consistent with the definitions of other RMPs. James K. Murkin, Acting Associate Wyoming State Director of the BLM, released Information Bulletin No. WY-2007-029 on September 4, 2007. The Information Bulletin, with the subject line "Guidance for Use of Standardized Surface Use Definitions," is germane to the incorrect definition of "surface disturbing activities" in the Draft RMP/EIS. As a guidance tool based on requests from field managers, Mr. Murkin prepared the bulletin to standardize the definitions of commonly used terms in RMPs and EISs. Clearly, by reviewing the five definitions below, the BLM has failed to implement the Information Bulletin. The following discloses the differences in definitions of surface disturbing activities between RMPs for Rawlins, Casper, Kemmerer, Grass Creek, and Bighorn Basin planning areas. Rawlins RMP: Surface Disturbance: Any action created through mechanized or mechanical means that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation. Examples of surface disturbance include construction of well pads, pits, reservoirs, pipelines, and facilities (e.g., parking lot and tanks). Casper RMP: Surface-disturbing Activities (or Surface Disturbance): The physical disturbance and movement or removal of land surface and vegetation. These activities range from the very minimal to the maximum types of surface disturbance associated with such things as off-road vehicle travel or use of mechanized, rubber-tired, or tracked equipment and vehicles; some timber cutting and forest silvicultural practices; excavation and development activities associated with use of heavy equipment for road, pipeline, power line and other types of construction; blasting; strip, pit, and underground mining and related activities, including ancillary facility construction; oil and gas well drilling and field construction or development and related activities; range improvement project construction; and recreation site construction. Kemmerer RMP: Surface-disturbing Activity: An action created through mechanized or mechanical means that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation. Examples of surface disturbance include construction of well pads, pits, reservoirs, pipelines, and facilities (e.g., parking lot and tanks).Grass Creek RMP: Surface-Disturbing Activities (or Surface Disturbance): The physical disturbance and movement or removal of the land surface and vegetation. It ranges from the very minimal to the maximum types of surface disturbance associated with such things as off-road vehicle travel or use of mechanized, rubber-tired, or tracked equipment and vehicles; some timber cutting and forest silvicultural practices; excavation and development activities associated with use of heavy equipment for road, pipeline, power line and other types of construction; blasting; strip, pit and underground mining and related activities, including ancillary facility construction; oil and gas well drilling and field construction or development and related activities; range improvement project construction; and recreation site construction. Bighorn Basin RMP Revision: Surface Disturbing Activities: These are Public Land resource uses/activities that disturb the endemic vegetation, surface geologic features, and/or surface/near surface soil resources beyond ambient site conditions. Examples of surface disturbing activities include: construction of well pads and	

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		roads, pits and reservoirs, pipelines and power lines, and most types of vegetation treatments (e.g., prescribed fire, etc.). NOTE: Some resource uses, commodity production and other actions that remove vegetative growth, geologic materials, or soils (e.g., livestock grazing, wildlife browsing, timber harvesting, sand and gravel pits, etc.) are allowed, and in some instances formally authorized, on the Public Lands. When utilized as a land use restriction (e.g., No Surface Disturbing Activities), this phrase prohibits all resource use or activity, except those uses and activities that are specifically authorized, likely to disturb the endemic vegetation, surface geologic features, and surface/near surface soils. Review of the preceding definitions revealed that only the Draft Bighorn Basin RMP is considering livestock grazing, wildlife browsing, and surface fire disturbance activities. This inclusion is inconsistent with other surface disturbing activities RMP glossary definitions. Surface disturbing activities should be limited to mechanical means, especially when there is a change in soil composition. This would remain consistent with other RMP definitions. The BLM must remove livestock grazing, wildlife browsing, and fire from the definition of surface disturbing activities to remain consistent with other RMP definitions. The Grass Creek RMP definition is very clear and should be used in the Big Horn Basin RMP. It does not consider livestock grazing and wildlife browsing as surface disturbing activities as is implied in the Big Horn Basin Draft RMP definition. The implication in the definition that unless "authorized" grazing and wildlife browsing is considered surface disturbing needs to be supported by some research or the best available science for this determination.	
10262_part 3	10262_part 3-1	The first paragraph in this section on page 4-347 of the RMP/EIS states 41,545 acres of long-term surface disturbance is projected. The BLM will cite the data and source of this information.	2062
10262_part 3	10262_part 3-10	The last paragraph on page 4-352 of the RMP/EIS discusses forest management and silviculture techniques. Previous sections for each alternative have disclosed the amount of projected timber harvest acres. The BLM will disclose timber harvest acres for Alternative D and cite the data and source of the information.	2062
10262_part 3	10262_part 3-11	The first paragraph on page 4-353 of the RMP/EIS discusses vegetation treatments managing toward a 65% HCPC. The BLM will cite the data and source for this information. Also, see vegetation section for comments regarding this issue.	2062
10262_part 3	10262_part 3-12	The second paragraph under the RMA section on page 4-353 of the RMP/EIS discusses the 12 SRMAs are substantially smaller in Alternative D than A. What is substantially smaller? The BLM will cite the acreage difference.	2062
10262_part 3	10262_part 3-13	2. The Recreation sections of this RMP/EIS mentions in several places the Recreation Setting Characteristics Condition (RSCC). It discusses maintaining the RSCC and retaining the RSCC. The document does not describe what the RSCC is for any of the areas where the BLM will be maintaining or retaining the RSCC. The BLM will describe the desired RSCC for all areas in which the RSCC is mentioned and not explained. The BLM will relate the desired RSCC to the mineral constraints or surface occupancy restrictions within each SRMA, ERMA, and RMZ. In addition, the BLM will provide the data and research conducted to rationalize the decisions on surface occupancy restrictions. If the BLM cannot provide the data and research rationale of the surface constraints in relation to the RSCC then they shall not impose those restraints specific to the SRMAs,	2062

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		ERMAs, and RMZs.	
10262_part 3	10262_part 3-2	The first paragraph of this section states 10,000 acres of long-term disturbance are projected from mining. The BLM will cite the data and source of this information.	2062
10262_part 3	10262_part 3-3	The last paragraph on page 4-348 of the RMP/EIS discusses adverse impacts to local tourism from the lack of WSR designations. The BLM will cite the number of tourists that visited the WSRs and the revenue generated from these tourists. Also, cite the anticipated loss of revenue from the tourists that will not visit these river reaches due to loss of WSR designation. If this cannot be quantified, then remove the statement.	2062
10262_part 3	10262_part 3-4	The fourth paragraph of this section on page 4-349 of the RMP/EIS states that there will be 40,000 acres of timber harvest throughout the planning period. The BLM will cite the data and source of this information.	2062
10262_part 3	10262_part 3-6	The first paragraph of this section on page 4-351 of the RMP/EIS states 28,079 acres of long-term surface disturbance is projected. The BLM will cite the data and source of this information.	2062
10262_part 3	10262_part 3-7	The first paragraph of this section on page 4-351 of the RMP/EIS discusses mineral entry and mining. Previous sections of Resource Uses states the acres available for mineral entry and long-term surface disturbance. This paragraph does not. The BLM will provide those acreages and cite the data and sources of this information.	2062
10262_part 3	10262_part 3-8	The third paragraph of this section on page 4-351 of the RMP/EIS discusses the qualitative differences in ROWs between alternatives. The BLM will add acreages to this discussion to quantify the differences.	2062
10262_part 3	10262_part 3-9	The first paragraph of this section on page 4-352 of the RMP/EIS states that three new ACECs with recreation values have been added in Alternative D. State the names of them in this paragraph.	2062
10262_part 3	10262_part 3-15	The plan states that the current AUMs of 305,887 will only be reduced by 1-2% over the life of the Plan. However, according to the Plan, the direct impacts to livestock grazing result from management actions that change AUM allocations or restrict livestock grazing. Yet, the only disclosure of impacts is for surface disturbing activities and closures. There are no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations. There are no impacts disclosed for management actions relating to wildlife habitat, special status species, special designations, etc., although it states that "when rangelands are not meeting resource objectives, the BLM implements changes in grazing management." The utilization levels have changed from the last RMP to the current draft yet there is no disclosure of impacts as a result of decreased utilization levels. Specifically for the allotments not meeting or not making acceptable progress towards meeting rangeland health standard where utilization levels have gone from 50% of current year's growth to 35% and from 60% of dormant to 40% of dormant.	2074
10262_part 3	10262_part 3-42	The plan states that the current AUMs of 305,887 will only be reduced by 1-2% over the life of the Plan. However, according to the Plan, the direct impacts to livestock grazing result from management actions that change AUM allocations or restrict livestock grazing. Yet, the only disclosure of impacts is for surface disturbing activities and closures. There are no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations. There are no impacts disclosed for management actions relating to wildlife	2074

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		habitat, special status species, special designations, etc., although it states that "when rangelands are not meeting resource objectives, the BLM implements changes in grazing management." There are also several areas in the management action Table 2-5 (RMP/EIS pg. 2-160 - 162) that states management must be consistent with "other resource objectives," but does not disclose which resources or objectives. These other resource management actions could have significant impacts to livestock grazing but are not disclosed in the RMP/EIS. These statements should be removed from management actions if the impacts cannot be disclosed.	
10262_part 3	10262_part 3-24	On page 3-176 it states that "When rangelands are not meeting resource objectives, the BLM implements changes in grazing management." However, the Wyoming Standards for Healthy Rangelands applies to all resource uses on public land, therefore if resource objectives are not being met due to a use other then livestock grazing then that use should be changed, not grazing. This policy could have significant impacts on the lessee because they have no control over other resource uses and cannot adjust their operations nor should they have to because of poor management of other resource uses.	2076
10262_part 3	10262_part 3-28	Despite the fact that livestock grazing has existed in the Big Horn Basin for over 100 years it appears to be the first resource use that gets eliminated or AUMs reduced in favor of other resources (i.e. wildlife, special status species). If these areas are worthy of special designation or listing they most likely evolved with the livestock grazing and therefore grazing should not be penalized due to these designations. Please include the following in methods and assumptions: "If livestock grazing has historically existed prior to wildlife management areas, special use areas or listing of special status plants or animals then the management for these species or within these areas will not affect livestock grazing allocations."	2076
10268	10268-1	[Cedar Mountain WSA] We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of 20,407 be increased to upwards of 26,975 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above.	2019
10268	10268-10	â€¢ [McCullough Peaks WSA] We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of24,531 be increased to upwards of37,359 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above. This additional acreage includes a major fossil site and breaks along the Shoshone River. Boundaries of the area are set by the Shoshone River on the west, a powerline on the north, and ways, private land, and topographic features on the south and east.	2019
10268	10268-11	â€¢ We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of 688 be increased to upwards of 8,985 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above. The Wyoming Game and Fish Department has identified the Castle Rocks section as a potential bighorn sheep reintroduction site. Therefore, BLM should maintain the required habitat.	2019
10268	10268-2	[Honeycombs WSA] We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of 20,156 be increased to upwards of 52,764 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above.	2019

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10268	10268-4	[Alkali Creek WSA] We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of 9,475 be increased to upwards of 17,117 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above.	2019
10268	10268-5	The citizens' proposed additions, including the Dry Medicine Lodge Canyon, would further protect .and enhance the complete ecosystem and alter a two-track to a trail.	2019
10268	10268-6	â€¢ [Medicine Lodge WSA] We recommend, per record 7217, that in addition to management under the current RMP, current management acreage of 7,182 be increased to upwards of 16,654 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above.	2019
10268	10268-7	[Bobcat Draw Badlands WSA] We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of 16,967 be increased to the BLM recommendation acreage of 18,540 acres or further 29,706 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above.	2019
10268	10268-8	[Sheep Mountain WSA] We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of 23,258 be increased to upwards of24,615 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above. This expansion would form more manageable boundaries, and result in the Sheep Mountain area being adjacent to the Red Butte area.	2019
10268	10268-9	â€¢ [Red Butte WSA] We recommend, per record 7217, that in addition to management under the current IMP, current management acreage of 10,805 be increased to upwards of 23,685 acres in order to capture and protect through adaptive management the unique wilderness qualities listed above. 'This provision 'expansion, per record 7228, allows the Red Butte area to adjoin the Sheep Mountain area. The BLM should, in turn, acquire the split estate land in Section 16 and small state acreage on the northern border for uniform management of the area.	2019
10268	10268-14	By recognizing the lands with wilderness characteristics in the 15-Mile Basin area, the BLM could ensure a unified management approach that links the three WSAs in this area (Sheep , Mountain, Red Butte and Bobcat Draw), which would have many benefits (Maps 63 and 72). The same is true of the three WSAs on the Bighorn Front (Trapper Creek, Alkali Creek and Medicine Lodge} - linkages among these areas can and should be created by recognizing the wilderness character of nearby lands in this area. Recognizing the wilderness character of these lands could also compliment and improve the management of many of these areas as special recreation management areas and zones, and as ACECs. Protection of the wilderness characteristics of these lands would complement the recreational and important resource values goals reflected by the designation of many of these areas as special recreation management areas or ACECs. Of the 16 LWCs inventoried in the 15-Mile Basin (see Table 1), the BLM has recommended that no special management prescriptions be made for any.	2027
10268	10268-15	Protecting the wilderness qualities of all LWCs on the Absaroka-Beartooth Front would complement the management of the McCullough Peaks WSA, existing Carter Mountain ACEC and its proposed expansion, Rattlesnake Mountain ACEC, Sheep Mountain ACEC and Upper Owl Creek/Absaroka existing ACEC and proposed expansion.	2027

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10268	10268-17	We believe that only by managing to protect the wilderness and natural characteristics of all eight LWCs on the Bighorn Front, the values currently provided by Trapper Creek WSA, Alkali Creek WSA, Medicine Lodge WSA, Paint Rock Creek Canyon CWP, Brown/Howe Dinosaur ACEC and Spanish Point Karst ACEC will be adequately preserved. In order to keep these areas intact as full ecological systems, these LWC additions are essential; otherwise not only will the critical winter range and habitat be lost, but the opportunity for management of a contiguous ecological unit along the Bighorn Front will be lost.	2027
10270	10270-2	Appendix R -10 2.0 Known Road and Trail Network maps do not define and document known Motorcycle Trails and also does not include the input from the public OHV riders.	2034
10270	10270-3	The Trail Definition is not defined in the BLM RMP document. I propose the definition to read as follows. "Trail: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high clearance vehicles."	2034
10270	10270-1	The high soil erosion rates of 53,758 tons per year for Alternative C is incorrect per page 33, 4-22 Table X-11 estimates a 2011 OHV RVD's of 33,687 with 75% being utilized on approximately 14,873 Open OHV riding acres. This calculates out to a 2.3 RVD / Open OHV riding acre. Alternative D has 5,941 Acres of Open OHV Riding which equals a 5.7 RVD / Open OHV riding acre. This is a 148% increase in usage per acre which equates to much higher erosion rates than Alternative C.	2045
10274	10274-1	Real Estate: BLM has identified areas of "low value" to exchange for lands of "higher value." BLM has unilaterally-established a concept of "value" to the public without accountability. An example is the area to the west of the town of Greybull, which is used by locals for mountain-biking, 4-wheeling, and other recreational opportunities, but is considered to be of "low value" and suitable for disposal. I could not tell from the documents how the determination was made.	2013
10281	10281-5	The WGFD recently updated their Strategic Wildlife Action Plans along with their Strategic Habitat Plan (April 2010) and TU suggests that the BLM incorporate the new information. Currently, the DRMP references the 2001 Strategic Habitat Plan (Table 1-3, page 1-15).	2002
10281	10281-2	The list is outdated (2008) and the since the Wyoming Department of Environmental Quality updates these lists every 2 years, a 2010 update should be included.	2031
10281	10281-3	The assumption that coal bed methane produced water is expected to be the same quality and quantity as produced water from conventional or deep oil and gas wells is unfounded in the DRMP (Ch. 4, page 4-31). If there exists data that confirms this statement, TU would like the Final RMP to include that data analysis and a discussion on how to manage such produced waters.	2031
10281	10281-6	However, the DRMP states that economic analysis from recreation use is limited to nonresident only. Limiting the economic discussion while expanding the use discussion does not make sense and diminished the importance of resident's contributions to local businesses, outfitters, guides, tourism, etc. In addition, the WGFD fish and game licenses depend on both resident and nonresident license sales as economic input to their budget.	2046

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10281	10281-4	Table 4-7 (Ch. 4, page 4-6) illustrates the acreages for oil and gas development potential but limits the potential development list to "moderate to none". Yet, in Chapter 3, (see 3.2.5, page 3-46) there is a discussion on the two new areas that are actively being pursued in future oil and gas development plans (Southeastern Beartooth Front and Deep Basin-Centered Gas). New unconventional gas fields that include the potential for gas development include tight sands, shale gas and under-pressured gas. These areas are discussed in terms of gas recovery in large amounts for all three types of natural gas within the Bighorn Basin area. We feel the Table (and consequent baseline drilling analysis discussion under leasable minerals) is an inaccurate account of potential development scenarios and should be amended to include the discussion in Chapter 3.	2061
10283	10283-5	2. The BLM should add "in compliance with Wyoming water laws" within the management action record #1037 dealing with natural flow regimes in priority streams supporting fisheries.	2002
10283	10283-1	Research has shown that timing limitations do not achieve their desired results when development occurs on lands with anything more than four pads per section in crucial ranges for both mule deer and pronghorn. This level of development constitutes "high" or "extreme" impacts to these habitats requiring mitigation measures in addition to seasonal/timing restrictions (WGFD Recommendations for Oil & Gas Resources within Crucial & Important Wildlife Habitats (2009) at 11).	2025
10283	10283-2	WWF suggests avoiding development or surface disturbing activities within migration corridors and stopover points "this includes roads, well pads and support facilities. Limiting the ability of migrating big game to access critical habitats reduces their chances to survive and thrive (Sawyer and Kaufmann 2009, Sawyer and Nielson 2011).	2025
10283	10283-3	The BLM should not focus solely on timing limitations in crucial winter ranges as the primary mitigation measure for big game (Sawyer et al. 2010). The results of the Sublette Mule Deer Study, assessing development under the standard timing stipulations indicate that it is inappropriate to rely on prior assumptions that timing limitation stipulations alone will prevent significant changes in big game abundance.	2025
10283	10283-4	Detrimental actions are listed within Appendix H - Wyoming BLM Mitigation Guidelines, but it isn't exactly clear which actions the BLM is referring to in Chapter 2 with the language in Appendix H. This needs clarified within the final RMP.	2054
10283	10283-6	14. The WGFD recently updated their Strategic Wildlife Action Plans along with their Strategic Habitat Plan (April 2010). The BLM should incorporate the new information. Currently, the DRMP references the 2001 Strategic Habitat Plan (Table 1-3, page 1-15).	2055
10285	10285-1	3. Livestock grazing is an integral part of Washakie County's agricultural base. The only disclosure of impacts disclosed is for surface disturbing activities and closures. There are no direct impacts disclosed that would warrant a reduction in animal unit months. The RMP/EIS states that the current AUMs of 305,887 acres will only be reduced by 1-2% over the life of the RMP. However, according to the RMP/EIS, the direct impacts to livestock grazing result from management actions that change AUM allocations or restrict livestock grazing. Yet, the only disclosure of impacts is for surface disturbing activities and closures. There are	2074

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations. There are no impacts disclosed for management actions relating to wildlife habitat, special status species, special designations, etc., although it states that "when rangelands are not meeting resource objectives, the BLM implements changes in grazing management." There are also several areas in the management action Table 2-5 (RMP/EIS pg. 2-160-162) that state management must be consistent with "other resource objectives," but does not disclose which resources or objectives. The other resource management actions could have significant impacts to livestock grazing, but are not disclosed in the RMP/EIS.	
10286	10286-46	The BLM indicates that the soil erosion from disturbed areas and fugitive dust has the potential to contribute to climate change because soils may darken snow cover and cause faster snow melt. Bighorn RMP/DEIS, pg. 3-8. Although fugitive dust has been shown to cause faster snow melt, it is inaccurate and misleading to suggest that this is a factor in global climate change. Local impacts such as snow melting are simply not comparable to global climate change issues. The BLM should clarify this statement in the final EIS.	2003
10286	10286-36	The BLM needs to significantly revise and clarify its proposed management action under Alternatives Band D that would "implement projects for the investment of maximum cultural resources protection." Bighorn RMP, Record No. 5025, pg. 2-98. As currently drafted, the BLM's management action suggests that the protection of cultural resources is the highest and best use of BLM lands. Such a requirement is not consistent with the BLM's multiple use mandate and inconsistent with Devon's existing lease rights.	2004
10286	10286-73	The BLM indicates that under Alternative B, the BLM would prohibit surface disturbing activities within potential cultural sites for ground buffers that may be up to 3 miles wide. The BLM does not, however, identify how or when setting would be important to a site's integrity. Bighorn RMP/DEIS, pg. 4-274. The BLM must identify and disclose to the public specific criterion that would be used when and if surface disturbing activity would be prohibited in a specific area in order to protect a site's integrity.	2004
10286	10286-14	Â The Secretary of the Interior, through the Interior Board of Land Appeals ("IBLA"), has unequivocally determined that, in Wyoming, the State and not the BLM, has authority over air emissions: In Wyoming, ensuring compliance with Federal and State air quality standards, setting maximum allowable limits (NAAQS and WAAQS) for six criteria pollutants CO (carbon monoxide), SOz (sulfur dioxide), NOz, ozone and particulate matter (PM1O and PMz.s), and setting maximum allowable increases (PSD Increments) above legal baseline concentrations for three of these pollutants (SOz, NOz, and PM1O) in Class I and Class II areas is the responsibility of WDEQ [Wyoming Department of Environmental Quality], subject to EPA oversight. Wyoming Outdoor Council, et 01., 176 IBLA 15, 26 (2008). Decisions of the IBLA are binding upon the BLM and have the same force and effect of a Secretarial decision. 43 C.F.R. Â§ 4.1 (2010) (noting that the Office of Hearings and Appeals, which includes the IBLA may decide matters as fully and finally as the Secretary of the Interior); see also IMC Kalium Carlsbad, Inc. v. Interior Bd. of Land Appeals, 206 F.3d 1003, 1009 (10th Cir. 2000) (holding that IBLA has de novo review authority over the decisions of subordinate agencies such as the BLM). Devon encourages the BLM to add a statement in the Bighorn Basin RMPs clarifying the scope of the BLM's authority as defined by the IBLA. The BLM does not have the authority to impose	2009

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		regulations or control measures on emission sources, including oil and gas operations, within Wyoming.	
10286	10286-16	Devon additionally believes that the BLM's goals to "improve air quality in the Planning Area as practicable" are unnecessary given the authority of the EPA and WDEQ over air quality. Bighorn RMP/DEIS, Record No. 1000, pg. 2-42. Congress has already directed the EPA to develop new and revised national ambient air quality standards based on the latest scientific knowledge. 42 U.S.C. 7408(a)(2), 7409(b)(1).	2009
10286	10286-48	To the extent possible, and even if the data is not considered "official" the BLM should include information from the newly installed monitoring site near Worland in the final EIS as the information will likely be far more accurate than information gathered from the Powder River Basin.	2009
10286	10286-43	Devon also objects to the BLM's proposal under Alternative B and Alternative D to prohibit surface disturbing activities within 5 miles or 2 miles of other historic trails. Bighorn RMP/DEIS, Record No. 7192, pg. 2-204. The BLM has not justified the necessity of protecting the trails to such an extent. Notably under the BLM's proposed management under Alternative D, the BLM would effectively place 1,047,962 acres off limits to oil and gas development because they are within approximately 3 miles of the identified trails. The proposed management is unreasonable and would effectively prohibit development in currently existing significant oil and gas areas including the Worland Unit. Incredibly, the BLM's proposed management under Alternatives D and B would significantly limit surface disturbing operations within heavily populated areas in the Bighorn Basin including Cody, Powell, and Worland as well as smaller towns such as Kirby, Manderson, Burlington, Deaver and Frannie, which are all located in a few miles of the trails. The BLM's radical departure from its previous management, which only protected areas within one-quarter mile of these historic trails, is unnecessary, unjustified, and inconsistent with Devon's existing lease rights.	2010
10286	10286-44	The only currently Congressionally designated trail within the planning area is the Nez Peirce Trail. As such, it is the only trail that necessitates significant protection. The BLM must ensure it is only attempting to protect contributing segments of trails. Further, the BLM should only attempt to protect areas outside of the trail when setting is an important component. According to the State Historic Preservation Office, setting is an important criterion in very few parts of the Planning Area. Historic trails such as the Bridger Trail should not be protected with the same restrictions as those Congressionally designated trails because they do not have the same status and are not entitled to equivalent protections. Finally, it is important for the BLM to recognize that only contributing segments of trails are entitled to or deserving of any protection. Non-contributing segments should be utilized for all multiple use activities without restrictions.	2010
10286	10286-25	The BLM should ensure that it does not place unnecessary requirements, limitations, or procedures on seismic and geophysical surveys. The BLM indicates that under the revised RMP geophysical exploration will be allowed within the "constraints necessary to protect other resources." Bighorn RMP/DEIS, Record No. 2034, pg. 2-58. On a national scale, the BLM has recognized that geophysical exploration is the type of activity that does not individually have a significant effect on the human environment because geophysical exploration has been identified as a Department-wide categorical	2016

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		exclusion. "Approval of Notices of Intent to conduct geophysical exploration of oil, gas, or geothermal exploration of oil, gas, or geothermal, pursuant to 43 C.F.R. 3150 or 3250, when no temporary or new roads construction is proposed." DOI Manual - 516 DM 11.9.B.6., 72 Fed. Reg. 45504, 45539 (Aug. 14, 2007); see also BLM NEPA Handbook, H-1790-1, Appendix 4, B.6 (Ret. 1-1710, 01/30/2008); 40 C.F.R. Â§ 1508.4(2010) (defining categorical exclusions).	
10286	10286-49	The BLM should clarify the language in the first sentence under the heading "Exploration" in Section 3.2.5 so that the public understands a federal oil and gas lessee is not required to conduct geophysical or seismic activities on BLM administered lands. 43 C.F.R_ subpart 3150. As currently drafted, the language in the Bighorn RMP may suggest that a lessee is required to conduct geophysical or seismic operations on BLM lands.	2016
10286	10286-29	The BLM's proposed management for the Absaroka Front under Alternative D is poorly drafted and confusing. Although BLM suggests Alternative D will be managed the same as Alternative B with a few exceptions, Bighorn RMP/DEIS, Record No. 4080, pg. 2-77, the BLM indicates the entire area will be closed to leasing under Alternative B, but suggests that portions of the area will be open to oil and gas leasing with CSU and NSO restrictions under Alternative D. The BLM should clearly indicate which areas are open and closed to leasing under each alternative. Further, Alternative B suggests the area will be managed as a ROW avoidance area, but Alternative D makes no reference to ROWs. Id. The BLM should clarify how ROWs will be treated under each alternative.	2020
10286	10286-13	Record No. 0003, pg. 2-42, states that BLM will utilize recommendations found in Wyoming Game and Fish Department (WGFD) Recommendations for Development Oil and Gas Resources within Crucial and Important Wildlife Habitats (WGFD 2009). The BLM makes a similar statement in Record No, 4061. The BLM must revise these statements to clarify that it will consider, not necessarily "utilize" all of the WGFD's recommendations. The BLM alone has primacy and the responsibility to manage federal lands under its jurisdiction in Wyoming.	2025
10286	10286-28	The proposed language under Alternative B that would prohibit all surface use within big game crucial winter range. Bighorn RMP/DEIS, Record No. 4079, pg. 2-77. As the BLM is aware, current seasonal stipulations in the existing Bighorn Basin RMPs prohibit construction and drilling activities in specific crucial winter ranges, but do not prohibit routine production operations necessary to safely maintain facilities. It would be inappropriate for the BLM to preclude all production operations in crucial winter range areas. Such a decision would essentially preclude year-round production operations and would lead to a significant decrease in domestic energy production. Moreover, many species such as pronghorn and mule deer have been found to habituate to increased traffic so long as the movement remains predictable. See Reeve, A.F. 1984. Environmental Influences on Male Pronghorn Home Range and Pronghorn Behavior. PhD. Dissertation; Irby, L.R. et at., 1984; "Management of Mule Deer in Relation to Oil and Gas Development in Montana's Overthrust Belt" Proceedings III: Issues and Technology in the Management of Impacted Wildlife. To the extent the BLM intends to apply the new restriction on existing leases, the BLM could be violating existing lease or taking private property without just compensation. The BLM must ensure that existing lease rights will be maintained and that production operations are allowed to continue throughout the year.	2025

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10286	10286-30	Devon is strenuously opposed to the BLM's proposed management action under Alternative B or D that would allow the BLM to apply wildlife seasonal "protections for surface-disturbing and disruptive" activities on the maintenance and operations of developed projects. Bighorn RMP/DEIS, Record No. 4082, pg. 2-78. As the BLM is aware, current seasonal stipulations in the existing Bighorn Basin RMPs prohibit construction and drilling activities in specific crucial winter ranges, but do not prohibit routine production operations necessary to safely maintain facilities. It would be inappropriate for the BLM to preclude all production operations in crucial winter range areas. Such a decision would essentially preclude year-round production operations and would lead to a significant decrease in domestic energy production. Moreover, many species such as pronghorn and mule deer have been found to habituate to increased traffic so long as the movement remains predictable. See Reeve, A.F. 1984. Environmental Influences on Male Pronghorn Home Range and Pronghorn Behavior. PhD. Dissertation; Irby, L.R. et at., 1984; "Management of Mule Deer in Relation to Oil and Gas Development in Montana's Overthrust Belt" Proceedings III: Issues and Technology in the Management of Impacted Wildlife.	2025
10286	10286-54	The BLM indicates in Chapter 3 that mule deer populations have declined because of decline in habitat quality and quantity. Bighorn RMP/DEIS, pg. 3-97. The BLM has not, however, provided sufficient data to support this analysis. Researchers in Colorado have attributed decline in Colorado mule deer populations primarily to competition from increased populations, loss of vegetation by overgrazing by deer in the 20'h Century, and the loss of habitat due to farmland conversion. R. Bruce Gill, Colorado Division of Wildlife. 1999. Declining Mule Deer Populations in Colorado: Reasons and Responses. The Oregon Department of Fish and Wildlife has also concluded that declines in the mule deer populations in Oregon are attributable to multiple natural changes in habitat including severe winters and droughts, changing predator-prey relationships, and changing grazing enforced management practices. The BLM should consider all of these factors and not simply assume oil and gas development is causing the decline in mule deer populations	2025
10286	10286-55	The Bighorn RMP/DEIS imposes significant restrictions in big game parturition (calving) area, but has not provided sufficient data to justify these restrictions. The BLM should review existing literature and determine whether such restrictions are actually justified. Based on the demonstrated success for avoiding adverse effects on wandering elk within crucial winter range, there are no major adverse energy extraction-related effects that cannot be mitigated with a combination of controlled surface use and other timing restrictions_ Elk populations within the Bighorn Basin are well above WGFD's herd objectives and the BLM has not justified additional restrictions in these areas.	2025
10286	10286-72	The BLM describes the potential impacts from oil and gas operations to big game species in the Bighorn RMP/DEIS. Bighorn RMP/DEIS, pg. 4-170. The BLM does not, however, include information regarding how species habituate to oil and gas activities. See Reeve, A.F. 1984, Environmental Influences an Pronghorn Range and Pronghorn Habitat, PhD Dissertations, Erv, Irby, L.R., et al., 1984; "Management of Mule Deer in Relation to Oil and Gas Development in Montana" proceedings III: Issues in Technology in the Management of the Impact to Wildlife.	2025
10286	10286-42	Devon is particularly concerned that the BLM's analysis of land with wilderness characteristic is not accurate. Several local governments involved in the	2027

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		planning process have identified flaws with the BLM's inventory and analysis process. Given this information, the BLM needs to re-inventory and correct its information regarding the approximately 571,000 acres of lands it believes to have wilderness characteristics using the characteristics outlined above and in the BLM policies.	
10286	10286-68	The BLM indicates in Section 4.2.5.2 that the BLM will manage Wild Lands as administratively unavailable for oil and gas leasing under Alternatives Band D. Given recent changes in the Department of the Interior's administration of lands with wilderness characteristics and "Wild Lands" the BLM should reassess and inform the public how Wild Lands will be treated and whether or not they will be made available for oil and gas development in the Bighorn planning area.	2027
10286	10286-7	The BLM should clarify its intention and authority to designate Wild Lands in the Bighorn RMPs and explain to the public how the law and the Secretary's memorandum will impact modifications to the Preferred Alternative.	2027
10286	10286-26	The BLM suggests it will manage intermittent streams on a watershed scale basis and will attempt to acquire perennial flow rights for streams under both Alternative B and the Preferred Alternative. Bighorn RMP/DEIS. Record No. 4055, pg. 273. In Wyoming, the allocation and adjudication of water rights are administered solely and exclusively by the State Engineer and Board of Control. Wyo.Const. art. 8, Â§ 5; WYo. STAT. ANN. Â§Â§ 41-101 - 1014 (LexisNexis 2011). All water within the State of Wyoming is owned by the State of Wyoming. Wyo. Const. art. 8, Â§ 1. Although certain water rights may be reserved to the federal government under very specific, narrow exceptions, the BLM does not have the right to manage water rights in Wyoming. The BLM should refrain from attempting to administer any water rights within the State. Further, under Wyoming law, only the state of Wyoming has the right to seek and hold a water right for instream flows for either wildlife or recreational purposes. WYo. STAT. ANN. Â§Â§ 41-1001 - 1014 (LexisNexis 2011); In re the General Adjudication of All Rights to Use Water in the Big Horn River Water System, 835 P.2d 273, 279 (Wyo. 1992).	2031
10286	10286-64	The BLM also suggests that impacts under Alternative D may result in fewer long-term adverse impacts to water resources due to increased reclamation standards and the requirements for mitigation under this Alternative. Bighorn RMP/DEIS, pg. 4-29. As explained earlier, reclamation plans are currently required for all oil and gas operations under Onshore Order No.1. The BLM should quantify or explain how or why it believes the reclamation plan is required under Alternative D will increase reclamation success over that already required on federal lands.	2031
10286	10286-37	As currently drafted, maps 38, 39, 40, and 41 appear to impose BLM visual resource management ("VRM") restrictions on BLM, private, and State of Wyoming lands without regard to ownership. The BLM has no right or authority to impose VRM restrictions on either State of Wyoming or private lands. As the BLM should be aware, one of the reasons the BLM Director remanded portions of the Rawlins RMP in 2008 was the BLM's apparent attempt to impose VRM restrictions on State of Wyoming and private lands. See Director's Protest Resolution Report, Rawlins Resource Management Plan, December 24, 2008, pgs. 139 - 140. See also Rawlins RMP pg. 1-1. The BLM must prepare new maps for the Bighorn RMP Final EIS that excludes State of Wyoming and private lands within the Bighorn Basin.	2032
10286	10286-38	Under Alternatives Band D, the BLM proposes to substantially increase the	2032

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		number of acres subject to Class II VRM restrictions. Bighorn RMP, Record No. 5052, pg. 2-103. Much of the area is not currently subject to VRM Class II restrictions. When proposing VRM restrictions in areas already leased for oil and gas development, the BLM cannot attempt to impose new VRM objectives or operations on existing leases. The IBLA has clearly recognized that BLM cannot impose visual resource objectives inconsistent with lease rights, and the BLM must consider the impacts of oil and gas operations and existing leases when developing VRM objectives during the planning process. See Southern Utah Wilderness Alliance, et. a/., 144 IBLA 70, 84-88 (1998). The BLM cannot impose VRM objectives without considering existing leases and ongoing oil and gas operations.	
10286	10286-39	The proposed VRM Class II designation for lands covered by leases may be in conflict with, and provide confusion about, prior decisions made to lease the same lands without restrictions for visual resources under the current RMP. The IBLA has addressed a similar situation in the past. In Southern Utah Wilderness Alliance, 144 IBLA 70 (1998) ("SUWA") a resource management plan designated certain lands as VRM Class II. The BLM had leased the same lands for oil and gas development under the existing RMP. The IBLA found this improper, and it criticized the San Juan, Utah Resource Area BLM office for applying VRM Class II restrictions to lands where it had previously approved oil and gas leases. The IBLA stated that where the BLM has made the decision to issue oil and gas leases, the BLM should not put the same lands in VRM Class II because it is "inherently contradictory" and creates a "conflict." Southern Utah Wilderness Alliance, 144 IBLA 70, 87 (1998).	2032
10286	10286-40	Placing VRM Class I or II restrictions on a significant portion of the planning area would significantly restrict oil and gas development, potentially even on existing leases. Bighorn RMP/DEIS, Record No. 5052, pg. 2-103. Based on past experience, and even language in the Bighorn RMPIDEIS itself, the BLM will essentially preclude oil and gas development in VRM Class I and Class II areas. Devon is concerned it may not be able to develop its existing leases if the BLM is precluded from proving rights-of-way or facility locations across newly created VRM I and II areas that did not exist at the time its leases were issued. The imposition of unreasonable restrictions on existing leases or federal units may result in an illegal taking of Devon's contractual and property rights. Finally, the BLM has not adequately studied the potential economic or socio-economic impacts the creation of new VRM Class I and II areas may have upon the public or the human environment as required by FLPMA and NEPA.	2032
10286	10286-74	When proposing visual resource management restrictions in areas already leased for oil and gas development, the BLM cannot attempt to impose new VRM objectives on operations on existing leases. The IBLA has clearly recognized that the BLM cannot impose VRM objectives inconsistent with lease rights, and that BLM must consider the impacts of oil and gas operations and existing leases when developing VRM objectives during the planning process. Southern Utah Wilderness Alliance, et al., 144 IBLA 70, 84 - 88 (1998). The BLM cannot impose VRM objectives without considering existing leases and ongoing oil and gas operations. Because the BLM failed to consider the number and nature of existing leases when preparing its visual resource assessment for the Bighorn planning area, the BLM must revise and redo its analyses. The BLM must correctly account for all oil and gas developments and, as recognized by the IBLA in the Southern Utah Wilderness case cited above, the BLM must not	2032

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		impose VRM restrictions higher than VRM Class III on existing leases.	
10286	10286-57	The BLM suggests that the mountain plover is still a proposed threatened species in the Bighorn RMP/DEIS. Bighorn RMP/DEIS, pg. 3-108. The United States Fish and Wildlife Service ("USFS") published a withdrawal of the proposed listing of the mountain plover on May 12, 2011. 76 Fed. Reg. 27756 (May 12, 2011). The BLM should update this information in the final EIS for the Bighorn Basin. The BLM also needs to correct the information regarding the mountain plover on page 3-113 of the Bighorn RMP.	2041
10286	10286-27	The BLM states that under all alternatives, it will limit access to crucial habitat and sensitive species habitat. Bighorn RMP/DEIS, Record No. 4071, pg. 2-75. The BLM should rephrase this statement by adding the language "to the extent consistent with existing rights." Although the BLM retains substantial authority to prohibit access to designated critical habitat under the Endangered Species Act, 43 C.F.R. 3101.1-2 (noting that the BLM can restrict access to surface leasehold to comply with nondiscretionary statutes), the BLM does not have the right to prohibit access to a leasehold to protect crucial habitat in a manner inconsistent with the lease rights conveyed. See, e.g., National Wildlife Federation, et al., 150 IBLA 385, 403 (1999).The BLM cannot, for example, limit access to crucial winter habitat for Pronghorn in a manner inconsistent with existing rights.	2042
10286	10286-33	The BLM should, however, revise DR Goal 9.1 to make it clear the BLM will maintain large patches of high quality sage brush habitat, while still providing for multiple use management. Although preserving the sage-grouse is of paramount importance to the State of Wyoming, the BLM, and operators like Devon, management for the species must be considered in the larger multiple-use mandate requirements for the BLM.	2042
10286	10286-56	On page 3-103 of the Bighorn RMP/DEIS the BLM suggests that special status wildlife species are governed under BLM Manual 68-40 (BLM 2001 (a)). The BLM should be aware that its special species management manual was updated and reissued in 2008 and that the 2001 version was replaced. See BLM Manual 68-40 Rel. 6-125 (12/12/2008). All references to the 2001 special status species manual or any requirements therein should be replaced with references to the 2008 manual.	2042
10286	10286-18	Devon is particularly opposed to the requirement under Alternative B to require 50 percent pre-disturbance of desired vegetation within three growing seasons and 80 percent cover within five years of initial seeding_ Bighorn RMP/DEIS, Record No. 1018, pg. 2-45. Such a requirement is not consistent with the existing BLM policy as expressed in Wyoming Instruction Memorandum 2009-022.	2045
10286	10286-32	It also appears the BLM failed to consider the significant detrimental impact to the local economy the seasonal prohibition on oil and gas operations would have upon the local economy. By precluding production during several months of the year, the BLM would force operators to significantly reduce their workforces on an annual basis. The management action would create a seasonal boom and bust cycle with routine maintenance workers and pumpers being laid off annually. The inconsistent nature of the work would almost certainly reduce the number of local employees lessees are able to hire, which would restrict or eliminate the long-term beneficial impacts of the oil and gas development to the local economy. The BLM's current socio-economic analysis does not account for this cycle.	2046

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10286	10286-10	In particular, Alternative B is not a reasonable alternative because it virtually eliminates oil and gas development from the public lands contrary to the BLM's multiple use mandate. Under FLPMA, the BLM is required to manage the public lands on the basis of multiple use and sustained yield. 43 U.S.C. Â§ 1701 (a)(7) (2010). "'Multiple use management' is a deceptively simple term that describes the enormously complicated task of striking a balance among the many competing uses to which land can be put, 'including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and [uses serving] natural scenic, scientific and historical values.'" Norton v. Sothern Utah Wilderness Alliance, 542 U.S. at 58 (quoting 43 U.S.C. Â§ 1702(c)). Further, under FLPMA, mineral exploration and development is specifically defined as a principal or major use of the public lands. 43 U.S.C. Â§ 1702(1). Under FLPMA BLM is required to foster and develop mineral development, not stifle and prohibit such development. Alternative B does not comply with the BLM's multiple use mandate and must be eliminated.	2047
10286	10286-11	The adoption of Alternative B, and to a lesser extent Alternative D, would significantly curtail domestic production compared to both the baseline scenario and any of the other alternatives analyzed by the BLM. Bighorn RMPIDEIS, pg. 4-57. The loss of such an enormous energy supply is contrary to the best interests of the nation, and inconsistent with the Energy Policy Act of 2005.	2047
10286	10286-5	When revising the Bighorn RMPs, the BLM should ensure that stipulations developed for future oil and gas leasing are the least restrictive necessary to adequately protect other resource values. Since the BLM issued the Washakie RMP in 1988, the Cody RMP in 1990, and the Grass Creek RMP 1998, Congress passed the Energy Policy Act of 2005. Section 363 of that Act required the Secretary of the Interior and the Secretary of Agriculture to enter into a Memorandum of Understanding (MOU) regarding oil and gas leasing and to ensure that lease stipulations are applied consistently, coordinated between agencies, and "only as restrictive as necessary to protect the resources for which the stipulations are applied." Energy Policy Act of 2005, Pub. L. No. 109-58, Â§ 363(b)(3), 119 Stat. 594, 722 (2005). The Memorandum of Understanding required by Â§ 363 of the Energy Policy Act of 2005 was finalized in April of 2006 as BLM MOU W0300-2006-07. The stipulations for oil and gas leases within the revised Bighorn RMPs should not be onerous or more restrictive than necessary. Based on Devon's review of the proposed alternatives in the Bighorn RMP/DEIs, the BLM did not follow the guidance in this MOU or the express direction in the Energy Policy Act of 2005. In almost every circumstance, the BLM proposes to adopt stipulations that are overly restrictive and unduly limiting. The BLM must consider the MOU when selecting the agency's Preferred Alternative or adopting the Bighorn RMPs.	2047
10286	10286-65	The BLM improperly suggests on page 4-58 that a VRM Class II restriction is only a moderate constraint on oil and gas development. Bighorn RMP/DEIS, pg. 4-58. The BLM more appropriately recognizes later in the Bighorn RMP/DEIS that "oil and gas exploration and development activities may be restricted or limited in VRM Class II areas. VRM objectives in Class II areas may limit the development of [oil and gas] facilities." Bighorn RMP/DEIS, pg. 466. Given the extreme restrictions on oil and gas development within VRM Class II areas, Devon urges the BLM to treat VRM Class II restrictions as a major restriction on oil and gas development, not a moderate restriction.	2047

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10286	10286-70	Devon further remains opposed to the BLM's proposition under Alternative B to manage big game crucial winter range and parturition habitat with and NSO restriction that would prevent surface occupancy for all oil and gas activities. Bighorn RMP/DEIS, pg. 4-70. Devon does not, however, believe the BLM has adequately described the potential adverse impacts such a restriction would have on oil and gas operations. The BLM merely notes that the mitigation measures may "increase project costs." Closing almost 1.4 million acres to surface occupancy would do far more than merely increasing project costs or making some areas inaccessible to oil and gas development. It would effectively eliminate all oil and gas development within a huge portion of the Bighorn Basin planning area. Such a closure would additionally lead to significant losses of revenue for the local, state and federal treasuries as well as significant losses in regional jobs.	2047
10286	10286-8	Further, the BLM should inform the public that only the Secretary of the Interior could withdraw the entire planning area from oil and gas leasing under FLPMA and that withdrawals can only be made using specific procedures mandated by FLPMA. 43 U.S.C. Â§ 1714(a), (b) (2010) (requiring withdrawals to be made by the Secretary of the Interior, or a person in the Secretary's office who has been appointed by the President with the advice and consent of the Senate and listing the requirements necessary for the Secretary to withdraw public lands).	2047
10286	10286-9	Under all four alternatives, the BLM proposes to make large areas of land unavailable to oil and gas leasing. Withholding an area from leasing constitutes a withdrawal under FLPMA. Unbelievably, under Alternative B, the BLM proposes to close almost 2,300,000 acres and render them unavailable for oil and gas leasing. Because closing areas to oil and gas leasing constitutes a withdrawal, the Department of the Interior will be required to comply with the procedural provisions of section 204 of FLPMA. 43 U.S.C. Â§ 1714 (2010). The BLM effectively admits that areas administratively unavailable to oil and gas development would "prohibit oil and gas exploration and subsequent development and exploration." Bighorn RMPIDEIS, pg. 4-62. This language confirms Devon's position that closing areas to leasing is effectively a withdrawal under FLPMA.	2047
10286	10286-19	The BLM should clarify that under all of the alternatives reclamation plans are required for all oil and gas drilling operations under Onshore Order Number 1, Section III, 4, j, 72 Fed. Reg. 10308, 10333 (Mar. 7, 2007). As currently described under Record No. 1019, the public may have the impression that reclamation plans are not always required for oil and gas development activities.	2049
10286	10286-31	Further, the BLM has not analyzed or apparently even considered the damage that could be done to oil and gas wells if they are shut-in on an annual basis. Nor has the BLM analyzed the very real threat that federal minerals would be effectively drained by offsetting wells on State of Wyoming and private lands if federal wells are annually shut-in. The BLM must prepare this analysis in order to disclose the significant adverse impacts that would be associated with the closure of oil and gas development on a seasonal basis, including the potential loss of federal reserves and royalties.	2049
10286	10286-76	Section 2.1 of Appendix A should also be revised to eliminate references to the 1983 Oil and Gas Onshore Order No. 1 and replace it with the revised version issued in 2005.	2049
10286	10286-24	Devon additionally encourages the BLM to adopt language similar to that contained in the Pinedale RMP that allows for the modification and expansion	2050

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		of Oil and Gas Management Areas in the event oil and gas development extends beyond the currently identified Oil and Gas Management Areas. The Pinedale RMP authorized the expansion of "Intensively Developed Fields" in two situations. First, an expansion of an existing oil and gas field without the need to amend the Pinedale RMP when bottom-hole density reached a specific level and when geology and reservoir analysis determined additional bottom-hole development is necessary to effectively drain a resource. See Record of Decision and Approved Pinedale RMP, pg. 2-22 (2008). Second, the Pinedale RMP authorizes the creation of new Intensively Developed Fields through an amendment to the Pinedale RMP if the above referenced geologic criteria are met, but the new field is not located adjacent to an existing Intensively Developed Field.	
10286	10286-66	The BLM describes areas of having high oil and gas potential if there is a potential for more than 100 wells per township. The BLM describes areas of moderate potential as having between 20 and 100 wells per township. Bighorn RMP/DEIS, pg. 4-59. Although such descriptions were generally true for traditional vertical oil and gas development, the same is not true for more recent horizontal development. As discussed earlier, oil and gas operators are often drilling long horizontal well bores capable of developing a single 640 acre section with a single well bore. As such, an extremely prolific area may have only 36 oil and gas wells within an entire township, yet it will be fully and. effectively developed. The BLM should recognize that its traditional analysis regarding oil and gas development potential by wells per township is not, necessarily, accurate given recent advances in technology.	2051
10286	10286-12	Further, as described in more detail in Devon's comments regarding Chapter 4, the BLM has not analyzed or disclosed the potential impacts the restrictions on future leasing may have upon operations on existing leases. As the BLM acknowledges in Chapter 3 and Map 7, a significant extent of the Bighorn planning area is currently leased for oil and gas development. Some leases, however, are isolated making them virtually impossible and not economically feasible to develop in their current state. Any responsible oil and gas producer who decides to take the risk of exploring by drilling a wildcat area must do so only after assembling a large enough block of leasehold acreage so that, if the drilling is successful, it can obtain an adequate return on the high risk dollars invested. The BLM has, in another context, recognized the need for control of a reasonable acreage block. See Prima Oil 8: Gas Co., 148 IBLA 45, 51, (1999) (BLM policy to suspend leases when "a lessee is unable to explore, develop, and produce leases due to the proximity, or comingling of other adjacent Federal lands needed for logical exploration and development that are currently not available for leasing"). The BLM must recognize, study, and report the economic impact of its decision to close significant portions of the planning area to leasing, or to make significant portions of the planning area only available with major constraints will have upon future exploration and development in the area. It is not enough for the BLM to simply assert that existing lease rights will be protected, the BLM must analyze further how existing lease rights will be impacted by future limitations on leasing and development and what protection it will afford existing leases in the above-described scenario.	2052
10286	10286-20	BLM should, however, clarify the language in Record No. 1019 of the Preferred Alternative that suggests "stipulations" will be required prior to the approval of surface disturbing operations. As discussed above, the BLM does not have the	2052

Table B-1. Individual Comments and BLM Response Index (Continued)

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		authority to modify stipulations on existing leases. Leases are valid, existing rights that cannot be modified by a newly developed RMP. The IBLA recently confirmed the fact that the BLM cannot add additional stipulations to a lease after it has been issued. Dejour Energy (USA) Corp., IBLA No 2010-175 (April 29, 2010).	
10286	10286-21	Further, the BLM has not analyzed or disclosed the potential impacts the restrictions on future leasing under Alternative B may have upon operations on existing leases. Devon owns numerous leases within the planning area, but to the extent such of these leases are isolated, they are virtually impossible and not economically feasible to develop. Any responsible oil and gas producer who decides to take the risk of exploring by drilling a wildcat area must do so only after assembling a large enough block of leasehold acreage so that, if the drilling is successful, it can obtain an adequate return on the high risk dollars invested. The BLM has, in other contexts, recognized this need for control of a reasonable acreage block. See Prima Oil Ei: Gas Co., 148 IBLA 45,51 (1999) (BLM policy to suspend leases when "a lessee is unable to explore, develop, and produce leases due to the proximity, or commingling of other adjacent Federal lands needed for logical exploration and development that are currently not available for leasing").	2052
10286	10286-22	Similarly, in Record No. 2011 the BLM suggests that under all alternatives it will include new stipulations on leases or restriction on existing leases when determined necessary. Bighorn RMP/DEIS, Record No. 2011, pg. 2-54. The BLM cannot impose stipulations or new restrictions on existing leases and particularly cannot impose new NSO restrictions on existing leases. Courts have recognized that once the BLM has issued an oil and gas lease conveying the right to access and develop the leasehold, the BLM cannot later impose unreasonable mitigation measures that take away those rights. See Conner v. Burford, 84 F.2d 1441, 1449-50 (9th Cir. 1988); 43 C.F.R. Â§ 3101.1-2 (2006) (BLM can impose only "reasonable mitigation measures ... to minimize adverse impacts ... to the extent consistent with lease rights granted").	2052
10286	10286-23	Devon is vehemently opposed to the proposed management actions under Alternative B and Alternative D that would allow the BLM to prohibit suspension of existing leases, even on a case-by-case basis. Bighorn RMP/DEIS, Record No. 2028, pg. 2-57. The terms of the Mineral Leasing Act of 1920 clearly and unequivocally allow the BLM to grant lease suspensions for a variety of reasons, the most important of which is when a suspension is in the interest of conservation. 30 U.S.C. § 209 (2010); 43 C.F.R. Â§Â§ 3103.4-4 and 3165.1.The BLM should not attempt to modify, alter, or curtail aspects of the Mineral Leasing Act and the BLM's regulations and manuals. Requesting and receiving suspensions is critical to oil and gas operators, particularly when the delays associated with oil and gas development are caused by the BLM. More often than not, oil and gas operations are delayed for years and years while the BLM completes the analysis and processes required by laws such as NEPA. Under IBLA guidance, the BLM's manual, and decisions of the Solicitor of the Department of the Interior, lessees are entitled to suspensions in the interest of conservation during the preparation of such analysis. See, e.g., River Gas Corp. et al., 149 IBLA 239,245 (1999); BLM Manual, 316010.2.21. A.1, 3160-10.2.21.B.1. (Rel. 3-150, 3/13/1987); see also BLM Manual, 3160-10, Appendix 1 Solicitor's Memorandum dated July 14, 1975	2052
10286	10286-3	The BLM's Land Use Planning Handbook also specifically recognizes that existing	2052

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		rights must be honored. BLM Land Use Planning Handbook H-1601-1, III.A.3, pg. 19 (Rel. 1-1693 3/11 IDS). The BLM must comply with its planning handbook and recognize existing rights. The authority conferred in FLPMA is expressly made subject to valid existing rights. 43 U.S.C. § 1701. Thus, an RMP prepared pursuant to FLPMA, after lease execution and after drilling and production has commenced, is likewise subject to existing rights. See Colorado Environmental Coal, et al., 165 IBLA 221, 228 (2005). The Bighorn RMPs, when revised, cannot defeat or materially restrain Devon's valid and existing rights to develop its leases through conditions of approval or other means. See Colorado Environmental Coal, et al., 165 IBLA 221,228 (2005) (citing Colorado Environmental Coal., 135 IBLA 356, 360 (1996) aft'd, Colorado Environmental Coal. v. Bureau of Land Management, 932 F.supp. 1247 (D. Colo. 1996). The BLM partially recognizes that it cannot modify existing lease rights in the Bighorn RMP/DEIS, but the agency negates this statement by suggesting that it will impose conditions of approval on operations that will, effectively, impose new limitations on leases. Bighorn RMP/DEIS, pg. 4-57. The BLM cannot use conditions of approval ("COAs") to modify or take existing lease rights.	
10286	10286-4	In the revised Bighorn RMPs and accompanying environmental impact statement ("EIS"), the BLM should state clearly that an oil and gas lease is a contract between the federal government and the lessee, and that the lessee has certain rights thereunder. See Mobil Oil Exploration & Producing Southeast, Inc. v. United States, 530 U.S. 604, 620 (2000) (recognizing that lease contracts under the Outer Continental Shelf Lands Act gives lessees the right to explore for and develop oil and gas); Oxy USA, Inc. v. Babbitt, 268 F.3d 1001, 1006-7 (10th Cir. 2001) (noting that the Tenth Circuit has long held that federal oil and gas leases are contracts) rev'd on other grounds, BP America Production Co. v. Burton, 549 U.S. 84 (2006). Although the BLM may revise the existing RMPs for the Bighorn Basin, the BLM-and the public-should be reminded that the BLM cannot unilaterally alter or modify the terms of existing leases. The BLM recently recognized the nature of existing oil and gas lease rights in the Pinedale RMP issued by the BLM in November of 2000. "Existing oil and gas or other mineral lease rights will be honored. When an oil and gas lease is issued, it constitutes a valid existing right; BLM cannot unilaterally change the terms and conditions of the lease ... Surface use and timing restrictions from this RMP cannot be applied to existing leases." Pinedale RMP, pg. 2-19. Similar language exists in the December of 2008 Rawlins RMP. Rawlins RMP, pg. 20. Devon encourages the BLM to include similar language in the Bighorn Basin RMPs.	2052
10286	10286-59	The BLM needs to clarify the language on page 4-4 of the Bighorn RMP/DEIS. In the third bullet point on page 4-4, the BLM suggests that the Secretary of the Interior has the authority to impose restrictions on lease terms. Bighorn RMP/DEIS, pg. 4-4. To the extent the BLM is suggesting it can impose restrictions on existing leases, the BLM's statement is factually and legally incorrect. As discussed in detail above, once the BLM has issued a federal oil and gas lease without no surface occupancy stipulations, and in the absence of non-discretionary statutory prohibition against development, the BLM cannot completely deny development on a federal leasehold. National Wildlife Federation, et at., 150 IBLA 385, 403 (1999).	2052
10286	10286-69	The BLM again suggests through Chapter 4 it intends to impose additional mitigation measures on exploration and development activities, or COA on operations in areas that have been designated unavailable for leasing in the	2052

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		revised RMP in order to exclude surface occupancy and restrict surface disturbance. As discussed above, the BLM has no authority to impose conditions of approval or other mitigation measures on valid existing rights. Even in areas where the BLM has determined that lands should not be available for leasing in the revised Bighorn RMPs, the BLM cannot limit surface use and occupancy. Doing so constitutes a taking of valid property rights in contravention of federal law and the Constitution of the United States.	
10286	10286-75	Devon vehemently opposes the language in Section 2.0 that suggests, however, the contract can be changed with the express consent of the authorized officer. Because the lease is a contract, it can only be modified by the mutual agreement of both the lessee and the lessor, the BLM does not have the authority to change the contract unilaterally. The BLM should revise the language in Section 2.0 of Appendix A in the final EIS.	2052
10286	10286-51	Devon believes that the BLM has significantly underestimated the oil and gas potential of the Planning Area. According to the Wyoming Oil and Gas Conservation Commission, the Bighorn Basin is the biggest oil and gas producing area in the Rocky Mountains and 78% of the Basin has never been developed. Several oil and gas operators in the Basin are currently setting significant new and previously undevelopable oil and gas reserves within the Bighorn Basin. In particular, the BLM has underestimated the potential of the Phosphoria formation in the Bighorn Basin. Existing Phosphoria formation traps likely contain significant oil and gas reserves that can be economically developed given appropriate price conditions and recent advances in technology. Additionally, the BLM has underestimated the potential for development from the Mowry Shale formation within the planning area. Interest in the Mowry Shale formation in the Bighorn Basin has increased due to the recent boom in production from the Bakken Shale formation in the Williston Basin of North Dakota. Success in the Bakken came from the analyses of geologic date from decades-old producing areas which identified untapped resources that, with the application of new development and drilling technology, have made the area the nation's largest oil producing region. The Mowry Shale shares many of the same characteristics of the Bakken Shale and other successful shale reservoirs within the United States. These characteristics include a significant thickness of hydrocarbon bearing shales,etiquette naturation, and the capacity to maintain open fractures, and susceptibility to fracture stimulation. To date, only limited production has been reported from the Mowry Shale in the Bighorn Basin because exploration and development are in the earliest stages. There has, however, been recent success in drilling development within the Mowry Shale in the Bighorn Basin. The United States Geologic Survey recently evaluated the Mowry Shale in the Bighorn Basin and estimated that undiscovered continuous oil and gas reserves included over 5 million barrels of oil and 348 billion cubic feet of natural gas. There is significant potential in the Planning Area that BLM should protect. Other operators in the Basin have estimated that the potential of the Mowry Shale is so significant the BLM's Reasonably Foreseeable Development Scenario ("RFD Scenario") may be twenty-five to fifty times understated. The BLM needs to reconsider its RFD Scenario for the entire Planning Area given the significant potential of Mowry development in this region.	2061
10286	10286-52	The BLM should also consider the increased potential of oil and gas development in the region using carbon dioxide (C02) flooding procedures. The	2061

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		Wyoming Enhanced Oil Recovery Institute ("WEORI") estimates that an additional 800 million to 2.25 billion barrels can be recovered from the Bighorn Basin as a result of enhanced oil recovery operations using carbon dioxide to displace stranded oil. Enhanced oil recovery is particularly important for the Bighorn Basin because, in many cases, existing infrastructures such as roads and well pads can be utilized to unlock this important domestic energy reserve. The sequestration of CO2 provides another important benefit. The BLM needs to reconsider its RFD Scenario given the extreme potential for enhanced oil recovery in this region.	
10286	10286-53	Thus, the BLM must carefully explain to the public that the RFD Scenario is not a cap or limitation on future development. In the most recent published decision from the IBLA regarding the RFD Scenario, the IBLA unequivocally determined that the RFD Scenario is not, and cannot be used as, a limitation on future oil and gas development. "While an important tool in the land use planning process, RFD scenarios do not constitute fixed or maximum limits on development under FLPMA such that exceeding them constitutes a violation of that statute." Biodiversity Conservation Alliance, et al., 1741BLA 1, 11 (2008). In order to prevent future litigation and appeals, the BLM must include language in the Record of Decision and the Bighorn RMPs describing the purpose of the RFD Scenario and the fact that the RFD Scenario is not a planning decision or limitation on future oil and gas development. Instruction Memorandum 2004-089, Policy for Reasonably Foreseeable Development (RFD) Scenario for Oil and Gas (Jan. 16, 2004).	2061
10286	10286-67	Devon questions whether the BLM has provided for adequate surface disturbance in Table 4.2 for the RFD Scenario. Bighorn RMP/DEIS, pg. 4-487. As the BLM is aware, oil and gas operators are currently utilizing horizontal development techniques in Wyoming, in particular, in the Bighorn Basin to develop and produce oil and gas from shale or other formations that previously could not be to developed. The use of horizontal drilling techniques, however, requires the creation of much larger individual well pads than traditional vertical or directional development. Although the number of actual wellbores maybe less and, as noted above, as little as one well pad per section, individual well pads are often significantly larger-as large as ten or twelve acres in size prior to interim reclamation. The larger well pad size is necessary to accommodate larger drilling rigs utilized for horizontal development and to accommodate the significant amount of equipment necessary for large stimulation and hydraulic fracturing processes necessary to develop these resources. As many as 100 individual tanks may be necessary to store the water, sand, and other materials necessary to hydraulically fracture a single horizontal well. The BLM should account for this additional disturbance in its RFD Scenario to ensure that it has adequately and properly analyzed potential impacts on oil and gas development in the Bighorn Basin RMP/EIS.	2061
10286	10286-41	BLM's proposal under Alternative B, Alternative C, or Alternative D to substantially increase the number of acres subject to ROW exclusion and avoidance areas in the proposed Bighorn RMPs. Bighorn RMP, Record No. 6034, pg. 2-111. The BLM has not justified this substantial increase in the number of acres subject to ROW exclusion and avoidance areas. Devon is particularly concerned that the ROW excludance and avoidance areas will be utilized to significantly hamper or decrease oil and gas operations. The BLM must be willing to work with oil and gas lessees and operators to design access routes	2066

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		for proposed oil and gas development projects. Future limitations on road construction could impact Devon's valid and existing lease rights or its rights as the operator of a unit such as the Worland Unit. While the issuance of an oil and gas lease does not guarantee access to the leasehold, a federal lessee is entitled to use such part of the surface as may be necessary to produce the leased substance. 43 C.F.R. Â§ 3101.1-2.	
10286	10286-34	For reasons that are not sufficiently explained in the Bighorn RMP Draft EIS, the BLM proposes to create management areas for sage-grouse that are very different from the Sage-grouse Core Areas developed by the State of Wyoming_ See State of Wyoming Executive Order No. 2011-5 (June 2, 2011) (Footnote 3: Although Devon does not fully support the sage grouse core strategy developed by the State of Wyoming, Devon was an active participant in the process and believes the policy provides for an important tool to both protect the sage grouse and foster continued oil and gas development. Although the Wyoming sage grouse core policy is far from perfect, it is a vast improvement from the sage grouse policy and protections developed by the BLM in the Bighorn RMPIDEIS.). It is imperative that the BLM and the State of Wyoming recognize and develop similar management objectives for sage-grouse core areas. Absent virtually identical management areas and mitigation measures, operators will be placed in a very difficult and precarious position of complying with different and potentially inconsistent management approaches.	2069
10286	10286-58	Further, the BLM's decision to create Key Habitat Areas in the Planning Area is incompatible with the State of Wyoming Sage-Grouse Core Areas and, thus, contrary to the January 2010 Greater Sage-Grouse Habitat Management Policy on the Wyoming Bureau of Land Management administered public lands including the federal mineral estate instruction memorandum authored by Wyoming BLM State Director, Don Simpson, that specifically requires and indicates the BLM will adopt the State of Wyoming's Sage-Grouse policy. See Instruction Memorandum No. WY-201O-012 (December 29, 2009). In the Instruction Memorandum, the BLM specifically and unequivocally indicates that Wyoming BLM sage-grouse "Key Habitat Areas correspond to the State of Wyoming's Core Population Areas (Core Areas)." Instruction Memorandum No. WY-2010-012, pg. 1.	2069
10286	10286-71	Additionally, the BLM has not adequately described the potential impacts the protective restrictions for Greater Sage-Grouse would have upon oil and gas development. The significant timing in NSO limitations proposed under Alterative B would effectively eliminate oil and gas development across large portions of the planning area. The BLM's extremely unreasonable noise restrictions may also have significant detrimental impacts to oil and gas development. The prohibition on additional noises beyond ambient levels in the majority of the planning area would effectively eliminate oil and gas development across the planning area. The BLM must more accurately describe these impacts in the RMP so the public is aware of the significant losses of revenue and jobs caused by the BLM's proposed management activities.	2071
10286	10286-45	In Section 2.7 the BLM suggests that under Alternative C, there is potential to exceed the NAAQS or WAAQs if the Alternative is adopted. Given the fact the BLM has not performed any air quality modeling for the Bighorn RMPs, and given the fact the State of Wyoming DEQ has recently implemented significant and comprehensive control requirements on all oil and gas operations within the State of Wyoming, the BLM has not sufficiently justified this assumption.	2009_1

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		Devon encourages the BLM to work with the WDEQ to determine if, given these new regulations, there is any potential for an exceedance of the NAAQS and WAAQS.	
10286	10286-47	In Table 3-3, the BLM indicates that a representative concentration for ozone is 62 parts per billion ("ppb"). The Bighorn RMP/DEIS, pg. 3-9. The text on page 3-13 of the Bighorn RMP/DEIS, however, suggests a slightly higher 66 ppb measurement, albeit that measurement was taken from a site on the other side of the Bighorn Mountains. Bighorn RMP/DEIS, pg. 3-13. The BLM should explain this apparent inconsistency.	2009_1
10286	10286-60	The BLM indicates in Section 4.1.1.1 that emission factors used to measure proposed emissions within the Bighorn planning area were obtained using WDEQ best available control technology ("BACT") levels for natural gas fired engines. The BLM should clarify whether it utilized BACT standards from 2011 or earlier standards. The WDEQ recently completed a rule making significantly modifying and reducing BACT standards in Wyoming. These new standards will undoubtedly reduce emissions from oil and gas projects. To the extent the BLM has not utilized the most recent BACT information the information contained in Chapter 4 and in Appendix U will not be accurate	2009_1
10286	10286-61	On page 4-9 of the draft RMP, the BLM indicates that as a result of higher levels of mineral development CH4 emissions are anticipated to be highest under. Alternative C, followed by Alternatives A, D, and B, respectively. Bighorn RMP/DEIS, pg. 4-9. On page 4-7 of the document, however, the BLM indicates that as a result of mineral development, CO2 emissions will be highest under Alternative C followed by Alternatives D, A, and B, respectively. Given the fact oil and gas development would be higher under Alternative C followed by Alternatives A, and then D, it seems likely that this should be the order for emissions as well. Bighorn RMP/DEIS, pg. 4-57. The BLM should explain this inconsistency.	2009_1
10286	10286-62	The BLM discussed that air quality impacts would primarily result from minerals development and production, and oil and gas activities. Bighorn RMP/DEIS, pg. 4-6. In fact, previous modeling performed by the State of Wyoming, EPA, and the Forest Service suggested that 90% of the air quality impacts at the Bridger Wilderness Area is attributable to distant forces outside of Wyoming, and not local sources within Wyoming. See The Southwest Wyoming Regional Calputt Air Quality Modeling Study: Final Report (SWWYTAF) (February 2001).	2009_2
10286	10286-63	In general, the BLM seems to assume, without analyses or support, that oil and gas development will necessarily cause greater impacts from fugitive dust and construction emissions than other types of energy development. Possibly this underestimation is simply a result of BLM's greater familiarity with potential impacts of oil and gas development given the long history of oil and gas development within the State of Wyoming. Devon encourages the BLM to review carefully its emissions analyses as contained in Appendix U to ensure it is adequately and accurately capturing potential construction and future dust emissions related renewable energy development. If BLM does not have adequate information to support its analyses that oil and gas development, rather than renewable energy development or other uses of the public lands, then BLM should not imply that oil and gas development necessarily causes more emissions from fugitive dust and construction emissions. The BLM also should ensure it has adequately captured the motor vehicle emissions associated with maintaining renewable energy infrastructure, including wind	2009_2

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		turbines. Just like oil and gas wells must be visited on a near-daily basis, wind turbines must be similarly inspected and maintained on an on-going basis.	
10288	10288-5	Based on WGFD Big Game Crucial Habitat identification, the area identified as Big Game Crucial Winter Range by the BLM within the Plan Area is much larger (almost double) than necessary for the maintenance of populations at objective levels. Consequently, we request BLM re-evaluate areas identified as Big Game Crucial Winter Range in the BHB Draft RMP and limit the designation of such areas to those necessary for the maintenance of populations at objective levels (i.e. to be consistent with WGFD Big Game Crucial Habitats).	2022
10288	10288-6	Based on the USFWS's recent findings and determination regarding the mountain plover, the stipulations and protections afforded to the mountain plover under the BHB RPM in Management Action #4125 and the Chapman Bench ACEC (Page 2-88, Table 2-5, Record #4125) is no longer warranted or scientifically justified.	2041
10288	10288-2	The Impact Analysis for Planning Model (IMPLAN) is a model using regional analysis. It appears the Big Horn Basin would be better analyzed with a more geographic specific approach. For example, in Table X-I, IMPLAN identifies regional oil and gas well numbers including coalbed natural gas. There has been very limited exploration and not any marketable sales from coalbed natural gas development in the Big Horn Basin. It appears the model may be using the entire state of Wyoming for a regional model. It is precisely because of the use of data like this that has no bearing on oil and gas development in the BHB makes the reported information and findings questionable.	2046
10288	10288-9	Discrepancy between Cooperating and Coordinating Agencies in the Scoping Process of the RMP and EIS. County Commissioners, certain conservation districts, the State of Wyoming, and certain agencies of the State of Wyoming applied for and were granted "cooperator" status during the scoping process of the RMP/EIS as provided for in the National Environmental Policy Act (NEPA) and BLM regulations. However, it does not appear that state and local governments were accorded "coordinating" status as required by FLPMA.	2060
10288	10288-3	Devon questions whether the BLM has provided for adequate surface disturbance in Table 4.2 for the RFD Scenario. Bighorn RMP/DEIS, pg. 4-487. As the BLM is aware, oil and gas operators are currently utilizing horizontal development techniques in Wyoming, in particular, in the Bighorn Basin to develop and produce oil and gas from shale or other formations that previously could not be to developed. The use of horizontal drilling techniques, however, requires the creation of much larger individual well pads than traditional vertical or directional development. Although the number of actual wellbores maybe less and, as noted above, as little as one well pad per section, individual well pads are often significantly larger-as large as ten or twelve acres in size prior to interim reclamation. The larger well pad size is necessary to accommodate larger drilling rigs utilized for horizontal development and to accommodate the significant amount of equipment necessary for large stimulation and hydraulic fracturing processes necessary to develop these resources. As many as 100 individual tanks may be necessary to store the water, sand, and other materials necessary to hydraulically fracture a single horizontal well. The BLM should account for this additional disturbance in its RFD Scenario to ensure that it has adequately and properly analyzed potential impacts on oil and gas development in the Bighorn Basin RMP/EIS.	2061
10288	10288-7	Conversely, A multitude of tables in the RMP Air Quality Technical Support	2009_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		Document, Appendix U, were labeled "Summary of ROW and Corridors Emissions" for Alternatives A, B, C, and D - tabled for the years 2005, 2015, and 2024, respectively. Activities included, for total purported emissions (PM10, PM2.5, NOx, SO2, CO, VOC, HAPs): "Heavy Equipment - Fugitive Dust; Heavy Equipment - Vehicle Exhaust; Commuting Vehicles - Fugitive Dust; Commuting Vehicles - Vehicle Exhaust." Emission levels were an order of magnitude lower in these tables, for similar vehicle operations, as compared to the tables labeled "Total Annual Emissions from Oil Wells." Source locations of the variables to generate emission figures - are questionable. It is not clear if emission figures were generated from data gathered within the Planning Area. On a similar note - Regarding motor vehicle operations/emissions/fugitive dust and Yellowstone National Park -visitation was down 5 percent, with 2,383,614 visitors, this year to date (Cody Enterprise - 08/08/2011). However, vehicle emissions from tourism and air quality effects were not addressed in the RMP - albeit air quality monitoring data from "oil wells" were.	
10289	10289-1	Designate all HMAs and HAs in the planning area as wild horse ranges to be managed principally for wild horse herds pursuant to 43 C.F.R. 4710.3-2. Wild horses should be allocated a minimum of 51 percent of forage and water resources in the HMAs.	2030
10299	10299-3	One of the most upsetting parts is the reasonable foreseeable development. According to the Wyoming Enhanced Oil Recovery Commission, there are great possibilities with C02 flooding and enhanced oil recovery. Additionally, the BLM fails to include reasonably foreseeable development which addresses horizontal and directional drilling - technologies happening in our neighbor communities.	2005
10299	10299-2	Research shows that BLM dependent ranch operations use of one AUM of BLM grazing would support 2.46 AUMs of livestock production. These numbers equate to the following: (all numbers are Millions of $)Value of Livestock Value of BLM AUMS Value of Total Production Value to Ranch Viability Production $10.9 $15.8 $26.9Earnings $3.5 $5.0 $12.4Employment 107 155 382.	2011
10299	10299-6	There is a discrepancy in the Big Game Winter Range area identified by the BLM and also by the WGFD. BLM Big Game Crucial Range covers nearly twice the area as WGFD Big Game Crucial Habitat, nearly 649,246 acres.	2022
10299	10299-9	The BLM did not conduct a study of special designations and other management areas and the economic impact on stakeholders and locals governments from the associated constraints and restrictions.	2046
10299	10299-7	As for Sage grouse conservation / protection, the BLM should defer to the USDA, State of Wyoming's Executive Order 2011-5 and local ranchers and farmers for the best management practices. The USDA is providing 21.8 million dollars to encourage ranchers and farmers in Wyoming to conserve habitat for the greater sage grouse, according to Agriculture Secretary Tom Vilsack.	2071
10329	10329-2	There are 687 grazing allotments in the planning area. Of those, 203 are either completely or partially in LWCs. The inventoried LWCs cover 569,277 acres or approximately 27% of the allotments. The following numbers are provided by Van Tassel and Richardson (1998) and Taylor (2004). Research shows that BLM dependent ranch operations use of one AUM of BLM grazing would support 2.46 AUMs of livestock production. These numbers equate to the following: (all numbers are Millions of $) Value of BLM AUMs Value of Total Production Value to Ranch Viability Value of Livestock Production $10.9 $15.8 $26.9Earnings $3.5 $5.0 $12.4Employment 107 155 382	2011

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10329	10329-1	The plan states oil & gas development would result in adverse impacts to wildlife habitat. As quoted in the plan: "As the number of wells, roads, and facilities increase, habitat in and near well fields, due to degradation, invasive species spread, and fragmentation, may become less suitable until most animals no longer use these areas". I ask what scientific study was done in the basin to prove this statement as true? As an outdoors person I have found antelope and deer in habitats with oil pads, drilling rigs, and roads hauling equipment.	2025
10329	10329-5	You state in the plan "reducing the number of biological entities in a system or making some of them less abundant reduces diversity", Yet nowhere in the plan do you address, using sound science, the decrease in this diversity having negatively affected the planning area,	2025
10329	10329-3	According to the Dean Runyan Report 2007, 80% of our Big Horn Basin tourist activities are outdoor activities. According to Wyoming Travel & Tourism; tourism spending reached $350 million dollars in2010 in the Big Horn Basin and supported 4660 jobs with earnings of over $97 million dollars. This generates $35 million dollars in sales tax collections for the Basin.	2046
10329	10329-4	Sage grouse conservation / protection, The BLM, in their plan, should defer to the USDA, State of Wyoming's Executive Order 2011-5 and local ranchers and farmers for the best management practices,	2071
10331	10331-1	4) Interior Secretary Ken Salazar has directed the BLM to "take no action under the Wild Lands Order," which Alternatives B & D were written for. Even if the term "wild lands" is changed to a new term, they are still illegal because the new term would merely be a synonym with the same intent.	2027
10332	10332-1	7. Western's transmission lines are likely already designated as ROW corridors within the two field offices. Please confirm this, as well as whether other linear features, such as pipelines, other transmission lines or distribution lines, will be required to locate adjacent to Western's transmission lines. If that is the case, then Western will work with the new proponent to ensure the continued safe and reliable operation of its facilities.	2066
10333	10333-2	the RMP is inadequate and understates the future potential of oil and gas development and recovery of existing reserves. Marathon recommends that the document be updated to include the concerns of industry and the State of Wyoming Joint Minerals, Business and Economic Development Committee, as stated in their letter to the BLM dated June 27, 2011.	2061
10336	10336-1	â€¢ Designate all HMAs and HAs in the planning area as wild horse ranges to be managed principally for wild horse herds pursuant to 43 C.F.R. 4710.3-2. Wild horses should be allocated a minimum of 51 percent of forage and water resources in the HMAs.	2030
10340	10340-2	Please explain on the record, in the response to public comments on the DEIS, how BLM has determined that reaching an agreement on the final plan in advance of analyzing public comments or even completing the public comment period aligns with its obligations under NEPA, How does BLM maintain credibility with the public when a decision is apparently reached in violation of the intent of the NEPA public comment process?	2054
10361	10361-1	The efficient and effective operation of the power delivery system is fundamental to Tri-State and its member entity operations. The power delivery infrastructure encompasses the construction of new transmission facilities to support electricity demand and load, and maintaining existing transmission facilities to ensure reliable supply of electricity. What specific management	2066

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		prescriptions (mitigation requirements) is BLM considering for construction and operation of new transmission lines in the areas mapped on Map 54 as "Right-of-way Avoidance and Mitigation Areas"? Will these new management prescriptions be applied to existing facilities now or in the future when these facilities are upgraded or improved?	
10362	10362-2	The Big Horn is the first, with studies this year for its potential for CO2 sequestration and "transitional sequestration" sites, new sources for CO2, and Rare Earth Elements and new gas and oil. We believe the final RMP and EIS should address these and other private and public explorations which will certainly continue into the twenty year time period of the RMP.	2015
10362	10362-1	We feel the draft RMP and draft EIS do not adequately address the application of Enhanced Oil Recovery (EOR).All of the known oil fields in the Big Horn Basin have been identified as residual oil zones (ROZ) by the University of Wyoming's Enhanced Oil Recovery Institute (EORI). Success by the Institute working with private oil field owners in recovering quantities of oil from similar old fields through the application of CO2 flooding is prompting private industry to look for CO2 sources in the Basin and to plan for pipelines into the Basin which will transport CO2 from western Wyoming, all of which will generate income. Within the last 60 days a pipeline/gas company has discussed their desire to place a pipeline into the Big Horn Basin for delivery of CO2.The Big Horn Basin ROZ will almost certainly be subject to CO2 flooding during the twenty-year RMP period. The final RMP and EIS should certainly take into account the reality of the potential for EOR activities.	2051
10364	10364-2	Record # 4055 (p. 2-73), under Alternative B and D, indicates that the BLM will "[i]ntensively manage intermittent streams judged as having potential to become, or return to being, perennial streams with fish on a watershed scale to perennial flows." This seems both inappropriate and unrealistic, if not contrary to Wyoming law. Only the State of Wyoming is able to obtain and hold a right for instream fisheries purposes.	2002
10364	10364-16	The management prescriptions under Alternative D, as outlined in Record # 5020, 5022, and 5023 (pp. 2-97 and 2-98), use the word "avoid." The common legal definition of "avoid" is "to make void or of no effect; invalidate." One may be led to the conclusion that surface-disturbing activities are precluded within 3 miles of important cultural sites throughout the Planning Area. Rather, it should be interpreted "as a term used to address mitigation of some activity" consistent with the definition provided in the Draft RMP and DEIS (p. Glossary-4). Although the use of the word "avoid" seems a poor choice, given the definition provided in the Draft RMP and DEIS it seems reasonable to include "(see Glossary)" following "avoid" in each of the Record #s referenced above.	2004
10364	10364-15	It appears as if Record #4077, Alternative D, was developed to address disruptive activities associated with grazing in delineated elk parturition habitat. I and others are concerned with the accuracy of current parturition habitat lines and further believe that those lines vary from year-to-year based on predator pressure and weather patterns. Consistent with comments outlined in letters from the Wyoming Game and Fish Department and the Wyoming Department of Agriculture, I cannot support this Alternative and would not support restricting cattle grazing in parturition areas based on the premise of disturbance. However, if Record #4077 was developed to address potential brucellosis impacts, I recommend the following language, "BLM would consider implementation, on a case by case basis, management actions jointly	2020

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		recommended by wildlife managers, grazing permittees, and animal health officials that would control the transmission of brucellosis."	
10364	10364-18	For example, on July 25, 2011 Bob Abbey, BLM Director, issued IM No. 2011-154, Requirement to Conduct and Maintain Inventory Information for Wilderness Characteristics and to Consider Lands with Wilderness Characteristics in Land Use Plans. As stated in the IM, "[t]his IM placed Bureau of Land Management (BLM) Manuals 6301, 6302, and 6303 into abeyance until further notice." But still, portions of the Draft RMP and EIS refer to Manuals 6301, 6302, and 6303. The Final RMP and EIS, when released, should apply current law and guidance and thus remove all references and narrative relating to Secretarial Order 3310 and its associated manuals. (See for instance: Executive Summary and Chapters 1 through 4.)	2027
10364	10364-19	The BLM"s analysis of lands with wilderness characteristics done in conjunction with the development of the Draft RMP and DEIS is of particular concern. As you are aware, local cooperators have presented information that appears to identify flaws with the BLM's inventory and analysis. Local cooperators identified that almost 20% of BLM lands were erroneously identified as having wilderness characteristics. In this area, the BLM identified 56 areas comprising a total of 571,000 acres. This area includes 634 miles of roads (of which 518 are two track), 442 reservoirs, 296 miles of fence, 569,273 acres of active allotments, 154 range improvements, 10 miles of water pipeline, 17 water wells, 8 oil fields, 68 miles of oil and gas pipeline, 8 active oil and gas wells, 59 plugged and abandoned oil and gas wells, and 248,315 acres (43%) which have oil and gas leases. Based on a review of the BLM and local cooperator findings, I cannot support the designation of any lands with wilderness characteristics in the Bighorn Basin. Further, the BLM should, in conjunction with local cooperators, initiate a new inventory process in order to correct what otherwise appears to be a misclassification of approximately 571,000 acres of land as lands with wilderness characteristics.	2027
10364	10364-8	The BLM intends to designate oil and gas management areas in the Bighorn Basin where the priority use is oil and gas development. For each of the ROZ Potential Sites listed in Table 1 (see Attachment A), the State requests that the BLM adopt (and spatially expand where necessary) the oil and gas management areas identified in Alternative C. The oil and gas management areas identified in Alternative D are insufficient to accommodate EOR development in all of the ROZs. In addition, the State requests BLM expand the Alternative C oil and gas management areas by 24,819 acres to encompass all federal surface and minerals within each ROZ Potential Site. The State requests that all Federal surface and minerals within the ROZ Potential Sites shown on Figure 1 (see Attachment A) be designated as oil and gas management areas as defined for Alternative C. A summary of the additional sections of federal surface and minerals that should be added to the Alternative C oil and gas management areas for each ROZ Potential Site is provided in Table 2 (see Attachment A).The primary resource use in the areas designated as oil and gas management areas will be oil and gas development. The BLM should clearly state in the RMP that development will be allowed to proceed within oil and gas management areas without amending the RMP so long as new well spacing does not exceed current well spacing in the fields. As stated previously, the State requests BLM adopt Alternative C for oil and gas management areas. In addition, the state requests BLM modify the description of Alternative C in Record # 2029 (Table 2-	2050

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		5) as follows: "Delineate Oil and Gas Management Areas (Map 21) (568,164 592,983 acres) around intensively-developed existing fields and existing fields with potential for enhanced oil recovery, using a buffer zone of up to 2 miles from the outer boundary of the existing field (Map 23). and incorporating all Federal surface and minerals within the boundaries of ROZ Potential Sites. Within these areas, manage primarily for oil and gas exploration and development (including EOR) and carbon sequestration; consider all other surface uses secondary." The oil and gas management areas would be allowed to be developed at the well spacing and surface densities (for all surface disturbing activities) of the existing fields.	
10364	10364-12	The description of CO2 sequestration (Record # 2035, p. 2-58) for Alternatives B and D are unrealistic. BLM needs to recognize that at some point in time EOR projects may qualify as sequestration projects for myriad federal and state laws and regulations. In fact, many now agree that the only currently-economic mechanism for geologic sequestration of CO2 is EOR. Alternative B would prohibit CO2 sequestration and Alternative D would allow sequestration only where it does â€œnot detractâ€ from other resource objectives. BLM needs to consider the link between EOR and sequestration when evaluating the feasibility of these alternatives. BLM should not and likely cannot adopt Alternative B. Further, the standard established by Alternative D is arbitrary and capricious. I request that the BLM adopt Alternative C for CO2 sequestration and dismiss Alternatives B and D from the Final EIS.	2051
10364	10364-3	The Draft RMP and DEIS fails to discuss advances in horizontal drilling and hydraulic fracturing technologies that are unlocking commercial oil rates from tight oil sands in the Turner, Parkman, and Sussex formations and shale oil from the Niobrara and other Cretaceous shales in other basins of the state.	2051
10364	10364-5	Recent advances in EOR, particularly using carbon dioxide (CO2) have proven economically effective in producing large quantities below the oil-water contact in similar (but with lower oil saturations) reservoirs in the Permian Basin in Texas. Based on recent studies completed in the Bighorn Basin by EORI and discussion with operators, it is reasonable to conclude that historically produced MPZs and previously uneconomic ROZs in the Bighorn Basin will be the target of EOR projects during the RMP projection period. The Wyoming Pipeline Authority has completed work that projects that the CO2 necessary to support EOR could reasonably be delivered to the Bighorn Basin as early as 2016. Current and projected oil prices indicate that EOR in the Bighorn Basin will be economically viable. The State of Wyoming has initiated and will continue to support significant efforts to accelerate potential EOR development in the Bighorn Basin and local governments in the Planning Area strongly support these efforts. EOR potential in the Bighorn Basin needs to be more fully described in the Final RMP and Final EIS.	2051
10364	10364-6	If the CO2 network is implemented as stated above, oil production would mimic the curve shown on Figure 2 (see Attachment A) and production could rise to over 20 million barrels per year by 2028 (the BLM RFD Scenario projects 4.2 million barrels per year). Obviously, such a significant increase in production would positively affect the forecasted annual earnings for all the alternatives contained in the Draft RMP and DEIS (p. 2-226). Not only would an increase in oil production from the basin benefit the Federal coffers and the State of Wyoming, significant increases would be expected in local revenues and would change for the better the dismal annual employment forecasted in the Draft	2051

Table B-1. Individual Comments and BLM Response Index (Continued)

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		RMP and DEIS (p. 2-226).I request that the BLM fully evaluate the potential for significant EOR development in the Bighorn Basin during the projection period in the Final EIS and revise the Draft RMP as necessary to facilitate and expedite EOR. I will expect the Final RMP and EIS to provide sufficient analysis and candid public disclosure to allow EOR development in the ROZs to proceed using Environmental Assessments rather than lengthy Environmental Impact Statements with significant plan amendments.	
10364	10364-20	The definition for surface-disturbing activities provided in the Draft RMP and DEIS (p. Glossary-38) is not the agreed upon definition by the BLM and cooperators, nor is it consistent with any other RMP in the state. I recommend that the BLM apply the definition for surface disturbing activities outlined in Information Bulletin No. WY-2007-029, Guidance for Use of Standardized Surface Use Definitions.	2054
10364	10364-4	In particular, I believe that additional discussion of production potential from the Mowry Shale should be addressed in the Final EIS and RMP.	2061
10364	10364-7	However, the BLM is not as clear on how impacts are treated and how disturbance is calculated from these well counts. It is my understanding that disturbance and impacts projected using the RFD well counts is also provided solely for the purposes of comparing impacts between Alternatives and that it is not BLM's intention that any of the estimates of disturbance or impacts provided in the RMP or EIS represent "analysis thresholds" for determining what actions may require a plan amendment. The relationship between disturbance estimates and impacts and what constitutes an analysis threshold is not clear in the Draft RMP and DEIS and BLM needs to provide a clear statement that exceeding the estimates of disturbance or impacts in the EIS will not result in the need for an RMP amendment. For instance, in Appendix T of the Draft RMP and DEIS BLM calculates short- and long-term surface disturbance from leasable oil and gas for each of the alternatives. Short-term disturbance during the 20-year projection period ranges from 1,527 (Alternative B) to 3,771 acres (Alternative C) on public lands. The projection for fee and state surface is 1,533 acres for all alternatives. BLM needs to clarify in the Final RMP and EIS that these estimates are provided for analysis purposes only to demonstrate the difference between alternatives and that disturbance or impacts beyond the analysis assumptions does not require a plan amendment.	2061
10364	10364-11	In addition, it is questionable that over 60 percent of the federal minerals and 80 percent of the BLM managed surface in the planning area needs to be subjected to "stringent terms and conditions" associated with ROW avoidance/mitigation areas. I request that the BLM reevaluate the criteria used to delineate ROW avoidance/mitigation areas with a goal toward balancing other resource uses of public lands. It may be beneficial to segregate avoidance and mitigation areas into two separate analyses so that it is clear to the public which areas should be avoided and which areas will require mitigation.	2066
10364	10364-10	While none of the ROW exclusion areas under either Alternative C or D appear to conflict with development of the ROZ Potential Sites, my staff did locate numerous areas during review of the BLM shapefiles where ROW exclusion areas overlap corridors for Alternative D. Where such overlap occurs regardless of Alternative, I request the BLM clearly document in the RMP that the ROW corridors take precedence over the ROW exclusion areas. Record # 6034 (p. 2-111) addresses ROW avoidance/mitigation areas. Under Alternative D BLM proposes to manage 2,512,202 acres within the planning area as ROW	2067

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Table B-1. Individual Comments and BLM Response Index (Continued)

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		avoidance/mitigation areas. Under Alternative C 1,174,335 acres would be managed as ROW avoidance/mitigation areas. The draft RMP/EIS defines "avoidance areas" as they pertain to ROW as follows: "ROWs either will not be granted in these areas, or if granted will be subject to stringent terms and conditions." (p. Glossary-4)[Footnote 5: Each polygon is attributed with a width in the shapefile, but we were unable to discern whether that width represented a width limit for the corridor or whether the attribute was used for mapping purposes.] In many cases, these ROW avoidance/mitigation areas are located within or overlap oil and gas management areas and corridors identified for both Alternatives C and D. It is inconsistent to identify an area where development will be the priority use while at the same time designating the same area as a ROW avoidance/mitigation area. I request that ROW avoidance/mitigation areas be removed from areas designated as oil and gas management areas and corridors under all alternatives.	
10364	10364-9	Right-of-Way Corridors and Right-of-Way Avoidance/Mitigation Areas The right-of-way (ROW) corridors identified in Alternative D will "strand" several of the ROZ Potential Sites from cost effective CO2 delivery and product shipment and may result in a disproportionate impact to private lands. I request that the BLM adopt the ROW corridors identified in Alternative C and shown on Map 53. If Alternative C is selected, all the ROZ Potential Sites can be accommodated using RMP corridors. I have been unable to locate in the Draft RMP and DEIS a specific description of the width of these ROW corridors and the ROW corridor polygons in the GIS shapefile provided by BLM for review by my staff appears to vary depending on location [Footnote 5]. Discussions with BLM staff have suggested that the width of these ROW corridors would be left to the discretion of the authorized officer. I believe that discretionary decisions will lead to confusion and may undermine the benefits to the environment intended by the ROW corridor designations. Consequently, I request that the BLM adopt corridors identified in Alternative C and modify Record # 6033 in Table 2-5 (p. 2-111) as follows: "Designate ROW corridors as shown on Map (Map 53). No limit will be placed on the width of these corridors as long as new linear facilities are constructed adjacent to existing linear facilities recognizing the need for adequate separation for operating system integrity, safety (construction and operations), appropriate federal, state and local statutes, regulations and policies, and land use constraints. Where BLM determines that a linear facility should be moved away from an adjacent utility to avoid a resource conflict, the new linear facility will still be considered to be within the RMP corridor."	2067
10364	10364-14	As noted in the Draft RMP and DEIS, Key Habitat Areas established by the BLM are not consistent with the Core Areas identified in Governor's Executive Order 2011-5 (71,241 acres larger). It is critical and is my expectation that the BLM's Key Habitat Areas remain consistent with the Core Areas (version 3). Deviation is one thing that will undermine support for the greater sage-grouse conservation strategy embodied in the Executive Order. BLM's Instruction Memorandum (IM) No. WY-2010-12 states that "WY BLM sage-grouse Key Habitat Areas correspond to the State of Wyoming's Core Population Areas (Core Areas)." The U.S. Fish and Wildlife Service consider the Core Population Area Strategy "a sound framework for a policy by which to conserve greater sage-grouse in Wyoming." BLM has served as a member of the Sage-Grouse Implementation Team with equal opportunity for input into the development of Core Areas. The Key Habitat Areas and associated protections identified in the Draft RMP and DEIS should be changed to reflect Core Areas (version 3) and	2069

Table B-1. Individual Comments and BLM Response Index (Continued)

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		stipulations outlined in Governor's Executive Order 2011-5.	
10364	10364-13	The Draft RMP and DEIS references the "Wyoming Office of the Governor 2008" (pp. 3-111 4-497, and 6-29), a reference to Governor's Executive Order 2008-2 Greater Sage-Grouse Core Area Protection. This is inaccurate. Governor's Executive Order 2008-2 was replaced by Governor's Executive Order 2010-4 and subsequently replaced by Governor's Executive Order 2011-5 Greater Sage-Grouse Core Area Protection, which I signed on June 2, 2011. To the extent necessary these references and associated language should be corrected to reflect the most up to date information. Further, the references - e.g., "WGFD has identified core areas" (p. 3-111) or "core areas identified by the WGFD" - should instead note that the established or identified core areas are by virtue of my Executive Order 2011-5.	2071
10366	10366-1	Comment #3: The above referenced table (Table 4-25 Bighorn Basin Draft Resource Management Plan/Draft Environmental Impact Statement) reflects a dramatic difference in local ad valorem production taxes when compared with the below information: (See Figure 35, Ecosystem Research Group (ERG)). The BLM/RMP Alternative C estimates a total collection of royalties, state severance taxes and local ad valorem production taxes of $93.5 million of 2008 dollars. The ERG group, when estimating tax revenue dollars generated from potential development from the Mowry Shale Formation could reach $2.3 billion over the life of the plan. COMMENT THIS RESOURCE MUST BE RECOGNIZED AND DEVELOPMENT OF THIS POTENTIAL RESOURCE MUST BE ENCOURAGED WITHIN THE BLM/RMP!!!	2046
10368	10368-8	Page 2-34, third paragraph: the restriction limiting surface disturbing activities within 500 feet and up to 1/4 mile of riparian wetland areas may eliminate the ability of the Company to serve customers who are located near or adjacent to these areas because distribution lines generally cannot span such long distances. The Company recommends that a site-specific exemption process for such instances be incorporated under Alternative D,	2033
10368	10368-9	Same location as above: the NSO restriction on wetland areas greater than 20 acres is arbitrary and requires further rationale to support the use of that specific acreage,	2033
10368	10368-11	In Table 2-5, Management Action 4113, the Company would like the BLM to clarify what is intended by the statement regarding retrofitting of existing lines. The Company has coordinated extensively with the U.S. Fish and Wildlife Service to develop and enact an Avian Protection Plan. It is not feasible to make all existing power lines and structures avian-safe all at once. Retrofitting is done according to a risk analysis which prioritizes higher risk lines and structures first. All new lines are built avian-safe. Furthermore, the Company has done extensive research regarding the use of anti-perch devices which demonstrate that they are not effective, in many cases are counter-productive, and lastly have no basis in scientific findings.	2042
10368	10368-12	Page 4-319, third paragraph: The Company seeks clarification regarding the use of the term 'aboveground'. Specifically, the Company is adverse to 'underground' powerlines as a form of mitigation given the general lack of understanding regarding the complications, high levels of disturbance, and limitations of underground transmission.	2066
10368	10368-2	The Company also requests that the BLM disclose what is meant by the term 'crowding' especially as it relates to electrical facilities. Similarly, the statement in the first paragraph on page 4-314 regarding 'maximum safe density of	2066

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		existing powerlines' requires further explanation. As stated above, the Company has a legal and regulatory obligation to plan and provide electricity and transmission service in a safe, reliable, adequate, and efficient manner to its customers. In the Company's experience as well as that of many utilities, concentrating transmission lines in a single ROW is counter to good planning and professional practice in that doing so can compromise system reliability and decrease system efficiency.	
10368	10368-4	The Company also suggests that the BLM modify its assumption on page 4-311 under Section 4.6.3.1 which states 'In terms of major utility lines, companies would focus first on the maintenance and upgrading of existing lines before undertaking new construction of major utility lines in the Planning Area.' As a starting point, the BLM should define what it means by 'major utility lines.' The Company suggests that the BLM base its definition on those used by the agencies under which electrical utilities are regulated, namely the Federal Energy Regulatory Commission (FERC) and the Western Electricity Coordinating Council (WECC). More importantly, the BLM needs to better understand the complexities and limitations behind the Company's ability to upgrade existing facilities because in many cases doing so may conflict with the Company's regulatory obligations to its customers. For example, existing lines may not be located in areas with increased load demand; upgrading an existing line may not provide the necessary benefit nor be the most prudent solution; and/or it may not be possible to take extended outages on fully-utilized existing lines in order to complete upgrades. It is important for the BLM to recognize that the capability of an electrical sub-transmission and distribution system is limited by the distance of the line. If only existing ROWs are used, then the ability to serve load using existing facilities may be greatly reduced by the additional line miles realized. Therefore, effectively reducing the capacity of sub-transmission and distribution systems may actually result in an increased transmission presence in the Basin due to the Company's regulatory need to build more transmission facilities to meet customer demand. Other restrictions, such as major re-routes (detours that increase line mileage by greater than 15%) could also have similar affects. Therefore, the BLM should assume that new ROWs will be needed within the planning horizon outside those currently occupied by existing lines.	2066
10368	10368-6	The Company is concerned about the dramatic decrease in areas available for new ROWs (from 788,275 acres down to 132,219 acres) and increase in areas identified as ROW avoidance/mitigation areas (from 1,003,194 acres up to 2,551,205 acres). These changes seem disproportionate to the need for future ROWs in the Planning Area.	2066
10368	10368-7	The Company would also like the BLM to explain its rationale to use the criteria for ROW avoidance/mitigation areas identified in the first bullet on page 4-313 as 'areas having a 25 percent or greater slope.' In fact, the Company has extensive ROW in such areas and is concerned that making such a blanket assumption will result in unnecessary complications to process new ROW in such areas. The Company recommends that the BLM identify an exemption process that will not preclude development of future ROWs due to the wholesale application of this criteria.	2066
10368	10368-1	With this in mind, the Company respectfully disagrees with the statement in the last paragraph on page 3-154 which states 'If the current rate of development continues and current management remains in place, designated ROW corridors should adequately meet future needs over the next 10 to 20 years. At this rate	2067

Table B-1. Individual Comments and BLM Response Index (Continued)

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		of development, corridors could eventually be more intensely used, but the BLM does not anticipate crowding. This statement is mostly reiterated in Section 4.6.3.1 on page 4-312 as an assumption used by the BLM in analyzing impacts to rights-of-way (ROW). In addition, the Company disagrees with the statement in the first paragraph on page 3-155 which implies that oil and gas production in the Planning Area is expected to come mostly from established fields that already have adequate infrastructure in place as well as the statement in the subsequent paragraph that the demand for electric ROWs in the Planning area will remain moderate over the next 10 to 20 years. In fact, the Company expects that its electrical facilities in the Big Horn Basin are not adequate to serve load in the next 10-15 years. For example, the Oregon Basin substation is currently seeking approval to expand in support of oil development that is occurring over the next two years. Furthermore, current load requests will require substantial subtransmission additions by 2014. If these trends continue the electrical system in the area will be substantially larger than today's system. Therefore, the impacts of implementing alternative D are not accurately portrayed in the document because the designated corridors will not adequately meet the future needs over the short term, let alone the planning horizon of the Project. Additionally, the current rate of development as defined by the BLM is not an accurate metric and should be updated to anticipate an increased rate of development which the Company would gladly collaborate with the BLM to help develop.	
10368	10368-3	Finally, the Company disagrees with and requests further clarification as to the origins of the statement in the sixth paragraph on page 3-155 that the development of transmission lines on public lands can create 'perceived threats to safety.'	2067
10368	10368-5	The Company has recognized that some of its existing transmission facilities should be represented in Map 54 (Land Resources Rights-of-Way and Corridors under Alternative D) and identified as ROWs that are not located in avoidance/mitigation areas. Attachment 1 is a low resolution map depicting the Company's existing facilities in the Planning Area; a better map can be provided upon BLM's request. Some of the facilities that need to be identified (demarcated in the red bubbles in Attachment 1) include: the 115kV transmission line between Thermopolis and the Hilltop Substation near Worland, the 115kV transmission lines extending to the west interconnecting with a Western Area Power Authority line as well as serving the Curly Creek pumping station (Express Tap), the 69kV transmission line between the Oregon Basin Substation and the South Cody Tap (not represented on Attachment 1).	2067
10368	10368-10	Page 3-111, third paragraph: abandonment of habitat by Greater Sage -grouse due to powerlines is not supported by scientific studies.	2071
10369	10369-12	This discretionary authority must be limited. In order to conduct safe and effective oil and gas operations, it is imperative for operators to have, at a minimum, limited access to well locations year-round to perform inspections, maintenance and other obligatory operations. BLM must recognize that certain inspection and maintenance activities must be conducted regularly and cannot be delayed. We recognize that limitation on some disruptive activities and access to well locations during critical seasons may be necessary, such as prohibiting construction activities (e.g. well pads, roads, pits) or limiting the number of trips allowed in the winter on big game crucial winter range when warranted. Therefore, we strongly recommend that BLM modify this proposal	2020

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		under Alternative D such that BLM will allow reasonable access to existing well locations year-round for maintenance and operation of developed projects, even in wildlife sensitive habitats; basic maintenance and operation activities necessary to maintain safe, effective, and environmentally sound operations should not be subject to wildlife seasonal restrictions.	
10369	10369-13	As such, we recommend BLM specifically identify areas where BLM will be able to apply seasonal wildlife protections on a case-by-case basis, and limit the use of case-by-case determinations to areas where application of protections is warranted and appropriate.	2020
10369	10369-10	Implementing a 4 ½ month TLS for crucial winter range and a 2 month TLS for parturition habitat will significantly, but unnecessarily, limit oil and gas development in these large areas. Consequently, we recommend that BLM limit the expanse of these habitat areas to the amount necessary for big game sustainability. We further recommend that BLM utilize WGFD Big Game Crucial Habitat Priority Areas (CHPA) as a guide for identification of these areas. Big Game CHPAs include crucial winter ranges, parturition areas, and migration routes with a ½-mile buffer for big horn sheep, elk, mule deer, pronghorn, moose, and mountain goat. Consequently, consistency with CHPAs will provide adequate protection of these important habitat areas. A comparison of big game crucial winter range and parturition habitat identified in the RMP (Map 35) to WGFD Big Game CHPAs reveals that the BLM's habitat areas are inexplicably much more expansive throughout the planning area, especially along its eastern, western (including the Absaroka Front Management Area), and southern boundaries. In light of this major discrepancy, it is necessary for BLM to re-evaluate its designation of big game crucial winter range and parturition habitat locations, and make them consistent with WGFD Big Game CHPA's.	2022
10369	10369-11	Based upon the identification of Big Game Crucial Habitat Priority Areas (CHPA) within the MA by the WGFD, the MA is much larger than necessary to protect big game populations. The total area defined as Big Game Crucial Habitat within the MA by the WGFD is significantly smaller than BLM's. In fact, the WGFD has only identified relatively small pockets of Big Game Crucial Habitat within the MA. In light of this discrepancy, we urge BLM re-evaluate the size and boundaries of the Absaroka Front Management Area such to include only habitat areas actually in need of special management, as indicated by WGFD Big Game Crucial Habitat designations. Additionally, this discrepancy clearly demonstrates that subjecting 130,984 surface acres to MA restrictions (e.g. CSU, NSO, and unavailable for leasing) is not justified.	2022
10369	10369-8	Big game crucial winter range and parturition habitat acreage for all alternatives (Map 35) is inexplicably much greater than Big Game Crucial Habitat Priority Areas (CHPA) defined by the Wyoming Game and Fish Department (WGFD). WGFD Big Game CHPAs include "crucial winter ranges, parturition areas, and migration routes with a ½ mile buffer for big horn sheep, elk, mule deer, pronghorn, moose, and mountain goat." A comparison of big game crucial winter range and parturition habitat identified in the RMP to WGFD Big Game CHPAs reveals that the BLM's habitat areas are much more expansive throughout the Project Area, especially along the eastern, western (including the Absaroka Front Management Area), and southern boundaries of the Project Area. I understand the value of protecting crucial wildlife habitat. However, in light of this discrepancy it is difficult to justify the extent of big game crucial	2022

Table B-1. Individual Comments and BLM Response Index (Continued)

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		winter range and parturition habitat under all alternatives in the BHB RMP. As such, I suggest BLM re-evaluate the designation of big game crucial winter range and parturition habitat locations, and reduce the size of these areas such that they are consistent with WGFD Big Game CHPAs.	
10369	10369-31	I request BLM remove the language concerning designation of 52,485 acres of LWCs as wildlands. As you are aware, the 2011 Continuing Resolution does not allow the BLM to move forward with designations of any wildlands.	2027
10369	10369-32	I also object to the adoption of seasonal restrictions on activities in both McCullough Peaks and Fifteen Mile Herd Management Areas from February 1 to July 31 because no scientific justification has been provided to show that oil and gas development is detrimental to wild horse populations.	2030
10369	10369-20	However, the BLM fails to recognize the beneficial impact of produced water discharges in stabilizing ephemeral and intermittent stream channels through creation of riparian zones, thus reducing natural erosion.	2031
10369	10369-21	Discharges of produced water can increase the total dissolved solids concentration in surface water. However, BLM fails to recognize that most of the streams receiving produced water discharges are naturally ephemeral or intermittent. Water users in the Big Horn Basin would rather have water with elevated levels of total dissolved solids that can be put to beneficial use, than no water at all.	2031
10369	10369-22	Mineral development is one of many human activities as well as natural events that have the potential to impact shallow groundwater quality and quantity. There are many other activities which can impact shallow groundwater quality and quantity. To single out mineral development as the principal activity impacting ground water, is a biased assumption, particularly if the BLM has no scientific justification or data for making this assumption.	2031
10369	10369-23	The WEPP model estimate that with no disturbance there would only be trace amounts of runoff, seems to disregard the amount of natural runoff experienced in the interior of the basin during snow melt or precipitation events. The badland topography and the clay content of soils in the Big Horn Basin can result in significant amounts of natural runoff and erosion from areas like McCullough Peaks, 15 Mile and other badland areas of the basin, which have very minimal human disturbance.	2031
10369	10369-24	While it is true that more surface disturbance can result in more impact to water, it does not hold true in many cases. Many surface disturbing activities associated with oil and gas are very far away from any live water and runoff from these disturbed areas would typically never reach live water, particularly with the BMP requirements mandated in Storm Water Construction permits. In some instances, BMPs installed at disturbed sites can actually decrease the rate of natural erosion from a site and promote stable vegetation establishment.	2031
10369	10369-25	Does this statement mean that the BLM intends to start requiring Water Management Plans for WPDES discharges in the Big horn Basin? If so, would this requirement be for existing surface discharges, or only for proposed new surface discharges.	2031
10369	10369-26	Produced water discharged from oil and gas operations is generally hotter than the naturally occurring surface water. However, most produced water discharges first enter a naturally ephemeral drainage that would otherwise not contain surface water. By the time the produced water does reach a perennial water, the temperature has cooled dramatically and there is little if any impact	2031

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		on the perennial water. One benefit of the increased water temperature in those ephemeral drainages is that it typically provides an unfrozen year round water source for wildlife and livestock. Also, in many cases the organic component of the produced water has naturally attenuated by the time it reaches live water	
10369	10369-27	How does the BLM plan minimize impacts on surface water quality from components of produced water? As previously stated the Wyoming DEQ permits WPDES discharges and promulgates and enforces water quality standards. It is not the duty, nor the legal authority of the BLM to set water quality standards or to issue WPDES permits.	2031
10369	10369-28	However, the BLM fails to recognize the beneficial impact of produced water discharges in stabilizing ephemeral and intermittent stream channels through creation of riparian zones, thus reducing natural erosion.	2031
10369	10369-29	It cannot be expected that produced water from coalbed CBNG will be of the same quality and quantity as produced water from conventional or deep oil and gas wells.	2031
10369	10369-30	What is meant by "conforming BLM actions to Wyoming DEQ water quality standards, enforcement, and remediation?" As previously stated the Wyoming DEQ permits WPDES discharges and promulgates and enforces water quality standards.	2031
10369	10369-16	Although surface discharge of produced water may increase runoff and erode soils if BMPs are not applied; likewise discharge of produced water can decrease the erosion of soils due to development of riparian zones and wetlands associated with surface discharge of produced waters. Discharge of produced water in the Big Horn Basin has resulted in the creation of hundreds of miles of riparian zones and thousands of acres of wetlands. These riparian zones have stabilized stream banks on otherwise natural highly erosive ephemeral and intermittent drainages, thus reducing erosion of soils. Wetlands, created by produced water discharges, slow and filter natural runoff, thus reducing soil transport and improving water quality. There are many examples of this in the Big Horn Basin, including Cottonwood Creek, Dry Creek Kirby Creek, and Gooseberry Creek to name a few.	2045
10369	10369-17	Is loam soil the best soil texture to use for WEPPP modeling in the Big Horn Basin (BHB)? Since most soils in the interior of the BHB contain a lot of clay (bentonite), should clay loam be used for modeling purposes rather than a loam soil? Also, clay loam may not be the correct soil type to use in this model, "clay soils" is probably a better soil type to reflect actual soil conditions here in the Big Horn Basin (especially on BLM lands in the interior of the Big Horn Basin). If the WEPP model is limited to use for soil types that are not the primary soil type in the Big Horn Basin (i.e. model limited to loam type soils), then this model should not be utilized to predict erosion rates in the Big Horn Basin, because it will be inherently inaccurate.	2045
10369	10369-18	If the WEPP model predicts little or no erosion on undisturbed rangelands and forestlands, then it will dramatically underestimate the amount of natural soil erosion in the BHB.	2045
10369	10369-19	Is the WEPP model, which was used to predict erosion rates and runoffs, calibrated to account for installation and implementation of Best Management Practices required by the Wyoming DEQ under the Stormwater Construction Permitting Program, which essentially requires no discharge of pollutants	2045

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		(including soil) from the construction site?	
10369	10369-7	Based on the statistics quoted above, there are 136,433 more acres administratively unavailable for oil and gas leasing under Alternative D than Alternative A (i.e. under current management). However, no discussion or justification has been provided in the DEIS. Increasing the acreage administratively unavailable will decrease management flexibility in the Plan Area. We strongly recommend that BLM re-evaluate the number of acres administratively unavailable for oil and gas leasing and consider opening these areas to potential leasing subject to the standard lease form and moderate/major constraints.	2047
10369	10369-14	BLM cites the West Tavaputs Plateau Natural Gas Full Field Development Plan Draft EIS (2008), Glossary for the definition of disruptive activity in the BHB Draft RMP. However, disruptive activity is not defined in the West Tavaputs Plateau Natural Gas Full Field Development Draft EIS document. What is the explanation for this incorrect citation?	2054
10369	10369-15	The definitions for surface-disturbing activities and disruptive activity in the BHB RMP are overly broad in application. When used as a land use restriction (e.g. Table 2-5, Record #4082) these terms may be interpreted to completely limit all activities within an area. For example, the definition of disruptive activity includes "activities that disrupt or alter wildlife actions." This language may be interpreted to include almost any minimal activity occurring on the land, including activities that do not have a negative impact on the energy reserves, health, or population of a species. I am not opposed to limiting surface-disturbing and disruptive activities to a reasonable degree provided it can be scientifically justified. For example, prohibiting construction activities (e.g. well pads, roads, pits) or reducing the number of trips allowed in the winter on big game crucial winter range is reasonable. However, we are concerned BLM may endeavor to completely restrict all minimally disruptive activities under these definitions. Therefore, we call upon BLM to modify the definitions of surface-disturbing and disruptive activities to expressly exclude access to locations for the maintenance and operation of developed projects.	2054
10369	10369-1	COMMENT: KHAs designated by BLM are inconsistent with the State of Wyoming's Core Areas. If the intent of BLM is to obtain and maintain consistency between KHAs and the State of Wyoming's Core Areas, then why are KHAs identified in this RMP different than Core Areas provided for in Wyoming EO 2011-5, Attachment A (Sage-Grouse Core Breeding Areas Version 3)? Figure Q-1 of the RMP clearly illustrates the discrepancies between Sage-Grouse Core Breeding Areas Version 3 and KHAs.	2069
10369	10369-2	Furthermore, there are 71,241 more acres of KHA (1,857,485) than acres of Core Areas (1,786,244) located within the total planning area. What are the justification and scientific reasoning for expanding KHAs and changing KHA boundaries from Core Area boundaries? The Wyoming Sage Grouse Implementation Team (SGIT) conducted an extensive public process supported by the best available science to develop the Core Area strategy and the Core Population Areas provided for in EO 2011-5.	2069
10369	10369-3	Within these OGMAs I support waiver of all sage grouse stipulations where the OGMA does not overlap with a State of Wyoming Core Habitat Area. In areas where the OGMA does overlap with a State of Wyoming Core Area, I support incorporation of only non-core area stipulations with the exception that no new surface disturbances will be allowed within 0.6 miles of a lek. For "existing	2069

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		activities" waivers of all sage grouse stipulations outside of core areas, and relaxation of core are stipulations to non-core stipulations is consistent with Governor Mead's Executive Order (EO) 2011-5 (Part 2 page 2 and Part 7 page 3 of EO 2011-5). BLM needs to ensure that the Big Horn Basin Resource Management Plan matches exactly with the State of Wyoming Core Area management plan, and Governor Mead's EO, as was committed to by the BLM representative on the Sage Grouse Implementation Team.	
10369	10369-4	However, sage grouse stipulations Under Alternative D are not consistent with stipulations provided for under EO 2011-5: Core Areas/Key Habitat Areas - Seasonal Use: Leks: Under EO 2011-5 - Activity will be allowed from July 1 to March 14 (i.e. not be allowed from March 15 to June 30) outside of the 0.6 mile perimeter of a lek in Core Population Areas where breeding, nesting and early brood-rearing habitat is present (EO 2011-5, pg. 9, Item 3). Alternative D - BLM extends this seasonal use restriction by two weeks, placing TLS on surface disturbing activities on nesting/early brood rearing habitat from March 1 to June 30 (Table 2-5, pg. 2-84). It is my understanding that BLM has chosen to start the TLS on surface disturbing activities on nesting/early brood rearing habitat two weeks earlier under the RMP than EO 2011-5 because sage grouse in the lower elevations of the BHB tend to start mating approximately two weeks earlier than leks at higher elevations in the BHB and other leks across Wyoming. I am not opposed to starting the TLS two weeks earlier to account for geographic differences in sage grouse behavior. A one-size-fits-all approach is not always preferred in wildlife management, and EO 2011-5 states that "adjustments to the stipulations may be necessary based upon local conditions and limitations." However, in these low elevation areas we request that BLM also end the TLS two weeks earlier to maintain consistency of overall TLS duration. If sage grouse mating starts two weeks earlier in lower elevations, then it should also end two weeks earlier in these areas. If the Wyoming Sage Grouse Implementation Team (SGIT) has determined that a 3 ½ month TLS for nesting/early brood rearing is adequate throughout Wyoming, then it should also be adequate in the BHB. An overall expansion of TLS duration is not necessary to protect breeding sage grouse.	2071
10369	10369-5	Again, I am not opposed to starting the TLS two weeks earlier to account for geographic differences in sage grouse behavior and biological requirements, if it is scientifically justified. However, if BLM is starting the TLS on winter concentration areas two weeks earlier to account for geographic differences, we request BLM end the TLS two weeks earlier to maintain consistency of overall TLS duration. If the SGIT has determined that a 3 ½ month TLS for winter areas is adequate throughout Wyoming, then it should also be adequate in the BHB.	2071
10369	10369-6	I request BLM limit sage grouse stipulations outside of KHAs and OGMAs to, at a maximum, ¼ mile CSU and a 2-mile seasonal buffer to occupied leks, to achieve consistency with EO 2011-5. In OGMAs located outside of Core Population Areas/KHA, sage grouse stipulations should be waived to encourage development of hydrocarbon resources in these. This would be consistent with EO 2011-5.	2071
10370	10370-3	The DEIS appears to argue that its "Lands with Wilderness Characteristics" are not WSAs, and FLPMA allows management for certain resources associated with Wilderness (opportunities for solitude, outstanding opportunities for primitive and unconfined recreation etc.). Thus BLM argues, the Non Wilderness Study	2027

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		Area Lands with Wilderness Characteristics designation is legal. But, in certain alternatives, BLM is proposing to manage these areas to protect Wilderness Character, just like the IMP. The BLM is simply calling these new WSAs by a different name. The agency is claiming Federal Land Policy and Management Act (FLPMA) Section 201 is the legal foundation for designating Non Wilderness Study Area We note this section does refer to a continuing inventory, but for "all public lands and their resource and other values...." BRC acknowledges that the agency can inventory to its heart's delight. This includes inventorying for resources or values associated with Wilderness. It is improper to make decisions based upon an inventory for a single resource value, in this case "Wilderness character."	
10370	10370-4	As noted above, the BLM has no authorization to engage in inventories for a small segment (Wilderness) of only part of the spectrum of "resources and other values" (recreation). Table 3- 46 is an example of how the DEIS has unlawfully excluded recreational uses and values that are incompatible with Wilderness management in its analysis.	2027
10370	10370-1	(H-1601-1 Appendix C, pages 18-20) BLM's directives seem clear. At least insofar as Off Highway Vehicle based recreation. Except in "Closed" and "Open" areas, each BLM office is required to develop a specific travel management plan, limiting all motorized vehicles to designated roads, primitive roads and trails. However, your Land Resources Travel management Maps (Map 55 - 58) indicate that "travel limited to existing roads and trails" is a management option. Ditto for Appendix R and other sections in the DEIS. The DEIS appears to state that except where we identify areas that will be limited to designated roads and trails, travel will be limited to existing roads and trails (unless we identify a specific reason or resource concern that mandates a travel management plan designating roads and trails). Travel limited to "existing" roads and trail is not consistent with the agency's planning criteria number 8.8. For program-specific guidance regarding land use planning-level decisions, the process will follow Land Use Planning Manual 1601 and Handbook H-1601-1, Appendix C. This appears to be a serious flaw in the DEIS. It is difficult to see how the agency can remedy this without issuing a supplemental analysis disclosing the agency's direction for travel management.	2034
10370	10370-6	T he BLM needs to include a site specific and up to date review of the Oil and Gas potential identified by the most current USGS Resource Assessment. The DEIS uses a regional analysis when a more accurate geographic specific approach is required.	2061
10371	10371-2	Appendix P contains only the "active use" column. Therefore, the MCD requests that Appendix P of the Draft RMP also include a "permitted use" column in order to express in AUM's, what is formally allocated and recognized by the RMP.	2074
10372	10372-7	Through personal conversation with Dick Loper, Wyoming State Grazing Board, the use of "Wyoming Standards for Healthy Rangelands", Appendix N is outdated. I would request BLM update their rangeland monitoring information.	2011
10372	10372-8	Mr. Loper suggested to me that the BLM should get rid of the entire Appendix W as well as Table W-1.	2011
10372	10372-3	Please remove Appendix S, Lands with Wilderness Characteristics from the RMP document as Secretary of the Interior, Ken Salazar has rescinded Secretarial Order No. 3310. (Record #6255, Obj. LR:9.1 Prefer Alt. C.)	2027

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10372	10372-1	The RMP is sorely lacking in all aspects of the socioeconomic analysis of the alternatives. This oversight needs to be corrected before an accurate review of the alternatives can be conducted. In particular, the oil and gas potential in the RMP and the effects of reduced livestock grazing are not clearly addressed. Nearly all the alternatives could include a reduction in AUMs but this reduction is not accounted for in the socioeconomic analysis. Any reduction in AUMs will have a direct impact on livestock producers as well as county revenues.	2046
10374	10374-2	Since the Draft Plan acknowledges that "Climate change is likely to combine with other human-induced stress to further increase the vulnerability of ecosystems to â€¦ loss of native species", affecting "breeding patterns, water and food supply, and habitat availability" (3-257), we suggest that it would be prudent to err on the side of caution by minimizing other human-caused stressors that are well understood. This conservative approach is especially important in large areas of intact, relatively undeveloped habitat, which provide the best sanctuary for wildlife, and in critical habitat areas such as breeding grounds, wintering grounds, and migration routes. The 2010 Wyoming Wildlife Action Plan recognized the necessity of incorporating planning for a changing climate into all wildlife and habitat management activities. That Plan explicitly acknowledged that the effects of a rapidly changing climate will profoundly affect Wyoming's wildlife and the habitats on which it depends. We strongly urge the BLM to fully incorporate climate change planning into the final decision on this Resource Management Plan, and to adopt a conservative, precautionary approach to ensure that wildlife has the best chance of surviving in a changing climate.	2003
10377	10377-3	The draft RMP should be re-written utilizing the best, most complete available scientific data. It should shown 5 year historical trends in each of the resource areas and provide alternative goals for these resources.	2054
10378	10378-25	I could find no mention of the abandoned town and mines of Gebo north of Thermopolis in the Heritage and other sections of the plan.	2004
10378	10378-6	Heart Mountain is the only NHL in the Big Horn Basin. I found no acreage given to protect the view shed. But it has been established on BLM administered mineral estate, with BLM administered surface in view of the site. After being there August 25, I do not believe that the 5-Mile buffer zone should apply. As I understand it, the housing for the 12,000 Japanese was located to the north of the present designated site. The view of the fields north to Heart Mountain enhances the idea that those Japanese who farmed for the camp excelled at it. The many photographs on view in various forms are sufficient to show the vastness of the camp itself. If a buffer zone outside the present landmark is deemed necessary, could it not consist of tree plantings instead of acreage?	2004
10378	10378-26	Most helpful would be a pullout-to-be-copied INDEX. Specific areas of interest could then be studied without having to search for items such as Mountain Plover. Who of the general bird-watching public would have thought to look up Mountain Plover under Vol. 3 "Appendix G, Exception, Modification, and Waiver Criteria Table G-1?" All the information that Vol. 3, Appendix K - Biological Resources, Table K-2 Appendix K-14 gave me was Mountain plover and the scientific name. No reference to the listing in Appendix G.	2006
10378	10378-28	Another example of the need for a pullout Index: In Vol. 3, Appendix G, Table G-1, Oil and Gas Lease Stipulations Appendix G-5. Scenic and Recreational Resources the 28 entries are mostly non-specific. Areas within the Bighorn River ERMA [Extensive Recreation Management Area] and Bighorn River SRMA	2006

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		[Special Recreation Management Area.) In order to understand the initials I had to finger through Volume 1 for the first 17 pages before I found the guide to them.	
10378	10378-29	The summary should be laid out in the same order as the explanatory text. The "catalogs" are confusing in that the summary doesn't necessarily follow the outline or language of the subjects in the main bodies of text. Eg. The summary, on pages ES-8 to ES-9 is devoted to Mineral Resources and is divided into locatable, leasable, and salable minerals. On pages 4-53, 54 and 55 of Vol. 2, some detailed information is given under "Leasable Minerals - Geothermal."	2006
10378	10378-31	What is SRMA? "Special Recreation Management Area" Not listed in Vol 1 SRMAs on page 3-364 or 3-165. Oh, yes. Here it is – it's in that 6160 South Bighorns RMZ (back to ACRONYMS "Recreation Management Zones.")	2006
10378	10378-16	NATIONAL BACK COUNTRY BY WAY: Special Designations I do not like Alternatives B or D, because B, "considers additional designations on a case-by-case basis" while already proposing two other roads, the Hyatville Logging Road and the Hazelton (33-Mile) road. Alt. D proposes the same two roads. My concern is that there is no acreage given. Is there viewshed or buffer zone acreage attached to these roads? Also, will this lead to closing of other area roads and forcing people to only use these two roads? Since tourism is an essential part of the Big Horn Basin economy, will these roads lead to tourists stopping in towns along the way?	2034
10378	10378-17	NATIONAL HISTORIC TRAILS: Special Designations None of these alternatives gives an acreage amount.	2010
10378	10378-8	There are three additional unspecified Paleontological resources under "Special Designations "Question: I assume that the field work for Prehistoric, Historic and Other Trails has been done otherwise STIPULATIONS affecting them cannot be applied?	2010
10378	10378-27	And, should the alfalfa weevil really be lumped in with wildlife instead of there being a table for Insects?	2025
10378	10378-11	The first column in the LWC chart is labeled - Lands with Wilderness Characteristics Area Name. The first entries were numbers, which did not relate to anything I could find, nor could I find duplicate acreages for Cedar Ridge and Upper Owl Creek in other information on LWCs.	2027
10378	10378-24	These VRM Classes should have been defined in the Summary.	2032
10378	10378-18	Vegetation: The EIS states "long-term surface disturbance contributes to the decline in abundance, distribution, or health of vegetation communities. Conversely, short-term surface disturbance from vegetation treatments would improve vegetation communities." What is considered short-term and long-term? What length of time has to be passed to determine whether surface disturbance is beneficial?	2033
10378	10378-19	Alt. C (no acreage given) has the most long-term surface disturbance and most activities that would adversely affect forests and woodlands.	2033
10378	10378-20	ALT. D, A, and B respectively allow the greatest use of silviculture treatments resulting in the greatest beneficial impacts to the harvest of forest products. Does the BLM have long-term scientific proof of this?	2033
10378	10378-30	Oil and Gas Stipulation. Middle Fork of the Powder River??? The Powder River is on the east side of the Big Horns in the Powder River Basin. But there it is, Middle Fork of the Powder Rive SRMA. Vol 3, Table G-1, Appendix p. G - 23.	2049

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		Bighorn Basin Resources Management Plan Revision Project. Stipulation Description is as follows: Apply a CSU stipulation on the Middle Fork of the Power River SRMA Exception: EC-011 Modification: MC-014 Waiver: NONE. There is no Middle Fork of the Powder River under "Middle Fork" or "Powder River" listed in any of the counties within the bounds of the Big Horn Basin plan,	
10378	10378-32	Yes, if I'm not on your mailing list please put me on it.	2060
10378	10378-1	In the RECREATION Appendix there are three pages of information related to the entire Big Horn Basin. There are NO Alternatives A and C in this Appendix.	2062
10379	10379-15	In order to comply with the secretarial order and the AGO initiative, the final RMP must incorporate management direction for responding to climate change impacts in the planning area. In particular, wildlife management direction must take into account the added detrimental effects that climate change is and will continue to have on wildlife, including special status species, in the planning area. The unique threats of climate change must be considered in developing monitoring and evaluation criteria so that information gathering in the future helps inform smart planning. Finally, better use can be made of the Rapid Ecoregional Assessment process and Landscape Conservation Cooperatives. These tools are alluded to in the DEIS but should be more effectively engaged to solved the difficult challenges faced.	2003
10379	10379-22	The NEPA process requires the consideration of climate change as part of the cumulative effects analysis. The cumulative impacts principles described above demonstrate that the effects of climate change on individual resources in the planning area must be considered cumulatively with the effects of the proposed RMP. A failure to look at climate change is a failure to take a "hard look" and impacts that will occur in the planning area. While there is no national direction for analyzing the impacts of climate change on BLM planning area, the Oregon BLM office has provided a useful resource to guide the development of this analysis. Instruction Memorandum OR-2010-112 provides direction and information regarding analysis of greenhouse gas emissions and consideration of changing climate conditions in NEPA documents. For example, the IM states that "[a] predicted change in climate conditions would be relevant to NEPA analysis if it would alter baseline conditions related to an issue identified for analysis or would alter the effectiveness of the proposed action." Based on this guidance, the final DEIS must analyze the effect of proposed management on special status species and wildlife resources in the context of climate change impacts.	2003
10379	10379-21	The DEIS cumulative impacts analysis shares the same flaws discussed above with regard to wildlife and special status species. While the impacts are correctly identified, especially in terms of outside activities that will affect the planning area, the analysis does not go beyond placing the alternatives on a spectrum. Alternative B is identified as having the lowest level of impacts throughout the DEIS so it follows that it would contribute the least to cumulative impacts from other sources. The final DEIS should go deeper in its analysis, especially of impacts to wildlife, to analyze the capacity of the resources in the planning area to absorb the additional effects of the proposed alternatives on top of those cumulative effects already known to occur.	2005
10379	10379-16	The BLM put in place oil and gas leasing reforms through IM 2010-117. These reforms, among other things, established a "Master Leasing Plan" process with the intent to fully consider important natural resource values before making a decision on oil and gas leasing and development, especially in areas with heavy	2014

Table B-1. Individual Comments and BLM Response Index (Continued)

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		leasing. The oil and gas management approach in the preferred alternative, which would establish oil and gas management areas to be managed primarily for exploration and development, is inconsistent with this BLM policy. Instead of focusing on providing sufficient analysis and mitigation for biological resources in areas with heavy oil and gas development, the preferred alternative would completely ignore biological resources in these newly established management areas. This opposite approach would go from full analysis and consideration of wildlife, as required by BLM reforms, to none. The final RMP should not establish oil and gas management areas because of their inconsistency with BLM policy direction on oil and gas leasing and development.	
10379	10379-2	The preferred alternative adopts a case-by-case approach to wildlife management that runs counter to BLM wildlife policy. There are a number of plan components in which Alternative B lays out a specific benchmark or standard, but Alternative D takes a step back from that standard to a case-by-case or as opportunities arise management model. For example, in record #4073, Alternative B requires that habitat enhancement for big game be completed on at least 200 acres of land in the planning area each year. The preferred alternative shirks this specific guideline for management for enhancement as opportunities and funding allow. DEIS at 2-76. While either option could lead to more habitat enhancement, the preferred alternative leaves the door open for no habitat treatments to occur at all, notwithstanding the fact that 200 acres may not even be sufficient to provide benefits for big game.	2020
10379	10379-3	In record #4082, Alternative B requires the plan to Apply wildlife seasonal protections for surface- disturbing and disruptive activities to maintenance and operation of developed projects when the actions are determined to be detrimental to wildlife. (Appendix H lists detrimental actions). DEIS at 2-78. This references Wyoming state BLM guidelines for wildlife management, which provide some specific mitigation guidelines for a few species. The approach in the preferred alternative, however, gets rid of the clear-cut guidance for wildlife management and provides only for protections to be applied on a case-by-case basis. While arguably the standards in the state BLM guidelines should be enhanced to meet the needs in the planning area, the preferred alternative abandons guidelines altogether, leaving us with no idea what standards might be imposed to protect wildlife for any given surface disturbing activity. At a minimum, the final RMP must meet obligations under 6500 by implementing clear management actions to support wildlife case-by-case management is not sufficient. Management actions should be measurable so that their achievement can be monitored and sideboards should provide directions for how on the ground application of objectives should work. Defenders recommend that Alternative B management direction be enhanced and adopted or that Alternative D management direction be modified to adopt actual standards, instead of leaving wildlife management to chance.	2020
10379	10379-10	Wildlife and Fish Monitoring protocols in the appendix are not sufficient, even if they are fully implemented as designed. While indicators are set for each resource, and action triggers are identified for each indicator, it is unclear what action is required once a trigger has been reached. For example, Greater Sage-grouse is an indicator for Wildlife, and action is triggered if annual lek site visits indicate a declining trend in the number of males and females. DEIS at C-8. Presumably, this monitoring would occur considering the importance of the	2025

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		species, but what is unclear is what response is required, and on what timeline with what resources, in the event that a declining trend is identified. Without these parameters for action, the plan cannot guarantee successful responses to negative monitoring data.	
10379	10379-11	Another key problem with the monitoring and evaluation protocol is the lack of a clear pathway for public involvement. While information is available to the public, it is unclear whether the public will have an opportunity to influence the responses being made to monitoring and evaluation, except for during NEPA processes where involvement is mandated. The implementation plan provides for working groups for monitoring and other areas of the plan, but it is unclear how the public would be involved in these groups moving forward. DEIS at D-1.	2025
10379	10379-13	This DEIS lays out at the outset that one of the main purposes of this RMP is retaining flexibility to adapt to new and emerging issues and opportunities and to provide for adjustments to decisions over time based on new information and monitoring. DEIS at ES-2. Defenders supports the careful use of adaptive management as a tool to reach wildlife management objectives, especially in cases where monitoring indicates that objectives are not being met. However, without clear objectives, reliable monitoring information and analysis, and direction for appropriate ways to respond in an adaptive management context, this approach is at best ineffective, and at worst reckless. The final RMP must resolve issues with wildlife and special status species objectives, remedy deficiencies in the monitoring program, and provide clear direction for land use managers on how to respond in an adaptive capacity.	2025
10379	10379-9	First, the DEIS makes clear that the "BLM will rely upon cooperating agencies for the funding, facilities, and labor to assist in or perform this data analysis." DEIS at C-1. This fails to guarantee that monitoring and evaluation to ensure that goals are being met will even occur, let alone that it will be effective. If state agencies doing monitoring have different priorities than the BLM, indicators on the list found in Appendix C may not be monitored effectively, or even at all.	2025
10379	10379-5	What is missing, again, is any discussion of whether either Alternative B or D present methods capable of protecting raptors in the planning area from future development. The DEIS points out helpfully that Alternative B is the most protective option for raptors and that Alternative D is less protective, but in justifying the selection of D the DEIS does not demonstrate what the long term impacts of either the larger or smaller buffer areas. DEIS at 4-222. Without that information it is unclear what the impact of the preferred alternative will be on raptors and there is no way to compare alternatives based on BLMs special status criteria to ensure protection of raptors under the new RMP.	2036
10379	10379-6	It is unclear what the exception to the prohibition provided for in the preferred alternative means because the DEIS does not define how the human health and safety exception would be applied. DEIS at 2-89. In addition, it is unclear whether the exception is even necessary, considering that more effective options than poisoning prairie dogs are available for dealing with plague.	2042
10379	10379-7	We also have concerns that there is insufficient active management to protect prairie dogs in the planning area. As the DEIS states, Black-footed ferrets are associated with and depend on prairie dog colonies in the Planning Area. DEIS at 4-231. Prairie dogs are especially important in the Bighorn Basin planning area, where the black-footed ferret was rediscovered in 1981. The RMP would allow for new areas to be protected for prairie dogs in the future if they are	2042

Table B-1. Individual Comments and BLM Response Index (Continued)

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		identified by the Fish and Wildlife Service or by the Wyoming Game and Fish Department as having potential for ferret reintroduction. DEIS at 2-88. We recommend that, instead of waiting for other agencies, areas be identified in this RMP and that, in addition to no surface occupancy protections, these areas have management direction in place to protect prairie dogs from shooting, disease, and other threats, and to restore prairie dogs through translocation and habitat enhancement.	
10379	10379-19	The fundamental problem with the analysis of oil and gas development in the DEIS is that, while the impacts of each alternative on the amount of oil and gas production is included, the impacts of various levels of oil and gas production on other resources, including wildlife, are not examined. This analysis could occur as part of the discussion of oil and gas development or as part of the discussion of biological resources. The final RMP must go beyond listing the amount of acres available for oil and gas development under each alternative to analyzing the effects of these different levels of development on biological resources in the planning area. This is especially important considering the clear indication that oil and gas development is likely to have the largest impact on these sensitive resources.	2054
10379	10379-1	The DEIS states that Alternative B, described as having an emphasis on conservation, is "less focused on supporting resource uses than the other alternatives." DEIS at 2-29. However, a number of emerging issues that this new RMP is required to respond to indicate increasing demands on BLM lands, like "increasing conflicts between resource uses and protection of specific wildlife and wildlife habitat" and "cumulative increase in surface disturbance." DEIS at 1-5. These emerging issues call for a conservation based approach that can support multiple uses by providing for resource extraction while also conserving biological resources. Some components for this type of approach were developed as part of Alternative B, but are then abandoned in the preferred alternative. Other components necessary for conserving biological resources are missing. The lack of clear management standards in the preferred alternative provides no guarantee that wildlife and other biological resources will receive necessary protection in the face of intensive resource development. A more balanced approach must be found.	2055
10379	10379-17	While placing the alternatives on a spectrum is certainly an important step in providing decision makers with the information they need to make a choice, it is not enough to be considered a "hard look." The final EIS should provide an analysis of the outcomes of each alternative's wildlife management approach. For example, does current science indicate that a no surface occupancy restriction in big game crucial winter range and parturition habitat is necessary to avoid declines in big game numbers? Answering this and similar questions would allow decision makers to determine whether the preferred alternative is sufficient in its wildlife management, or if additional protections need to be in the final RMP. Without such an analysis they are left to guess.	2055
10379	10379-20	Defenders would also like to point out that an alternative offering another approach to oil and gas development was left out of the analysis. The DEIS indicates that a phased oil and gas development approach was looked at, but ultimately was not considered. DEIS at 2-7. A phased approach could offer an additional option for decision makers to meet obligations for protecting biological resources and allowing for oil and gas development as a multiple use. Defenders urge BLM to reconsider analyzing a phased oil and gas development	2055

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		alternative.	
10379	10379-4	However, the DEIS and draft RMP fail to demonstrate that this approach is biologically consistent with BLM objectives under 6840. Without this analysis, it is impossible to establish this GSG management approach with any confidence that listing can be avoided. We recommend that additional analysis be completed, and in the meantime, we recommend erring on the side of caution and selecting the most protective measures feasible for the Greater Sage-grouse.	2071
10381	10381-1	The section on air quality is very disturbing. How can the BLM analyze emissions with no baseline? Using data from other areas doesn't allow for accurate accounts, either.	2009
10381	10381-2	The socioeconomic section was also poorly analyzed. The IMPLAN model used is a regional model and a more local model would more accurately address the issue. The BLM doesn't mention how oil and gas is the lifeblood of the communities, and provides many programs and services like water, sewer, roads, hospitals and schools.	2046
10382	10382-2	Big Game Crucial Winter Range acreage identified by BLM for all alternatives (Map 35 - Biological Resources, Fish and Wildlife Resources, All Alternatives) is much greater than Big Game Crucial Habitat Areas identified by the Wyoming Game and Fish Department.	2022
10382	10382-1	Enhanced oil recovery (EOR) research that my company is pursuing that may allow us to develop additional oil and gas fields and extend the life of current fields. As well, directional and horizontal drilling may cause additional resources to become profitable to develop. Both of these reasonably foreseeable technologies are not considered in the Reasonably Foreseeable Development section of the RMP.	2051
10382	10382-3	Emissions from oil and gas activity arc incomplete and are inconsistent with nonoil and gas activity emissions. Tables labeled "Total Annual Emissions from Oil Wells" failed to include any actual emissions from oil wells. Tables labeled "Summary of ROW and Corridors Emissions" were much lower for the same activities as were listed in the tables labeled "Total Annual Emissions from Oil Wells." Tourism related vehicle emissions and air quality effects were not considered in the RMP.	2009_1
10383	10383-11	Relevance and importance criteria used in the analysis of Areas of Critical Environmental Concern (ACEC) is generic and does not include data sets to confirm or deny the four noted importance criteria and the five relevance criteria.	2001
10383	10383-10	There is an indiscriminate selection of air quality monitoring sites to properly evaluate alternative impacts. Thunder Basin Special Purpose Monitoring (SPM) and Interagency Monitoring of Protected Visual Environments (IMPROVE) sites are included in the analysis, but Boulder and Bridger Wilderness IMPROVE air monitoring sites are not used for analysis purposes although they are closer to the Planning Area (100 miles vs. 70 and 58 miles, respectively).	2009
10383	10383-17	Prior to any proposed modification of AMP or elimination of livestock grazing allotments in the Planning Area as a protective measure for greater sage-grouse and/or other wildlife species, the BLM must follow the grazing regulations set forth in Section 4100 of the BLM's public land grazing regulations. Changes must and can be made through using solid data, professional range and wildlife expertise of the BLM, range consultants when needed/contracted by the	2011

Table B-1. Individual Comments and BLM Response Index (Continued)

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		permittee and the permittee's own knowledge and historical insights.	
10383	10383-14	Avoiding weed invasions generally requires a number of aggressive actions to be successful. Those actions include: Rapid re-establishment of desired vegetation; Timely weed surveys; Aggressive weed control where needed; Periodic monitoring; Prompt re-treatment where warranted. Nowhere does this draft EIS embrace the above common sense, adaptive management scenarios. Why?	2012
10383	10383-4	Recognition of elk parturition areas are not contained in current elk scientific literature. If there is such new scientific information the BLM should share that with the public. There are 205,872 acres of BLM-recognized elk parturition habitat in this draft EIS which would prohibit or restrict grazing, oil and gas development, and motorized access. The Guardians do not support this intended management approach, nor do we recognize it as scientifically valid.	2025
10383	10383-5	What the RMP/EIS does not bring to the discussion is how the overpopulation of elk has negatively affected BLM permittees. As affected parties, the LGCA and the Guardians asks that the RMP/EIS qualify and quantify how the increase in elk has: Complicated grazing for BLM permittees; Compromised the economic viability of permittees; Disrupted attaining utilization standards.	2025
10383	10383-19	The draft in no way addresses or even looks at the range conditions and impacts associated with over populations, year round grazing and no management rotation strategies of wild horses as they relate to rangeland health.	2030
10383	10383-6	The agricultural community has become greatly dependent on the surface discharge from oil and gas development. It has become a vital water source for livestock and provides perennial fresh-water sources. Additionally, the water creates hundreds of miles of riparian zones and thousands of acres of wetlands. The draft never mentions this. A document such as this should speak to such realities if it is to be a credible and balanced document. There is an inherent obligation to inform the public of such collateral beneficial details as such information is not generally known or appreciated but certainly important in helping the public to see how things are connected.	2031
10383	10383-13	Vegetation inventories are deficient, particularly invasive species inventories. A return to "historical vegetation" is unnecessary on a total landscape scale. This term ignores the appropriateness of blending that concept with having the vegetation move in a forward rangeland health direction.	2033
10383	10383-2	ECONOMIC STRATEGIES WORKSHOP - NOT CONDUCTED BUT REQUIRED There is no record of the BLM having conducted a credible Economic Strategies Workshop which would have allowed the public to "identify desired economic and social conditions" and to "collaborate with BLM staff members to identify opportunities to advance local economies and social goals through planning and policy decisions."	2046
10383	10383-9	The BLM doesn't clearly represent the results of oil and gas development and mining in the Basin. The BLM needs to look at more locally available data in regards to our economic viability (for instance the research done by Bighorn Basin Resource Alliance). This data clearly shows how important oil and gas is to our communities and in 2,000 pages the BLM doesn't clearly articulate how important it is. For instance, all four of the counties in the Bighorn Basin received 54 percent of their property taxes directly from oil and gas development. By including this information, it will inform citizens of the current economics. The regional IMPLAN model allows for much flawed data. A more	2046

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		local model would represent the data more accurately	
10383	10383-12	Measurement indicators are missing for all resources, making it infeasible to conduct an effects analysis.	2054
10383	10383-7	Livestock grazing should not be considered a surface disturbing activity. Any final RMP should be absolutely clear that livestock grazing is not to be viewed, perceived or "managed" as a surface disturbance with accompanying restrictions. To do so would be patently deceitful, and unjustified. Definitions deserve lasting transparency so they cannot be later "redefined" by anti-grazing interests.	2054
10383	10383-16	It is not possible to recreate maps and information based on information provided in the RMP/EIS. Therefore, the BLM must better describe and disclose methodologies and correct GIS data issues.	2057
10383	10383-8	No proper science exists that would support changes which would increase the acreage of "administratively unavailable" for oil and gas leasing from 150,000 to almost 300,000. Additionally the amount of moderate restrictions rose dramatically from 1.7 million acres to 3.5 million acres. Why? Where is the substantiation for this change which increases restrictions? The potential impacts to livestock grazing with these increases in unavailable acreages and increases in moderate restrictions are not addressed, yet the potential exists.	2071
10383	10383-3	There are no direct impacts disclosed under any of the alternatives for management actions that change AUM allocations. No credible "management document" should be absent of substantiated reasons for changes (up or down) in AUM allocations.	2074
10384	10384-1	EOC in the Big Horn Basin has not been given adequate consideration in the draft RMP. Oil industry representatives are clear that tremendous EOC potential exists in the aging oil fields within the region, yet the BLM has repeated stated "Low to moderate potential". There is also huge potential in Mowry Shale development. At the present time, the records room in the Big Horn County courthouse is over-run with oil industry representatives who are researching oil and gas lease information. I strongly urge the BLM to take a hard look at these two areas, using current scientific information, and update the final RMP accordingly. Definition of Reasonable Foreseeable Development needs to accurately define today's developments. Mineral potential in the Bighorn Basin is significantly underestimated in the RFD scenarios. Of special concern to us in Big Horn County is the mining of bentonite, which is a vital part of our local economy.	2051
10384	10384-2	Related to the above, Rights of Way corridors need to be better protected in the final RMP, as EOC will require pipelines for carbon dioxide injection and oil transportation away from the Big Horn Basin. Carbon sequestration is a secondary industry with great possibilities that could be realized, but that, too, is contingent on the availability of pipelines to carry the material. The preferred alternative (D) of the draft RMP greatly increases the acreage designated as Right-of-Way (ROW) corridor avoidance/mitigation and exclusion areas. This increase will make the construction of the aforementioned EOR pipelines difficult into many existing oilfields in the Bighorn Basin. Where Right of Way Corridors conflict with Right of Way Avoidance/Mitigation Zones, it should be clearly documented in the final RMP that the ROW corridors will take precedence over the ROW exclusion areas.	2066
10385	10385-2	2. Page 3-42 in Management Challenges Approximately 30,000 acres of land has	2015

Table B-1. Individual Comments and BLM Response Index (Continued)

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		been disturbed in the Bighorn Basin due to bentonite mining, along with approximately 4,000 acres of road and haul-road disturbance (BLM 2008c).The approximate of 4000 acres of road disturbance from bentonite activities cannot be accurate. Assuming 30 linear feet of width per road, this equates to 1100 miles of roads from bentonite activity. Unless the other bentonite mines have substantially more roads than my mine, the 4000 acres of road disturbance stated in the RMP should be reviewed for accuracy.	
10385	10385-5	5. Page 3-169 in Lands with Wilderness Characteristics The BLM performed an inventory of lands in the Planning Area to determine if any BLM-administered lands had wilderness characteristics. Wilderness characteristics are resource values that include naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Areas evaluated for wilderness characteristics generally occur in undeveloped locations of sufficient size (usually at least 5,000 acres) to be practical to manage for these characteristics. Smaller areas are considered if they are contiguous with designated Wilderness or WSAs or are of a manageable size. Map 63 Land Resources - In the Township T55N R93W there is a Wilderness designated area to the east of our patented mining claims which is actively being mined day and night. Based on the Wilderness characteristics listed above in the RMP, this area should not be classified as a WSA because the area is certainly not in solitude with the dozers, scrapers and blasting operating daily nor is it an unconfined recreation area either for the same reason.	2027
10385	10385-1	1. Page 3-41 in Locatable Minerals In the plan it states: The six mines in the Bighorn Basin employ 132 persons, and another 360 persons are employed at the milling -processing facilities at six different mills (one in the Worland area, two near Greybull, and three near Lovell, Wyoming).The number of employed people in the bighorn basin from the bentonite industry is a lot more than the number stated in the plan. My mine alone has four full-time contractors (stripping overburden, hauling bentonite, drilling/blasting and conducting environmental activities) totaling over 60 employees. The number stated in the RMP is the number of employees who work "in-house" for the bentonite companies, i.e. not contractors. Please modify in the RMP the number of people employed from the bentonite industry in the Bighorn basin. My guess is the number of workers in the bentonite industry is 10X more than what the RMP states.	2049
10385	10385-4	4. Map 54 Land Resources Rights-of-Way and Corridors Alternative D Why is the area east of the Big Horn River and SE of Lovell mostly classified as Right-of-Way Avoidance/Mitigation Area? This area is a major active bentonite mining region in the Bighorn basin. Won't this designation hurt the bentonite industry when we need to obtain a ROW to access new mining areas in the future?	2066
10386	10386-4	We believe that the Lands with Wilderness Characteristics (LWC) analysis which was conducted by the BLM is flawed. It was based on erroneous data. The Chamber believes this flawed effort was clearly substantiated when private citizens, county commissioners and conservation district supervisors documented the lack of wilderness characteristics in numerous situations. A clearly disturbing reality is that using the BLM's own criteria for what would qualify as lands with wilderness characteristics was not met time and again, yet the parcels went forward as qualifying as LWC, which we believe is misleading. We are extremely concerned that the designation of these flawed LWCs could potentially erase billions of dollars in total potential output.	2027

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		Consequently, many socio-economic aspects stand to be impacted.	
10386	10386-1	Socio-economics: There is a disconnect between the concerns of the communities of the Planning Area and the BLM's socio-economic analysis. It does not appear that the BLM has complied with the requirement for the public to "identify desired economic and social conditions" and to "collaborate with BLM staff members to identify opportunities to advance local economies and social goals through planning and policy decisions." This is a significant weakness in this draft EIS. The potential socio-economic impacts of each proposed alternative in this Resource Management Plan/DEIS deserve full development, consideration and justifications. Real numbers, current numbers and solid data sets are absolutely necessary to comply not only with the requirements of the National Environmental Policy Act, but to respect the legitimate expectations of all the communities involved. The agency needs to strengthen all of the socio-economics in this DEIS if it is to fulfill is public trust.	2046
10386	10386-2	The draft EIS does not set forth data relative to the historic and current conditions for the Planning Area (PA). This makes a proper analysis of the various alternatives impossible. There should be a clear and verifiable discussion of the starting point for this landscape scale document (PA). This PA has been under management scenarios for decades, and these management scenarios are based in public documents which were developed under the National Environmental Policy Act. How these management scenarios have affected the Planning Area is missing from this draft EIS in any substantive way.	2054
10386	10386-5	One of the most worrisome general themes in this draft EIS is the continual statements of perception that are used to recommend management changes or to characterize a multiple use. Such statements and/or missing data sets can be found relative to reduction in livestock grazing, wildlife habitats, analysis of Areas of Critical Environmental Concern (ACEC), enhanced oil recovery, mineral potential to name only some. It appears more than likely that in the planning process for this RMP/EIS the BLM has violated or not conformed to the Data Quality Act of 2000.	2055
10386	10386-3	Rights-of-way (ROW) which would require avoidance/mitigation areas seem beyond reasonable. They range in magnitude from 941,778 acres - 2,717,617 acres depending on the alternative. However, there are no justifications as to why these acreages are necessary, or if they would be effective in protecting resources. This seems economically irresponsible, as NEPA requires the socio-economic impacts be fully considered and set forth. This document lacks that information.	2066
10387	10387-11	We did not see any documentation to support that irreparable damage was taken into consideration on the designation of current ACECs or on the newly proposed ACECs.	2001
10387	10387-7	Trapper-Medicine Lodge ACEC area, we would like to express our concern over the listing of this area. We realize the importance of the water recharge area to the local municipalities in the area and believe that all municipal and irrigation waters are important. We would like to see supporting documentation to justify the special geologic qualities of the above area. Much of the State of Wyoming is a recharge area for many aquifers, and we do not understand what criteria have been used to classify this particular one as an ACEC. The Madison Limestone appears to us to receive recharge over a much greater section than just the ACEC plotted area. Why does the erosional environment make this area so special?	2001

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10387	10387-1	In Appendix W, in the fifth paragraph on page W-1, narrative states that watershed and vegetation management objectives would not be met if utilization levels consistently exceed the levels in Table W-1. Please include in the Final RMP peer reviewed, science based support for this statement.	2011
10387	10387-2	We have noticed that Appendix P contains only the "active use" column, and would like to request that a "permitted use" column be added in order to show what is formally allocated and recognized by the BLM.	2011
10387	10387-5	Permittees also need to be included in the list of those with whom the BLM intends to cooperate in the collection, analyzing, and reporting of monitoring data. Looking at Appendix C under DATA COLLECTION, we find that permittees are not included. On page 3-176 it states that "When rangelands are not meeting resource objectives, the BLM implements changes in grazing management." The lessee has no control over the other resource uses and shouldn't be penalized for the poor management of other resource uses. Prior to any changes in grazing management because rangeland objectives are not being met the BLM must provide multiple year monitoring data (3 to 5 years) to document that grazing is the cause.	2011
10387	10387-8	prior to any reduction in AUMs or adjustments in utilization levels due to wildlife use, the BLM will provide monitoring data to support the reductions and provide reasonable alternative areas to graze to replace the AUMs lost due to wildlife excess use. The BLM needs to provide the policy, law, or regulation that allows preferential use of wildlife over livestock.	2011
10387	10387-14	Big Game Crucial Winter Range: The Draft Plan covers nearly twice the area identified by the Wyoming Game and Fish Department as Big Game Crucial Habitat which seems unnecessary to us. The state agency designations should be supported as it is difficult in the BLM document to determine what the BLM intends with their designations.	2022
10387	10387-15	Elk Parturition Areas: Hamilton Ranch does not support the removal of cattle or sheep due to elk disturbance concerns unless it, too, can be scientifically supported. There is no scientific evidence in the plan suggesting that stock grazing creates problems for birthing elk.	2025
10387	10387-6	Big Horn Sheep: The RMP states (pg. 3-97): Bighorn sheep populations in the Planning Area have increased due to the establishment of native core areas in occupied bighorn sheep habitat and because of habitat augmentation and improvement through burning and livestock permit changes. What is this statement suggesting? Does it suggest that the elimination of domestic sheep and goats allotments in Big Horn Sheep habitat has increased population numbers? We are not aware of any sheep allotments in the Big Horn Sheep designated habitat. BLM needs to furnish data on historic grazing allotment and Big Horn Sheep population data to see if there are correlations and if increases have taken place. Also, what does habitat augmentation entail? We'd like to see a definition of this term in the RMP.	2025
10387	10387-10	Much of the mapping presented by the BLM does not include many of the roads, range improvements, pipelines, water wells, and oil fields that are currently on the land. The BLM needs to do a new inventory of the 56 proposed areas that potentially could be managed as LWCs. These designations are just one more way to regulate the grazing and other industries that have occurred in the area for over a century. Nowhere is it stated in the Draft RMP that the area is already surrounded by 9.13 million acres of U.S. Forest Service, Wilderness	2027

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		Areas and National Parks. We question why there is a need for more areas that are restricted or closed. Many of the areas proposed do not represent what we would consider to be lands with wilderness characteristics because most of them certainly show some habitation and use by man. In the BLM Manual 6301 it is stated that naturalness refers to looking natural to the average visitor who is not familiar with the compositions of a natural ecosystem. An average visitor from a metropolitan area may not recognize weed infestations and other man induced influences. To most anyone living in the city, much of the Big Horn Basin BLM lands will look like wilderness. How can the agriculture possibly survive, if untrained individuals are influencing the determination of lands with wilderness characteristics? Also, many of the LWCs do not meet the requirement that they contain 5000+ acres or if not meeting that requirement they are not contiguous to wilderness or existing WSAs.	
10387	10387-12	We do not think the BLM has taken into consideration the Reasonably Foreseeable Development (RFD) that could potentially occur in the Big Horn Basin. Horizontal and directional drilling is happening in other areas and should be considered in this next 20 year plan.	2051
10387	10387-4	Please change the definition of surface-disturbing activity as stated in Appendix 2 (Footnote 1, Table W-1). Livestock and wildlife are listed as a surface disturbing activity, and it appears that this RMP is the only one in Wyoming that views it as such. Surface-disturbing activities should only include uses that remove non-renewable resources such as top soil, sand, gravel, etc. We feel that the surface disturbing activity applies more to construction of well pads, roads, reservoirs, pipelines, power lines, parking lots, etc	2054
10387	10387-9	Please clarify "stakeholder" and "interested publics." The term "stakeholder" needs to taken out of the grazing section and abolished. The Code of Federal Regulations (CFR) 4100.0-5 has a specific definition for "interested publics" and is a term used in the grazing portion of the code, and we feel it is important that the BLM definition is consistent with the existing regulations. A "stakeholder" can be any citizen of the United States. The above regulation states that the U.S. citizen actively request involvement before being consulted on grazing management and Allotment Management Plans. Please include the above CFR definition in the RMP.	2054
10387	10387-13	BLM management needs to be consistent with the core areas identified by the State of Wyoming. Also, the Executive Order from the Wyoming Governor specifically conveyed that normal livestock and rangeland management practices be considered "de minimus" by that Order.	2069
10388	10388-6	Page ES-7, last P: As previously discussed, livestock grazing has to be listed as a surface disturbing activity on our Public Lands.	2011
10388	10388-7	Page ES-10, P 5: As previously discussed, livestock grazing causes 98+ percent of the wetland/riparian habitat impacts and must be thoroughly addressed here.	2011
10388	10388-5	Page ES-5, last P: Shouldn't all the existing HMPs be listed here?	2025
10388	10388-2	Based on the total lack of information on Stock Pond Wetlands in the entire three volumes of this RMP/EIS document, it appears that BLM has purposely chosen to ignore them in an attempt to once again freely mismanage these Range Improvement Projects as Public Land GRAZING SACRIFICE AREAS. Previous BLM Grazing EISs and MFP/RMPs of the 1980s specifically addressed Stock Pond Wetlands, as required by EO 11990, which led to the subsequent preparation of BLM Reservoir Habitat Management Plans to guide the steady	2033

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		improvement of the wetland values at these abundant water collection sites by the Range and Wildlife manager public servants. Also, Stock Pond Wetlands meet every published definition of the term "wetland," including the one in the EO and those in this EIS/RMP document. Obviously (although BLM currently refuses to recognize the fact), the purpose of the EO was to protect/improve all wetland values on Public Land. It makes no difference to wildlife if a palustrine Stock Pond Wetland furnishes them their habitat needs as a result of water collected behind a man-made dam or if habitat needs are furnished in a wetland created by a beaver dam or as an indirect result of man's activities associated with irrigation. It appears that most of the current BLM public servants in the Bighorn Basin, versus those of the 1980s, are trying to justify their failure and lack of ingenuity and dedication to protect/improve ALL wetlands on Public Lands. On page 4-133, it states that, ALL (emphasis added) riparian/wetland areas are evaluated per the Wyoming Standards for Healthy Rangelands (Appendix N) and managed toward proper functioning condition (PFC). Thus, the condition/trend of Stock Pond Wetlands must also be presented in this RMP/EIS.	
10388	10388-8	Page 1-6, last bullet: Must mention EOs 11990 and 11988 (Protection of Floodplains) as existing Statutes.	2033
10388	10388-4	Page ES-3, 5th bullet: Must list EO.	2054
10389	10389-10	In addition to lacking an adequate range of geographic alternatives for the MLPs, Appendix Y also lacks an adequate range of management alternatives. This is because beyond identifying the proposed special designations for each of the MLPs and referring the public to an "oil and gas constraints" map, BLM did not provide a detailed analysis of the management prescriptions for those designations in Appendix Y.	2014
10389	10389-11	As a critical first step in the development of MLPs, BLM must identify and fully evaluate the impacts of oil and gas leasing and development on "important resources and values" within the MLP planning areas. Those resources and values include lands with wilderness characteristics, wildlife habitat and others specifically identified in section II.A of IM 2010-117, as well as any other important resource or value that may be present within the MLP planning areas. This approach is also required under NEPA, as discussed above. However, Appendix Y, merely lists a number of "resources of concern" that exist within each MLP planning area, without further description or evaluation of potential impacts.	2014
10389	10389-12	As discussed in Section X.A, the only measures identified in Appendix Y to resolve potential resource conflicts in MLP planning areas are special designations and the customary range of "oil and gas constraints." However, IM 2010-117 also requires BLM to "consider a range of new constraints" and "other planning decisions" like phased leasing, capping surface disturbance and requiring compliance with best management practices. Id. at II.B. Some of these measures are already analyzed under one or more of the Draft RMP's proposed alternatives, while others are not evaluated in any of the alternatives.	2014
10389	10389-13	Furthermore, prioritizing leasing "in areas where development is most likely to occur based on historical development, adjacent development, or geologic information" was a principle recommendation of the team of resource specialists who prepared the "Stiles Report"(Footnote 3: Available at: http://www.doi.gov/documents/BLM_Utah77LeaseParcelReport.pdf)Â and was carried forward into IM 2010-117 as a measure that BLM should evaluate when	2014

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		preparing MLPs. IM 2010-117 at II.B. Thus, BLM must consider phased leasing - i.e., prioritizing leasing in areas with high development potential, such as the Oil and Gas Management Areas, and minimal resource conflicts - as a means of resolving potential resource conflicts in the MLP planning areas.	
10389	10389-14	BLM should identify areas with conflicts between existing leases and the protection important resources, in particular lands with wilderness characteristics and critical wildlife habitat, and should then evaluate allowing those leases to expire and closing them to future leasing in the MLPs. BLM made such a commitment in the Jack Morrow Hills Coordinated Activity Plan for an area that, like the MLP planning areas, contains critical wildlife habitat and other "sensitive" resources	2014
10389	10389-8	While BLM addressed the MLPs in the Draft RMP, it did so superficially. Instead of developing and presenting to the public a full range of alternatives for the MLPs, BLM simply summarized in a brief appendix how it addressed the management of the MLPs throughout the Draft RMP and then described how such a "holistic" approach addressing "land use allocations for all resources" was preferable to actually preparing MLPs. Draft RMP at App. Y-1.	2014
10389	10389-9	In order to consider an adequate range of alternatives for the MLPs, BLM must evaluate a wider range of geographic areas, including the areas nominated by the public and, for Absaroka-Beartooth Front, the "core" area separate and in addition to the nominated area.	2014
10389	10389-1	The definition and application of "wilderness characteristics" in the RMP and related documents must be corrected. The Glossary in the Draft RMP includes a definition of "Wilderness Characteristics" that refers to a 2003 IM, which should be replaced with the current IM 2011-154, Attachment 1, which defines wilderness characteristics.	2027
10389	10389-4	The Draft RMP also overstates the potential impacts on oil and gas production from managing lands to protect their wilderness characteristics. The Draft RMP acknowledges that BLM expects oil and gas development to be focused in established fields (see, i.e., Draft RMP, p. 3-155). Most of the lands with wilderness characteristics are outside these fields, which is not discussed in the Draft RMP and, therefore, not fully taken into account in weighing the impacts of protecting lands with wilderness characteristics on oil and gas development.	2027
10389	10389-5	Given the substantial acreage identified with wilderness characteristics, only evaluating protection of all the acres or less than 10% of those acres does not represent an actual consideration of alternatives and makes the Preferred Alternative appear to be "a foreordained formality" in contravention of NEPA, as well as FLPMA and the agency's current guidance on considering management of lands to protect their wilderness characteristics. The range of alternatives for the Bighorn Basin RMP must include a true range of alternatives to protect lands with wilderness characteristics; the BLM must expand the analysis in the Draft RMP.	2027
10389	10389-6	IM 2011-154 sets out considerations in deciding whether to manage lands to protect their wilderness characteristics, including analysis of "manageability" and other resources values and uses. Attachment 2, p. 2. The Draft RMP purports to have engaged in these considerations, as well, in compliance with previous guidance. Draft RMP, p. 3-174. However, while the Drat RMP does not provide a detailed discussion of this process, the information provided indicates the evaluation needs to be corrected. Table 3-46 sets out the "other resource values and uses" and also appears to identify manageability factors. Draft RMP,	2027

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		pp. 3-169 - 3-173. However, the table includes "proximity to wildland urban interface" as a resource value/manageability issue. As noted above, outside human impacts are generally not to be considered in evaluating "naturalness"	
10389	10389-7	The mere proximity of the wildland urban interface is not an appropriate measure. In addition, IM 2011-154 requires that BLM analyze not only whether other resources and values are present in lands with wilderness characteristics, but also whether those resources are available on other public and private lands outside those areas â€" thus ensuring that the BLM considers the relative importance of the resources and values located within the lands with wilderness characteristics. Attachment 2, p. 2. However, Table 3-46 does not include this analysis at all.	2027
10400	10400-5	Different divisions within the Wyoming Department of Environmental Quality (WDEQ) have different regulations for the resources they are charged with protecting. The citation should be for the Water Quality Rules and Regulations to avoid confusion for the reader. Additionally, for the same reason the applicable WDEQ division should be referred to specifically throughout this document. Class I waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed, nonpoint sources of pollution shall be controlled through implementation of appropriate best management practices, and the water quality and physical and biological integrity which existed on the water at the time of designation will be maintained and protected. Water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water and other values of present and future benefit to the people are all considered by the Environmental Quality Council in designating these waters. However, a water does not need to possess all of these values to be designated as Class 1, and such designation does not necessarily create requirements to protect values which are not related to water quality.	2031
10400	10400-6	Although produced water has the potential to cause these negative impacts, the WYPDES program regulates discharges to protect water quality and support designated uses, and to protect against these negative impacts. This paragraph needs to elaborate on the WYPDES program's role in increasing beneficial impacts and reducing negative impacts, as well as discussing how the BLM should communicate with the WQD if such issues associated with permitted discharges are identified. WEPP Model starting at pages 4-14 and 4-29; and Appendix V The WEPP model discussion is very brief and provides little information, other than the results, to the reader. The model appears to grossly underestimate runoff and erosion, and it appears to need to be calibrated to the Bighorn Basin. Assuming that undisturbed areas have essentially no runoff implies there was no streamflow, other than from springs and snowmelt from the mountains, prior to the basin being settled, and that all runoff seen today is only from disturbed areas. The low amount of runoff associated with disturbed areas is also very low, since it appears to predict that over 95% of the precipitation that falls on disturbed areas does not nm off. The model should be run in various watersheds in the basin in comparison to water quantity and sediment load data to see how it correlates with surface disturbed areas, etc. If the WEPP model has been calibrated to actual Bighorn Basin data, Appendix V needs to discuss this in much more detail. Based on these issues it is difficult to	2031

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		support the model as more than a qualitative tool; however, ranking of the relative amounts of erosion and sediment loading associated with the different alternatives appears correct.	
10400	10400-1	The WOGCC has regulations that require reporting of the anticipated completion and stimulation (hydraulic fracturing) program (WOGCC Rules and Regulations, Chapter 3). Language should be included in the document to reflect this regulation.	2049
10400	10400-2	discusses conforming with WQO regulations and meeting Wyoming water quality standards, yet this record implies the BLM will only use BMPs to meet those requirements. The WQO has a number of permitting and other requirements that the BLM, its permittees and/or authorized actions must meet that rely on more than BMPs. For example, Wyoming Water Quality Rules and Regulations (Chapter 4, "Reporting and Cleanup of Releases of Oil and Hazardous Substances") requires reporting of leaks and spills to the WQO - a requirement which is often overlooked or ignored. Please change the language: "BLM actions will conform with WQO regulations and requirements through application of BMPs and other measures, consistent with resource goals and objectives. Require reporting of leaks and spills to the WQD."	2054
10400	10400-3	It may be appropriate for this line to reference State Engineers Office regulations (Part III) for proper water well abandonment.	2054
10400	10400-4	Although the 2010 and 2008 303(d) Lists are similar, we can see no clear justification why the BLM did not use the most recent 2010 303(d) List which was published in April 2010. Additionally, the WQD is currently in the process of developing TMDLs for 14 of these 303(d) listed waters. The FEIS should use the 2010 303(d) List.	2054
10400	10400-7	Detailed groundwater monitoring discussions should be included in the report. "Groundwater Quality and Quantity Impacts and/or Proactive Management Actions" contains some general source discussion, but no detail on groundwater monitoring. Appendix C, Monitoring and Evaluation, contains broad monitoring and evaluation requirements, but a detailed discussion of groundwater monitoring requirements related to energy development should be included, if not in this section, elsewhere in the document. (Section 2.3.2 Mineral Exploration contains some discussion of oil and gas development.) Wherever the BLM chooses to include groundwater monitoring detail in the document, here is some suggested language to include in WQD's comments to the BLM: The WQD supports the recent BLM/USGS document "Regional Framework for Water Resources Monitoring Related to Energy Exploration and Development" (Framework). This guidance document provides a seven (7) step framework for developing a monitoring strategy for measuring and mitigating water resource damage. The framework should be specifically referenced in the EIS and the monitoring framework should be followed to develop a monitoring plan for both surface and groundwater prior to any development.	2054
10400	10400-8	This is not the definition of Surface-Disturbing Activities agreed to by the BLM and Cooperators throughout this process of developing this RMP, nor is it even similar to that in any other RMPs in the state. This definition muddies the waters and confuses the reader by including vegetation disturbance in the definition of surface disturbance. Surface disturbance is the physical removal of the land surface by mechanical means. Vegetation can be "disturbed", such as by grazing or browsing, without creating surface disturbance.	2054

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10401	10401-1	Grazing permittees in these areas have BLM maps showing many times the developments than are shown in the maps presented in this plan and wildland evaluations prepared to nominate these areas.	2027
10408	10408-1	Big Game Crucial Winter Range acreage identified by BLM for all alternatives (Map 35 - Biological Resources, Fish and Wildlife Resources, All Alternatives) is much greater than Big Game Crucial Habitat Areas identified by the Wyoming Game and Fish Department (WGFD) (WGFD Habitat Priority Areas - Revised January 2009, WGFD GIS Section, http://gf.state.wy.us/habitat/portal/index.asp).	2022
10412	10412-1	we are requesting a 90 day extension and will be meeting here in Billings as soon as possible to discuss the Big Horn Basin RMP	2007
10413	10413-1	o Tables labeled "Total Annual Emissions from Oil Wells" failed to include any actual emissions from oil wells.	2009_1
10479	10479-5	The negative environmental consequences of the RMP's and EIS' proposed livestock grazing practices must be analyzed and compared to alternative grazing practices.	2011
10479	10479-1	The RMP states that the HMA Plan or the grazing permit renewal process is the proper forum for AML revisions. However, it is the RMP which guides the management and distribution of the resources within the Planning Area. AMLs are based on resource allocation. Therefore, the RMP must include options to increase AML and reinstitute zeroed-out Herd Areas (HAs).	2030
10479	10479-2	The BLM must include an alternative for increasing AMLs. Increasing AML can be accomplished through the agency's Adaptive Management Strategy and by decreasing livestock grazing within the complex, pursuant to 43 C.F.R. 4710.5(a).	2030
10479	10479-4	The RMP fails to provide cross-reference information regarding the wild horse HMAs and zeroed-out HAs by livestock allotments. Inspecting the maps to try to see where the two intersect is imprecise, and the maps don't identify individual allotments due to their sheer number -- 687 -- covering virtually all 3,200,000 acres of BLM-administered "surface land."	2054
10480	10480-3	The DEIS states that the gray wolf is a Bureau sensitive species. The Service recommends that the text state that gray wolves in Wyoming are also currently listed as a nonessential experimental population under the Act.	2025
10480	10480-4	The DEIS states that wolverines existing in the planning area. The DEIS should state that the species is currently a candidate for listing under the Act.	2025
10480	10480-1	Please reword the text to state that this species is currently a candidate for listing under the Act.	2033
10480	10480-2	The DEIS states that the mountain plover is proposed for listing; However, on May 12, 2011, the Service announced the decision to withdraw the proposed listing of the mountain plover as a threatened species under the Act (76 FR 27756). Please change the text to reflect this change in status.	2041
10480	10480-5	Please correct this typographical error to state December 1 - September 30.	2054
10481	10481-1	Table 2-5. Detailed Alternatives. Record #4031. p. 2-65: The WDA does not support the language in the Agency Preferred Alternative (Alternative D): "Manage to achieve or make progress towards achieving 65 percent or more of Historical Climax Plant Community (HCPC)." We recommend removing this language and using the language provided in the first portion of Alternative A: "Implement objectives for Watershed Protection, Forestland Management and	2011

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		Livestock Grazing." This, in addition to the second paragraph in Alternative D, provides flexibility to define the Desired Plant Community (DPC) most compatible with management objectives, budget and personnel capabilities and current land use. Furthermore, if managing for HCPC is the goal, the DPC can include this. Currently, Alternative D does not provide the flexibility to manage for both DPC and HCPC.	
10481	10481-4	Record #6253 allows "permitted livestock grazing use consistent with other resource objectives and in agreement with the Wyoming Standards for Healthy Rangelands." The WDA recommends removing "consistent with other resource objectives" from this management action. Livestock grazing has occurred on these lands for decades without harming wilderness characteristics and it is reasonable to conclude that livestock grazing managed to meet the Standards for Healthy Rangelands will not reduce these characteristics.	2011
10481	10481-5	Table 2-5. Detailed Alternatives. Record #6268. p. 2-160:The WDA strongly urges the BLM to delete the word "stakeholder" from this management action and add the words "interested publics." Interested publics is an established term used in the livestock grazing portions of the Code of Federal Regulations (CFR) and this RMP must be consistent with existing regulations. CFR 4100.0-5 includes a specific definition for interested publics. It is important to cite these regulations in the RMP: CFR 4100.0-5 Interested public means an individual, group, or organization that has:(1)(i) Submitted a written request to SLM to be provided an opportunity to be involved in the decision making process as to a specific allotment, and(ii) Followed up that request by submitting written comment as to management of a specific allotment, or otherwise participating in the decision making process as to a specific allotment, if BLM has provided them an opportunity for comment or other participation; or(2) Submitted written comments to the authorized officer regarding the management of livestock grazing on a specific allotment. Even though there is a definition of stakeholders in the glossary, stakeholders are not included in the grazing portion of the regulations and cannot be used in this RMP. The definition of stakeholders in the glossary can include anyone holding U.S. citizenship. The CFR regulations cited above require U.S. citizens to actively request involvement before being consulted on grazing management decisions and Allotment Management Plans.	2011
10481	10481-6	Chapter 3 - Affected Environment, Livestock Grazing Management. AUM Allocations, p. 3-176 - 3-177: New statistics are available from the USDA National Agricultural Statistics Service on the impact of cattle and sheep in Wyoming and the U.S. Please update the statistics to include up-to-date information.	2011
10481	10481-7	The DEIS states: "Livestock and, to a lesser extent, wild horses and wildlife would contribute to the introduction and spread of invasive species." The WDA does not believe the BLM has sufficient data to show livestock are the main reason invasive species are introduced and spread. It is not reasonable to prioritize the culprits in the introduction and spread of invasive species. We recommend the DEIS strictly discuss the fact that invasive species will continue to spread in the planning area and this could occur for several reasons including livestock, wild horses, wildlife, surface disturbance, vehicles and travel routes, etc. If the BLM insists livestock are the primary factor in the introduction and spread of invasive species in the Bighorn Basin, we would request data to verify this statement be included.	2011

Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
10481	10481-8	Chapter 4 - Environmental Consequences, Special Status Species - Plants, Alternative B, Resource Uses, p. 4-208: The DEIS states "Alternative B places more emphasis on meeting the rangeland health standards and maximizing multiple use benefits." This statement is not correct. Each alternative places equal weight on obtaining the Wyoming Standards for Healthy Rangelands and Alternative B does not emphasize multiple use benefits.	2011
10481	10481-9	Chapter 4 - Environmental Consequences, Special Status Species - Wildlife, Trophy Game, Alternative A, p. 4-227: The DEIS does not disclose the true impact of livestock grazing on grizzly bears. While the paragraph does describe conflicts between livestock and grizzly bears, there is no disclosure on how choosing Alternative A (or Alternative D, p, 4-246) will truly impact grizzly bears. The WDA does not believe opening or closing areas to livestock grazing will greatly impact grizzly bears on BLM land. How much overlap actually exists between livestock allotments and grizzly bear habitat? How many conflicts have arisen? Will closing additional areas to livestock grazing under Alternative B really decrease conflicts? The true impacts are not currently displayed in the DEIS and we recommend deleting this discussion since the Wyoming Game and Fish Department manages wildlife in Wyoming.	2011
10481	10481-3	If Record #4077, Alternative D, was developed to address disruptive activities associated with grazing in delineated elk parturition habitat, then the WDA does not support this Alternative. We are concerned with the accuracy of current parturition habitat lines and believe these lines vary year-to-year based on predator pressure and weather patterns. Therefore, we do not support restricting cattle grazing in parturition areas based on the premise of disturbance. However, if Record # 4077 was developed to address potential brucellosis impacts, we recommend the following language, "SLM would consider implementation, on a case by case basis, of management actions jointly recommended by wildlife managers, grazing permittees, and animal health officials that would control the transmission of brucellosis."	2020
10481	10481-10	Chapter 4 - Environmental Consequences, Livestock Grazing Management, Alternative D, Resources, p. 4-378: The DEIS states that Alternative D "allows water development projects in sage-grouse nesting habitat with 10 inches or less annual precipitation if adverse effects can be avoided or mitigated based on site-specific analysis, a less restrictive requirement for allowing water development than that under Alternative B," The DEIS should clearly state how this action will impact livestock grazing management. For example, will it make distribution and management of livestock more difficult? Will it be costly to mitigate impacts?	2071
10484	10484-1	The plan mentions that the adverse impact to allowing timber harvest is an increase in unplanned ignition sources (chainsaws) in woodlands. What is this statement based on? How many fires have started due to chainsaws? How do these numbers compare to natural ignitions such as lightning.	2008
10487	10487-1	Fidelity believes BLMs sage grouse management should be consistent with Wyoming EO 2011-5 and the KHAs acreage should mirror the sage grouse core areas. There is no justification or scientific evidence provided to explain this discrepancy in the RMP	2069
10489	10489-2	The Impact Analysis for Planning Model (IMPLAN) is a model that uses regional analysis. It appears the Big Horn Basin would be better analyzed with a more geographic-specific approach. Example, in Table X-1, IMPLAN identifies regional oil and gas well numbers including coal bed natural gas. There has been very	2046

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Table B-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
		limited exploration and not any marketable sales from coal bed natural gas development in the Big Horn Basin. The model appears to be using the entire state of Wyoming for a regional model. Data like this has no bearing on oil and gas development in the Big Horn Basin and makes the reported information and findings questionable as well as misleading.	
10490	10490-1	For purposes of clarification, we request the BLM insert "(see Glossary)" following "avoid" in record #s 5020, 5022, and 5023 on pages 2-97 and 2-98. We also suggest on page 3-131 in paragraph 2,"buffer zones" be replaced with "visual resource management areas" as this may help to clarify how the BLM is proposing to manage these types of cultural resources.	2004
10572	10572-2	How can the BLM have standards that the mining companies have to comply with but the mining is exempt?	2032
10572	10572-1	Cretaceous strata in the Bighorn Basin have yielded important paleontological finds. In particular, outcrops of the Cloverly, Meeteetse, and Lance Formations produce dinosaur bones, while outcrops of the Thermopolis Shale and Mowry Shale produce the fossil bones of marine reptiles. (page 3-133) Where are the findings'? It states on page 3-133 that there is a lack of information.	2059
10577	10577-1	It is not clear to me if you are referring to mountain bikes in record 6049 or something else. Based upon a discussion of this topic elsewhere in the document, it is clear to me that you are talking about motorized vehicles. "Mechanized vehicle" is not in the glossary of terms. "Mechanized use" is in the glossary and refers to mountain bikes. There are a couple of issues here that apply to other areas of this document besides this record, but this is where it first arises. First, areas with “limited travel designations” are an OHV designation and does not apply to mountain bikes. Second, I would suggest this section be checked for meaning to make sure you are not inappropriately lumping motorized and mechanized together. It would help to add a glossary term for "limited travel designations".	2034
10578	10578-1	Any closure of Tatman Mountain for emergency communications is unacceptable. As the Sheriff for Big Horn County, we are responsible for the safe dispatching of ambulance fire search and rescue, and law enforcement. Over 13,000 citizens require our services. Tatman Mountain is the only location we have found that provides adequate communication for the entire counties emergency resources.	2054

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ATTACHMENT C

COMMENTER RESPONSE INDEX

1.0 INTRODUCTION

The tables presented in Attachments C and D are provided to assist commenters in finding their submitted comments and identifying the associated BLM comment summary and response in the Comment Analysis Report. Table C-1 provides a list of first and last names of commenters, the commenter's affiliation (if applicable), and the commenter's comment document number. PDF copies of all received comment documents are located on the BLM website: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html. Within Attachment D, also located at the above website, Table D-1 includes all individual substantive comments and identifies the BLM summary comment and response number associated with individual comments, organized by comment document number.

To use these tables:

1. Locate your name and associated comment document number in Table C-1.
2. Using the comment document numbers from Table A-1, go to Attachment D on the BLM website address provided above and find your identified individual comment(s), comment text, and BLM summary comment and response numbers in Table D-1.
3. The BLM summary comment/response numbers match those provided in Section 4.2.2 of the Comment Analysis Report.

With this information (comment document number, comment number, and summary comment and response number) commenters can locate a copy of their original comment document on the BLM website, their individual comments in Attachment C, and BLM summary comments and responses in Section 4.2.2 of the Comment Analysis Report.

Table C-1. Index of Commenters

Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Abbott	Tyler	U.S. Fish and Wildlife Service	1002
Allard	Wayne	American Motorcyclist Association	1006
Applegate	David	Anadarko Petroleum Company	1024
Baird	Virginia	Unaffiliated Individual	1005
Baird	John	Unaffiliated Individual	1014
Bales	Patricia	Unaffiliated Individual	1015
Bales	Shirley	Unaffiliated Individual	1031
Bales	Steve	Unaffiliated Individual	1056
Ball	Gene	Unaffiliated Individual	1001
Bates	Karen	Unaffiliated Individual	1033
Bebout	Eli	State of Wyoming Legislature	1079
Bell	Matt	Unaffiliated Individual	1053

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Table C-1. Index of Commenters (Continued)

Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Bodtke	Dale	Unaffiliated Individual	1007
Bohan	Suzanne	Environmental Protection Agency	1066
Bolles	Randy	Devon Energy Corporation	1026
Bowman	Bo	Hot Springs County Planning Office	1016
Briggs	Jeff	Unaffiliated Individual	1044
Brown	Scott	Double Dollar Land and Livestock LLC	1018
Bruner	Travis	Western Watersheds Project	1028
Close	Dan	M-I SWACO	1076
Culver	Nada	The Wilderness Society	1051
Dillon	Mattew	American Colloid Company	1012
Dockery	Carl	Unaffiliated Individual	1054
Edmunds	Daly	Audubon Rockies	1037
Fearneyhough	Jason	Wyoming Department of Agriculture	1013
Flitner	David	Flitner Ranch, Flitner Packing and Outfitting, Hideout Adventures	1011
Flitner	Tim	Diamond Tail Ranch	1042
Hildebrand-Marvin	Robin	Unaffiliated Individual	1065
Hilding	Nancy	Unaffiliated Individual	1070
Holmer	Steve	American Bird Conservancy	1074
Jachowski	Kathleen	Guardians of the Range	1047
James	Michael	Denbury Onshore, LLC	1023
Jespersen	Soren	The Wilderness Society	1067
Johnsey	Danette	Unaffiliated Individual	1036
Keller	Michael	Fidelity Exploration and Production Company	1048
Liguori	Sherry	Pacificorp	1073
Liguori	Sherry	Rocky Mountain Power, Avian Power Line Interaction Committee	1075
Magagna	Jim	Wyoming Stock Growers Association	1049
Magstadt	Rick	WYO-BEN, Inc.	1021
McClenahan	Pepper	Enhanced Oil Recovery Institute	1041
McGaffin	Graham	The Nature Conservancy	1039
Mead	Matthew	Office of the Governor	1069
Miller	Neil	Unaffiliated Individual	1010
Molvar	Eric	Wild Earth Guardians	1008
Moore	T.R. "Doc"	Northwest Wyoming O.H.V.	1004
Moseley	Claire	Public Lands Advocacy	1025
Nelson	April	Unaffiliated Individual	1032
Newcomer	Chris	Sierra Club	1055
Nielson	Glenn	Mountain Holdings	1038
Noecker	Suzy	Wyoming Farm Bureau Federation	1057
Nordberg	Ronald	Unaffiliated Individual	1077
Olson	Claire	Basin Electric Power Cooperative	1019
Orchard	Cathy	Unaffiliated Individual	1034

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Table C-1. Index of Commenters (Continued)

Commenter Last Name	Commenter First Name	Commenter Affiliation	Comment Document Number
Orchard	Charly	Unaffiliated Individual	1035
Public	Jean	Unaffiliated Individual	1040
Radakovich	Jason	Hoodoo Ranch	1043
Roden Jr.	John	Unaffiliated Individual	1072
Rolston	Bob	Wyoming County Commissioners Association	1068
Rosin	Lawrence	Unaffiliated Individual	1059
Ruble	Peggy	Bighorn Basin Local Government Cooperating Agencies	1017
Salvo	Mark	Defenders of Wildlife	1022
Satas	Vic	Unaffiliated Individual	1058
Schiffer	Linda	Unaffiliated Individual	1062
Shaffer	Raymond	Unaffiliated Individual	1063
Skaer	Laura	Northwest Mining Association	1050
Steitz	Jim	Unaffiliated Individual	1003
Stuble	Julia	Wyoming Outdoor Council	1029
Sylvester	Joseph	Unaffiliated Individual	1009
Thagard	Neil	Theodore Roosevelt Conservation Partnership	1052
Thompson	Rick	Tri-State Generation and Transmission Association, Inc.	1027
Tolman	Donald	Unaffiliated Individual	1064
Trefen	Jennie	Wyoming Wilderness Association	1046
Umphlett	Jeff	Unaffiliated Individual	1045
Williams	Bruce	Wyoming Enhanced Oil Recovery Commission, University of Wyoming	1020
Williams	Hana	Wyoming Outdoor Council	1030
Wuerthner	George	Western Watersheds Project	1071
-	-	Sierra Club	1060
-	-	Unknown Letter	1078
-	-	WildEarth Guardians	1061

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ATTACHMENT D

Table D-1 includes all individual substantive comments and identifies the BLM summary comment and response number associated with individual comments. The table is organized by comment document number. Please refer to Attachment C, Table C-1 within the Comment Analysis Report for the Bighorn Basin Resource Management Plan Revision Project to locate your name and associated comment document number.

Table D-1. Individual Comments and BLM Response Index

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1005	1005-3	Alternative F Record 49. It is counter productive to the sage grouse to limit livestock grazing on bum areas. Record 50 is completely unnecessary ~it is extreme to fence off a burned area and to not allow grazing within a specific time frame. It appears there is an obvious agenda against Livestock grazing under the guise of restoration of the land Alternative E & F appear to be totally against livestock grazing on public lands. There is no proof that livestock grazing on public lands degenerates the grasses.	3011
1005	1005-2	Chapter 4:3 Some of the lands in the West NEED controlled burns and grazing to help manage wildfires. If the grass and weeds are not thinned out and forest clearings are not allowed, periodically, a natural fire will get out of control quickly and uncontrolably!	3011
1008	1008-82	This discretionary language calls into question the BLM's commitment to implement the conservation measures outlined in its policy. The Bighorn Basin RMP should include language that is mandatory, not discretionary.	3027-1
1008	1008-80	BLM should correct the deficiencies in the State policy by requiring that nesting habitats be delineated, and that new road construction be sited at least 0.8 mile from leks, nesting habitat, and winter concentration areas. Within these areas, jeep trails should be used for access, and seasonal closures to motor vehicles should be applied during breeding, nesting, and wintering periods.	3039-1
1008	1008-79	Unfortunately, both the State and Wyoming BLM Core Area strategies (and Bighorn Basin RMP Preferred Alternative) only require protective buffers of 0.6 miles around leks in designated core habitat; this corresponds to a 6% probability of lek persistence (Christiansen and Bohne 3008). BLM itself concedes, "Energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% (Walker et al. 2007a)." DEIS at 367. By comparison, the NTT report recommends a 4-mile lek buffer for siting industrial development in sage-grouse habitat (SGNTT 2011), a prescription in greater accord with the science.	3035_2

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1008	1008-78	This policy required BLM to complete an Ecoregional Assessment for the Wyoming Basins Ecoregion. Id. at 11. This Wyoming Basins Ecoregional Assessment publication ("WBEA")3 was completed in 2011, and BLM should reference the findings of this report as they apply to the Bighorn Basin RMP, which falls within the Wyoming Basins Ecoregion, in order for the BLM has not met its obligation to "use the best available science" including publications specifically mandated under the Strategy. This study included a complete land cover mapping exercise including analysis of human footprint, which would have been useful to include in the Affected Environment section of the FEIS. Chapter 5 of this publication (WBEA at 112) specifically addresses sage grouse avoidance of oil and gas developments and other permitted facilities. This analysis found that sage grouse density was negatively correlated with major highways, powerlines, and the presence of oil and gas wells. WBEA at 124. These researchers pointed out, "Any drilling <6.5 km [approximately 4 miles] from a sage-grouse lek could have indirect (noise disturbance) or direct (mortality) negative effects on sage-grouse populations." WBEA at 131. This finding supports the NTT recommendation of a 4.0-mile no-surface-disturbance buffer, but not the application of an 0.6-mile buffer as in the proposed Bighorn Basin RMP Preferred Alternative. Model results (WBEA at 134) could have been used to examine what proportion of high abundance roost sites and general use areas were encompassed by the Core Area and non-Core mitigation measures applied under each alternative.	3035_2
1008	1008-77	With this in mind, we ask the BLM to gather each of the scientific articles referenced in the Literature Cited section of these comments, review them thoroughly and incorporate their findings into the EIS, and add them to the administrative record for this RMP revision.	3035_2
1008	1008-75	In the Bighorn Basin RMP DEIS, BLM failed to apply baseline information from the Wyoming Basins Ecoregional assessment and other scientific studies and reports to inform its analysis of impacts by alternative. BLM also failed to map and present sage grouse wintering habitat as part of the baseline information requirement. Text on Affected Environment with regard to sage grouse habitat also failed to discuss the winter habitat needs of the birds (SDEIS at 3-3), in spite of clear scientific evidence that impacts to sage grouse by oil and gas development on winter ranges can have profound effects on the birds (Walker 2008). BLM Sensitive Species policy imposes additional requirements to provide baseline information. For BLM Sensitive Species, the agency is responsible for "Determining, to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluating the significance of BLM-administered lands and actions undertaken by the BLM in conserving those species." BLM Manual 6840.2(C)(1). Furthermore, the agency is responsible for "Monitoring populations and habitats of Bureau sensitive species to determine whether species management objectives are being met." BLM Manual 6840.2(C)(3). The BLM must make up for the absence of population status and trend data for BLM Sensitive Species by generating these data of its own accord where they are unavailable through WGFD, Wyoming Natural Diversity Database, or other external sources.	3035_2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1008	1008-71	Do not use fire in precipitation zones < 12", except as last resort and where conditions allow and cheatgrass is a very minor component. (Northwest Colorado RMP Amendments).	3011
1008	1008-70	Avoid all new structural range developments and location of supplements (salt or protein blocks) unless independent peer-reviewed studies show that the range improvement structure or nutrient supplement placement benefits sage grouse. (North Dakota RMP Amendments).	3035_8
1008	1008-69	Where riparian and wetland areas are already meeting standards they would be maintained in that condition or better. Where a site's capability is less than PFC, BLM would manage to achieve or move toward capability. Manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. (North Dakota RMP Amendments).	3034
1008	1008-68	Authorize new water developments only when no adverse effect to sage grouse. (Northwest Colorado Plan Amendments).	3023-1
1008	1008-67	Prioritize assessments that include sage grouse habitat parameters, using ESD to determine if rangeland health standards are met. Develop objectives to conserve, enhance of restore sage grouse habitat. Give preference to SG habitat unless site-specific circumstances warrant an exemption. Manage toward ecological site potential and toward reference state to achieve sage grouse objectives. (Northwest Colorado Plan Amendments). Develop drought contingency plans that provide for a consistent/appropriate response. (Northwest Colorado Plan Amendments).	3035_8
1008	1008-66	Bury new distribution lines within 1 mile of leks. (HiLine RMP revision). Incorporate sage grouse habitat objectives into grazing permit renewals. (Northwest Colorado RMP Amendments).	3035_8
1008	1008-65	Find General Habitats unsuitable for surface mining; apply disturbance cap with exception when SG population is stable or increasing. Offsetting mitigation as needed. Recommend minimization of impacts. (Northwest Colorado RMP revision).	3035_8
1008	1008-64	Noise limited to no more than 10 dBA above ambient, where technologically feasible. (Buffalo RMP revision).	3035_8
1008	1008-63	Only allow geophysical operations by heliportable drilling methods and in accordance with seasonal timing restrictions. (North Dakota RMP Amendments). High-profile structures exceeding 10 feet in height, would be eliminated, designed or sited in a manner which does not impact SG. Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts to GRSG. (North Dakota RMP Amendments).	3035_8
1008	1008-62	Allow new routes/realignments during site-specific travel planning if it improves GRSG habitat and resource conditions. Allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrading would have minimal impact on sageâ€¢grouse habitat, is necessary for motorist safety, or eliminates the need to construct a new road. (North Dakota RMP Amendments).	3035_8

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1008	1008-61	Site and/or minimize linear ROW to reduce disturbance to sagebrush habitats. Maximize placement of and transportation routes in existing ROWs. Power lines would be buried, eliminated, designed or sited in a manner which does not impact SG. ROWs would be allowed with appropriate mitigation and conservation measures identified within the terms of the authorization to minimize surface disturbing and disruptive activities. Co-locate new ROWs within existing ROWs where possible. (North Dakota RMP Amendments).	3035_8
1008	1008-60	Conduct restoration of roads, primitive roads and trails not designated in travel management plans. (North Dakota RMP Amendments).	3035_8
1008	1008-59	Limit motorized use to existing roads and trails pending travel management planning. Complete planning within 5 years of ROD.	3039-1
1008	1008-58	Avoid all new structural range developments and location of supplements (salt or protein blocks) unless independent peer-reviewed studies show that the range improvement structure or nutrient supplement placement benefits GRSG. Design any new structural range improvements and location of supplements to conserve, enhance, or restore SG habitat through an improved grazing management system relative to SG objectives. Evaluate existing range improvements and location of supplements during AMP renewal process to make sure they conserve, enhance or restore SG habitat. (North Dakota RMP Amendments).	3035_8
1008	1008-57	Evaluate the role of non-native seedings to determine if they should be restored to sagebrush; seedings that contribute to grazing management that improves SG habitat can remain. (Northwest Colorado RMP Amendments).	3035_8
1008	1008-56	Do not allow treatments with a potential to adversely affect SG. Retain a minimum of 70% of ecological sites capable of supporting 12% cover in Wyoming big sage or 15% cover in mountain big sage. Manage a total disturbance cap of less than 30% lands not meeting these criteria. Irrigated meadows do not count against the disturbance cap. (Northwest Colorado RMP Amendments).	3035_8
1008	1008-55	Authorize water developments only when no adverse effect to sage grouse. Analyze springs, seeps, and pipelines to see if modifications are needed. (Northwest Colorado RMP Amendments).	3035_8
1008	1008-54	Priority Habitats are exclusion areas for new renewable energy ROW permitting. (North Dakota RMP Amendments; HiLine, Buffalo, and South Dakota RMP revisions). Maximum 25% forage utilization for livestock grazing in each grazing allotment. (North Dakota RMP Amendments).	3035_8
1008	1008-53	Close Priority Habitats to energy and non-energy leasable minerals leasing. (HiLine RMP revision).	3035_8
1008	1008-52	No Surface Occupancy stipulations required for any new fluid minerals leasing. (North Dakota RMP Amendments; HiLine, Billings/Pompeys Pillar, Miles City, and South Dakota RMP revisions).	3035_8

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1008	1008-51	Priority Habitat would be a priority in consideration of land acquisitions. Retain public ownership of PH. Consider exceptions where: There is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the priority sage-grouse habitat area; Under priority sage-grouse habitat areas with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure consideration would be given to pursuing a permanent conservation easement. (North Dakota Plan Amendments).	3035_8
1008	1008-50	Prohibit or bury powerlines within 0.6 miles of leks unless no SG declines can be demonstrated. Prohibit overhead transmission except within 0.5 mile of existing lines, corridor a maximum of 1 mile wide. Bury lines where possible. (Buffalo RMP revision). High-profile structures exceeding 10 feet in height, would be eliminated, designed or sited in a manner which does not impact sage grouse. Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts to sage grouse. (North Dakota RMP Amendments).	3035_8
1008	1008-49	New road construction would be limited to realignments of existing roads, if that realignment has a minimal impact on greater sage-grouse habitat, eliminates the need to construct a new road, or is necessary for public safety. Incorporate BMPs. Existing roads used to access valid existing rights; if unavailable, construct to minimum standard necessary. (HiLine RMP revision, North Dakota RMP Amendments).	3035_8
1008	1008-48	Conduct restoration of roads not designated during travel planning. (Northwest Colorado RMP amendments).	3035_8
1008	1008-47	Use existing roads, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary. Allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrading would have minimal impact on sage-grouse habitat, is necessary for motorist safety, or eliminates the need to construct a new road. (North Dakota RMP Amendments).	3035_8
1008	1008-45	For geophysical exploration (Record #86), the protections in Alternative E are unnecessarily strict, and Alternative F is preferable as it will fulfill the requirements of sage grouse to avoid disturbance while minimizing the need for wildcat exploration through drilling. DSEIS at 2-31.	3023-4
1008	1008-44	We agree with Record #36 for both alternatives (SDEIS at 2-22), although the use of Plateau in heavily cheatgrass-infested areas might be allowed in cases where sage grouse are not using the treated habitats. This might be accomplished by deliberately driving grouse off by teams on foot prior to treatment, and by treating from backpack units rather than aerial or truck/ATV application.	3014

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1008	1008-41	The BLM has also not considered protections for sage grouse for lands outside Priority Habitats, and has not fully considered NTT or Sage-grouse Recovery Alternative measures proposed for sage grouse general habitats. What will be the impact of permitted activities on grouse populations that fall outside the Priority Habitats/ACEC boundaries under this plan? The SDEIS is silent on this matter.	3035_1
1008	1008-40	We are concerned that the BLM has not fully considered the Sage-grouse Recovery Alternative or the National Technical Team recommendations in full, and has not provided sufficient explanation for why this has occurred. In particular, measures to protect sage grouse wintering habitat are entirely absent from all alternatives, and there is no impacts analysis for permitted activities on wintering sage grouse and their habitats. There is a notable absence of baseline information in the SDEIS on wintering habitats, and the lack of impacts analysis leaves open the question of how heavily wintering sage grouse will be affected by permitted activities under the new RMP, and what effect this will have on the viability of sage grouse populations both inside and outside Priority Habitats.	3035_1
1008	1008-39	The Bighorn Basin DEIS supplement, and the Draft EIS to which it is related, do not appear to consider alternatives to provide enhanced protections for sage grouse General Habitats of the type recommended in the National Technical Team report.	3035_1
1008	1008-38	Placing salt blocks in upland areas is not an effective means of drawing cattle use away from riparian areas. Bryant (1982:784) found that salt placement and alternate water sources did not influence cattle preference for riparian habitats, and came to the following conclusion: "These cattle used the salt when convenient but did not alter behavior patterns to obtain it." Thus, the BLM should not rely on the placement of salt blocks as a means to draw livestock away from riparian habitats.	3034
1008	1008-37	The pattern of grazing may have a significant effect on efforts to maintain riparian areas in Properly Functioning Condition. Bryant (1985) found that season-long grazing had the greatest negative impact on riparian vegetation. Late season grazing may result in less disturbance to riparian communities (Green and Kaufman 1995). Clary (1995:24) made the following recommendation for grazing in riparian areas: "If utilization guidelines are used, those rates that do not exceed 30% of the annual biomass production will likely maintain production the following year." Riparian areas should be the focus of monitoring efforts, as these areas can become ecologically impaired before upland habitats begin to show signs of damage.	3034

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1008	1008-34	According to the Conservation Objectives Team (U.S. Fish and Wildlife Service 2013: 45), the following objective should be a guiding principle: Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage grouse (e.g. shrub cover, nesting cover). Should Alternative E not be selected, the Bighorn Basin RMP should implement its management standards such that this direction is achieved. Furthermore, we recommend that BLM should include a provision to retire livestock grazing allotments on a willing-permittee basis when they come up for renewal under all alternatives, as is included under all alternatives in the BLM's South Dakota RMP Draft EIS. We support the effort in Alternatives E and F to effect this change.	3035_6
1008	1008-33	for sage grouse Priority and General Habitats there should be a decision procedure and actions described below, depending on habitat conditions. 1. Assess which lands meet the Connelly el al. (2000) guidelines both in riparian areas and upland areas in Table 3. Include the conservation community and grazers in this assessment. 2. For those not meeting these guidelines, determine that the allotment does not meet rangeland health standards. To meet these standards, the sagebrush community must meet or exceed the height and percent canopy cover percents for sagebrush, native grasses, and forbs in Table 3 (Connelly et al. 2000). 3. Change grazing use as necessary so that upland and riparian areas have a positive 2 or better Grazing Response Index (GRI) score for allotments not meeting standards. 4. For allotments that meet standards, insure grazing practices produce a "0" or plus net GRI score. 5. In sage grouse nesting areas, do not allow grazing until after the 20th of June (Braun 2006). 6. During permit renewal, inventory the amount of forage produced in the allotment, assess the allotment ecological conditions, and document past grazing use. As a part of permit renewal, conduct a range capacity analysis to assess the stocking rate for the allotment. Stocking levels for allotments that meet standards should lead to less than 25% utilization (Braun 2006) and for allotments not meeting standards, less than 15% utilization. 7. For allotments not meeting the rangeland health standards, prohibit grazing during a severe or worse droughts as defined by the national drought monitor. 8. For allotments that meet the standards, reduce grazing use prior to a drought to utilization levels less than 10-15% utilization for forage expected during the drought. 9. In sage grouse habitats, produce an annual end-of-season report for each allotment.	3035_6
1008	1008-32	If Alternative E is not adopted, all allotments in Priority Habitats must be managed to meet or exceed Rangeland Health standards, and following natural fires, livestock should be excluded for a 2-year period. We concur with the wisdom of applying Records # 88 through 101 for Alternative F as a backup plan in this regard. Record #113 is a good goal for the management of wild horses, and should be applied equally to domestic livestock on all grazing allotments within Priority Habitat.	3035_6
1008	1008-31	The RMP should include at least one alternative that targets a 10.2-inch residual summer height throughout sage grouse nesting habitat during the nesting season.	3042

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1008	1008-30	For allotments where sage grouse nesting is known to occur, shifting on-off dates (if necessary) could minimize the chances of impacts to nesting sage grouse, and livestock drives should be routed to avoid sage grouse leks during the strutting and nesting seasons.	3035_6
1008	1008-29	BLM should fence off natural springs and place livestock water sources outside the fences rather than at the spring itself. If past actions have dried up natural springs or wetlands to create stock tanks, then remedial action should be required return some water to ground for sage grouse and vegetation, in an area protected from livestock.	3017-3
1008	1008-28	We strongly concur with the need to abstain from vegetation treatments in Priority Habitats, per both Alternatives E and F. SDEIS at 2-21, 22. There is a growing scientific consensus that burns and mechanical treatments are deleterious to sage grouse. For Record # 102, the Alternative E language should be adopted, as Alternative F allows the continued degradation of sage grouse habitats through treatments that may not be compatible with sage grouse persistence.	3011
1008	1008-27	Taking into account the negative effects of vegetation treatments on sage grouse nesting and lekking areas, and uncertainty in the overall extent of sage grouse nesting habitat surrounding lek sites in the Great Plains region, the BLM should prohibit vegetation treatments within 3 miles of sage grouse lek sites.	3042
1008	1008-26	BLM proposes to continue to allow the use of prescribed fire in Core Areas, which will cause negative impacts to sage grouse populations. BLM measures under Alternative F would "limit" prescribed fire in ACECs on lands with less than 12 inches of annual precipitation, but apparently still allow it. SDEIS at 2-23. "Limit" is a word so poorly defined that it is impossible to tell whether it has any effect at all; it appears purely discretionary. Prescribed fire not only harms sage grouse by eliminating the sagebrush that is their key habitat element, but also promotes the spread of cheatgrass (smooth brome and Japanese brome), which are becoming ever more widespread in the Bighorn Basin. Required measures for prescribed fires reduce the negative effects but do not drop them below the threshold of a significant impact to sage grouse.	3011
1008	1008-25	BLM should rigorously evaluate all sagebrush habitat treatment projects to determine how exactly they will impact sage grouse populations prior to counting such projects as assets toward sage grouse recovery or threats to sage grouse persistence.	3042

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1008	1008-24	We are concerned that many, if not most, of these "habitat improvement" projects are actually harming sage grouse habitat in the long term and that the remainder will cause short-term impacts to sage grouse populations that contribute to the multiple serious threats to their existence. The scientific basis for many such projects (which include prescribed burns and mechanical or herbicidal thinning or removal of sagebrush) is extremely shaky, and given the lack of familiarity of the project proponents with basic sage grouse habitat requirements, such projects may unintentionally cause additional damage to sage grouse habitats. The impacts (positive and/or negative) of such projects have not been rigorously tested, and thus their results for improving (or harming) sagebrush habitats remain open to speculation.	3042
1008	1008-23	The Bighorn Basin RMP should cure these problems for BLM-managed lands and projects on BLM-managed minerals by establishing Priority and General Habitat boundaries as inviolate and permanent designations (at least throughout the life of the Plan) and by precluding exceptions or waivers of sage grouse measures within these respective habitats. BLM must ensure that all Core Area/Priority Habitat/ACEC protections are nondiscretionary standards, so the agency can rely on them as conservation measures that are adequate and reliable in the context of Endangered Species decisionmaking by the U.S. Fish and Wildlife Service.	3035_1
1008	1008-22	All new roads should be located farther than 1.9 miles from active leks; Alternative F is deficient in this regard by allowing tertiary roads as close as 0.6 mile, although the NSO stipulations in Alternative E are well within the scientifically sound thresholds described by peer-reviewed studies that do not result in significant impacts to breeding populations. Seismic activity should be limited to periods outside the breeding/nesting or winter use season, for breeding/nesting and winter concentration habitats, respectively. Allowing heliportable geophysical exploration in Priority Habitat only outside the season of use is the proper approach.	3039-1
1008	1008-20	We concur with the need to manage Priority habitats as right-of-way exclusion areas per Alternative E rather than avoidance areas per Alternative F. SDEIS at 2-17, 27, 28. An exception could be allowed to the exclusion for buried powerlines, regardless of location. Similarly, Priority Habitats should be exclusion areas for wind power projects and met towers, per Alternative E. SDEIS at 2-19. Discretionary "avoidance" is too weak, and there is no evidence extant that compensatory mitigation has increased sage grouse numbers anywhere. Despite tens of millions of dollars being spent on offsite mitigation in the Pinedale Field Office, the result has been a net loss of sage grouse.	3033-1

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1008	1008-19	On Density and Disturbance, we support the approach as outlined in Alternative E as the preferable approach to managing the density of surface disturbances. SDEIS at 2-17, Record #7. Some modifications would be helpful here. The section should read "do not exceed one disturbance per 640-acre section" to remove any and all ambiguity as to how the density calculations will be made. While using square-mile sections has its limitations, it is more rigorous than averaging the density over a larger area, and all sage grouse scientific studies have calculated well pad density on a per-square mile basis (not using a DDCT), so their results would be applicable to an RMP that managed density in this way. We agree with 3% as the maximum allowable density of disturbance that should be allowed in Priority Habitats. We appreciate the language requiring the well to be sited on the portion of the lease most distal from the lek. Record #76 for Alternative E fleshes out additional NSO requirements that would best protect leks -- and to some degree, nesting habitat -- from individual disturbances. SDEIS at 2-30.	3035_4
1008	1008-18	Alternatives E and F both include a 3% disturbance cap, within the range recommended by the NTT, but they calculate disturbance based on a DDCT. This use of the DDCT results in an inaccurate disturbance calculation that allows more that 3% per square mile on a section-by-section basis, the threshold at which negative impacts to sage grouse occur. BLM should manage Core Area habitats to prevent significant impacts to sage grouse, including from surface disturbance in excess of 3% per square mile, within Core Areas under the new RMP.	3035_4
1008	1008-17	We support the designation of the ˜Key Habitats" as shown in Map SEIS-1, rather than the Core Habitats that would apply to Alternative F, because the Key Habitats more closely represent the Core Areas as originally designated in 2008 and prior to gerrymandering of boundaries that excluded major areas near highly populated leks that has occurred subsequently. BLM has itself identified that the Key Habitat Areas, beyond state-designated Cores, "include additional productive habitats identified as important to greater sage grouse in the Planning Area." SDEIS at 3-3. We find that the changes made by the SGIT from the original Core Area map on balance have a negative effect on the ability to conserve grouse in the Bighorn Basin, and would unduly facilitate industry proposals that would degrade key grouse habitats that need to be protected. We would further recommend that connecting corridors be established between the ACEC units, and managed for sage grouse retention and passage. These corridors should follow the 4-mile buffers of more lightly populated leks wherever possible.	3035_1

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1008	1008-16	Importantly, the BLM has a better option: Implement the National Technical Team recommendations, which are in fact consistent with state Executive Order 2011-5. EO 2011-5 prescribes a maximum of 1 well pad or mine site per square mile as calculated within a DDCT area; applying a one well pad or mine site per section limit as recommended by the NTT would result in a lesser density than 1 site per square mile when calculated with a DDCT area, and therefore would be allowable under EO 2011-5. Requiring a no surface disturbance buffer of 4 miles would never allow surface disturbance within 0.6 mile of leks inside Core Areas, and therefore would be allowable under EO 2011-5 because the state prohibition of surface disturbance within 0.6 mile of leks would be upheld. An unconditional burial of electrical distribution lines would never violate the state guideline to bury powerlines when possible. Implementing a 2.5% or 3% cap on surface disturbance on a per-square mile basis would always yield a disturbance result less than the state's 5% limit and therefore within the realm of acceptable outcomes under the state policy. At no point does state policy mandate that impacts to sage grouse reach the maximum levels allowed under the policy; the state thresholds under EO 2011-5 are written as limits, not targets. The BLM therefore has the opportunity (and indeed under NEPA, FLPMA, and Manual 6840, the responsibility) to implement the science-based measures recommended in the NTT Report in order to both maintain consistency with state Core area policy and protect this BLM Sensitive Species with measures that satisfy NEPA's scientific integrity standards and prevent unnecessary or undue degradation to sage grouse Core habitats under FLPMA.	3035_4
1008	1008-14	Given the limitations in the Wyoming strategies and considering new scientific information on sage grouse, it is unlikely that application of the strategies in Alternative F will prevent further declines in sage grouse. BLM should instead apply at minimum the measures recommended by the BLM's National Technical Team, and more preferably the Sage Grouse Recovery Alternative attached to these comments. See Attachment 1.The impact of the failure to apply adequate protections to Core Areas would likely to result in major impacts to sage grouse. Given the inadequacy of mitigation measures proposed under Alternative F to protect sage grouse in Core Areas, the consequences for making sage grouse Core habitat available to sage grouse populations are likely to be locally severe.	3035_1
1008	1008-13	We have grave concerns about the adequacy of conservation measures employed by the State of Wyoming and the Wyoming State Office of the Bureau of Land Management (BLM) under its Instruction Memoranda to conserve greater sage grouse in that state, carried forward in the detailed provisions of Alternative F. The two entities' Core Area strategies are similar and share weaknesses that prevent them from successfully addressing the conservation needs of sage grouse. These policies were established in State Executive Order 2011-5 and BLM Instruction Memoranda WY-2010-012 and WY-2010-013, and carried forward in Instruction Memorandum WY-2012-019.	3035_1

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1008	1008-12	Alternative F appears to adopt the state's Core Area policy and 2012 BLM instruction memoranda to guide sage grouse management measures. The performance to date of sage grouse Core Area protections under state Executive Orders and Wyoming BLM Instruction Memoranda has been poor, and they have in many cases failed to prevent significant impacts to sage grouse populations in Core Areas. In many cases, the BLM appears to have limited its own conservation measures for sage grouse to those included in state Executive Order 2011-5 (EO 2011-5). However, this alternative excludes many of the most important conservation measures recommended by the NTT. Importantly, EO 2011-5 was promulgated in the absence of a NEPA process, and this lack of NEPA foundation has undermined its effectiveness. Because there was no "hard look" at potential impacts to sage grouse in Core Areas under EO 2011-5, and no requirement of scientific integrity as imposed under NEPA, many of the measures included in EO 2011-5 do not reflect the best available science and their implementation in the face of industrial uses of the land to which the Order applies will in fact result in significant impacts to the viability of sage grouse populations in Core Areas.	3035_1
1008	1008-11	We are concerned that Alternative F will not uphold BLM's obligation to manage Sensitive Species to "minimize or eliminate threats," Either within or outside of Core Area habitats. As detailed elsewhere in these comments, mitigation measures applied under Alternative F (and the even less-protective Alternatives A through D in the original RMP DEIS) will inevitably lead to serious impacts to sage grouse populations within Core Areas. This result represents an unnecessary and undue degradation of key sage grouse habitats.	3035_1
1008	1008-9	We strongly urge the BLM that Priority Habitats should be withdrawn from future oil and gas leasing, allowing existing leases to lapse as they expire, as in Alternative E. SDEIS at 2-29. Existing leases should have all measures approved under the RMP revision applied as Conditions of Approval. However, the Preferred Alternative would not apparently close Priority Habitats to future oil and gas leasing. Id. BLM should close sage grouse Priority Habitats to future oil and gas leasing as a means of steering future land uses away from conflict in the future.	3035_9
1008	1008-8	BLM should consider a phased leasing alternative under which a third or less of the planning area is open at any given time to leasing and development. Leases that are not drilled and held by production are forfeited back to the agency after their 10-year lease term expires, except in cases of unitization. It makes the best sense for BLM to close areas that are highly sensitive to future leasing even if they are leased today; most of BLM's Wilderness Study Areas were heavily leased upon establishment, and even though operators were given the opportunity to be grandfathered in if these leases were developed, few were and today WSAs are almost entirely free of the encumbrance of oil and gas leases.	3023-3

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1008	1008-7	The level of protection outside Core Areas should be maintained under the Preferred Alternative and adopted into the RMP, and this level of protection should be accorded to Core and Connectivity Areas as well. As perch inhibitors do not fully prevent raptor perching, this measure should be amended to allow buried powerline but prohibit new overhead lines under any circumstance.	3033-2
1008	1008-6	The NTT Report recommends that all electrical distribution lines be buried within Core Areas, period; BLM does not evaluate this under Alternative F. See SDEIS at 2-17, 18; Records # 8, 10. Under both alternatives, the agency would evaluate the need to bury existing power lines. Id. But in Alternative F, Priority Habitats would be an avoidance area, not an exclusion area. Id. At Record #10. BLM itself points out reductions of sage grouse use within 2.9 miles of powerlines. According to BLM (2003: 2-8), Power lines may also cause changes in lek dynamics, with lower growth rates observed on leks within 0.25 miles of new power lines in the Powder River Basin of Wyoming as compared with those further from the lines. This was attributed to increased raptor predation (Braun et al. 2002).	3033-1
1008	1008-5	According to BLM IM 2012-44, "The conservation measures developed by the NTT and contained in Attachment 3 must be considered and analyzed, as appropriate, through the land use planning process by all BLM State and Field Offices that contain occupied Greater Sage-Grouse habitat." This must be done fully in the Bighorn Basin EIS supplement. IM 2012-44 does not provide an option not to analyze these measures in at least one alternative unless a clear finding is provided that the measure is not appropriate, and BLM has provided no such findings in the context of the Bighorn Basin supplement.	3035_1
1008	1008-3	Importantly, the BLM appears to rely heavily on discretionary measures such as "avoidance" rather than "exclusion" of activities known to be detrimental to sage grouse inside Priority Habitat areas. And even more importantly, BLM in many cases adopts measures that provide inadequate protections based on the available science, which outlines thresholds at which significant impacts can be expected. The lack of sufficient regulatory mechanisms to conserve sage grouse and their habitats was identified as a primary threat leading to the USFWS warranted but precluded finding in 2010. 75 FR 13910. The Preferred Alternative (presumably Alt. F) will need to be strengthened to meet the level of protection recommended in the National Technical Team Report at minimum in order to represent effective conservation measures that have some chance of obviating the need to list the greater sage grouse in general, and this population in particular, as Threatened or Endangered. We are concerned that BLM may not fully apply mitigation measures identified in the RMP revision, using agency discretion to create loopholes in cases where project proponents find mitigation measures to be onerous. RMP language should be clearly articulated that standards are indeed standards and will be applied rigorously throughout the life of the Plan.	3035_1

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1008	1008-1	BLM must consider implementing key sage grouse protections recommended by USFWS and the BLM's own National Technical Team (e.g., a 4-mile no surface disturbance buffer for active leks within Core Areas). The agency must also consider the Sage-Grouse Recovery Alternative attached to these comments; it is important to note that this alternative has been considered in detail for sage grouse plan amendments elsewhere within BLM purview. The agency must consider expanding Priority Habitat designations beyond the Core Areas designated under State Executive Order, and we applaud the agency for doing this under Alternative E's Key Habitats. And the BLM must consider measures that require the elimination of surface disposal of coalbed methane wastewater.	3035_1
1009	1009-6	Also, if the mining company is unable to claim this and mine through then the mining company would not be able to continue the cast back technique and this would require a stop and start that would result in additional disturbance and which is not a desired BMP from an ecological basis.	3020
1009	1009-4	The socioeconomic section of the Draft RMP failed to include bentonite mining industry even though 16% of the employment for Big Horn County is the mining industry generating 22% of the earnings. The proposed options E & F would have a greater impact than what is portrayed in this section and I believe that the author is incorrect with their analysis.	3036-1
1009	1009-3	When developing a mine plan for submission it is occasionally found where a corner or a small amount of bentonite is located outside of the existing claims and will be claimed prior to submitting the plan of operation. If the lands became an ACEC then the existing claims would be valid in the above instance however, the mining company would not be able to obtain the additional mineral since it will be proposed to be withdrawn by Congress.	3020
1009	1009-2	In regards to the proposed ACEC lands for both E (I, 764,621 Acres) & F (I,529,955 Acres), they will have a significant impact on the mining companies as well as grazing. Both of these industries provide a significant source of revenue to the Big Horn Basin. This would be fine if all of the lands were claimed, but they are not. With the additional restrictions placed on the ACEC such as drill notices requiring a plan of operation in order to assess whether or not the bentonite is a viable option for mining would be detrimental to the industry for those operating on federal lands based on the additional time and work to complete the notice. This would also at least double the workload of an already "super busy" Field Offices.	3020
1011	1011-7	Record #50 requiring fencing off of burned areas is another proposal designed to destroy the economic viability of livestock grazing on Federal lands and cannot be scientifically justified. Proper herd management is currently used to avoid unwarranted intrusion into sensitive areas and is effective.	3011
1011	1011-6	Record #49 the concept of eliminating livestock grazing from grazing in burned areas is very counterproductive to the resource. Many shrubs take many years (50-60) to develop and the elimination of livestock grazing is not scientifically justifiable and again, another radical and single use, environmentally biased proposal designed to eliminate livestock grazing from Federal lands.	3011

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1011	1011-5	Chapter 4.3 Fire and Fuels Management: This restrictive use of fire as a management tool is another scientifically unjustified provision available to land managers and should not be eliminated from the options available to sustain and improve the forage potential of Federal lands.	3011
1011	1011-2	Chapter 2, Table 2.3 Alternatives E & F. This clause establishes sage grouse as the single dominant use at the expense of all others. It cannot be justified scientifically. Our cattle operation, commercial hunting business and guest ranch, all use lands inhabited by sage grouse with no negative effects. The predator problem, especially coyotes, is in fact a serious problem and as their population has increased, there has been increasingly serious pressure on the sage grouse on our ranch lands, both private and public.	3001
1011	1011-1	2. Chapter 2, Table 2.2 states that Desert Land entries would be abolished. The fact is that irrigated lands, blended with Federal lands are a positive relative to sage grouse habitat. We have local evidence on our own fee property, proving this and our private irrigated land base has consistently assisted the survival rate of sage grouse during severe winters.	3016-1
1012	1012-1	We recommend that the BLM continue to maintain Alternative D as the Preferred Alternative in the Bighorn Basin RMP. While we appreciate the analysis of the new Alternatives E and F for Greater Sage-grouse conservation, we do not believe that these alternatives are necessary. Alternative E would establish an Area of Critical Environmental Concern (ACEC) based on a modified version of the federally managed portions of Wyoming's Version 2 Core Areas, which we believe have little biologic value in the eastern Bighorn Basin. Alternative F would establish an ACEC based on federally managed portions of Wyoming's Version 3 Core Areas. While we feel that the Version 3 Core Areas have biologic value, we feel that the State of Wyoming is already providing adequate and appropriate protection for sage-grouse and the species' habitat. The State of Wyoming's Greater Sage-grouse Core Area Protection strategy, currently set by Executive Order 2011-5, has proven to be an effective conservation strategy for the sage-grouse. This strategy has been endorsed by the United States Fish and Wildlife Service, and we also believe that the BLM has been able to successfully implement it on projects occurring on federal land in Wyoming. Further, the strategy applies to regulated development on all lands whereas the proposed Alternatives would only apply to BLM land though a significant amount of non-BLM land exists in these areas. As such, we believe that the protections provided by the strategy exceed those that could come from the proposed Alternatives.	3001
1013	1013-6	Appendix L, Best Management Practices, Vegetation Treatments/Fire and Fuels Management, #24-25, p. L-7: The Best Management Practices refer to "annual grasslands." Generally, annual grasslands are an ecosystem that exists in California and not in Wyoming. The WDA recommends changing the language to "areas infested with undesirable annual grasses" or similar language to decrease possible confusion.	3042

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1013	1013-5	4.4.2 Vegetation -Grassland and Shrubland Communities. 4.4.2.3 Detailed Analysis of Alternatives, Alternative F, Resource Uses. p. 4-46: "livestock grazing management in this ACEC includes multiple management actions that would benefit grasslands and shrublands, including requirements for land health assessments to determine whether rangeland health standards are being met..." The BLM is already required to determine whether rangeland health standards are being met. This requirement includes meeting standards for wildlife habitat, including greater sage-grouse habitat. Alternative F does not change or extend this requirement. We recommend removing this portion of the analysis.	3042
1013	1013-4	Table 2.5. Detailed Alternatives, 7000 Special Designations (SO) -ACECs - Proposed Greater Sage-Grouse Priority Habitat Area ACECs, Record #110, p. 2-35: Alternative F -"Identify the specific allotment(s) where retirement of grazing privileges is potentially beneficial. (See Appendix P for a list of all grazing allotments in Core Habitat Area; this list indicates the universe of allotments where retirement could be considered, not those currently identified for retirement)." The WDA continues to be concerned about identifying allotments through an RMP process where retirement of grazing privileges is "potentially beneficial." We do not recommend carrying this action forward as part of the preferred alternative.	3017-1
1013	1013-3	Table 2.5. Detailed Alternatives, 7000 Special Designations (SD) -ACECs - Proposed Greater Sage-Grouse Priority Habitat Area ACECs, Record #31, p. 2-21: Alternative E -"If there ever is any legitimate need to reduce "thatch" in meadows, grass mowers will be used. Thus, livestock manure, trampling damage to soils, weed spread will be minimized." The action expressed in this record includes many negative statements towards livestock grazing, assumes livestock cannot be managed in a manner to reduce "thatch,'' introduces bias immediately against the idea of reducing "thatch" in meadows and contains more analysis points than actual actions. The WDA recommends removing bias and analysis points from Record #31 by rewriting the action to read "If necessary, "thatch" in meadows will be reduced using grass mowers." The BLM should analyze the pros and cons of using other methods, such as livestock, in Chapter 4. In addition, we do not recommend carrying this action forward as part of the preferred alternative	3042
1013	1013-2	The WDA requests the BLM incorporate language similar to the following in order to be consistent with EO 2013-3, Greater Sage-Grouse Core Area-Grazing Adjustments, which supplements EO 2011-5: "The BLM will collaborate with appropriate Federal agencies, and the State of Wyoming as contemplated under Governor Executive Order 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where Greater Sage Grouse conservation objectives are not being achieved on federal land, to determine if a significant causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site based action to achieve Greater Sage-Grouse conservation objectives within the framework." We recommend the BLM add the above language as a standalone management action in the preferred alternative .	3017-1

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1013	1013-1	The actions addressed in Alternatives E and F are built with the perception that livestock grazing is always a negative influence on greater sage-grouse habitat and the BLM's management options to improve livestock grazing management, and thus greater sage-grouse habitat, are limited. In reality, livestock grazing can be managed to maintain or improve greater sage-grouse habitat and the BLM already has the authority to make changes to livestock grazing management without additional restrictions added through this RMP Revision process. Choosing Alternative E or Alternative F as the preferred alternative will have negative consequences on livestock grazing, the ability to manage livestock grazing, local economics and the custom and culture of Wyoming and the West.	3017-3
1016	1016-5	6. The last-minute introduction of Sage Grouse mitigation measures into this planning process is unacceptable. After years of a drawn-out planning effort, numbing the participants to the point where some have abandoned the process, two new alternatives have suddenly been mandated by BLM political leadership. These last-minute additions have then been run through an amended EIS process. We have been repeatedly assured that the Preferred Alternative is not one of these new sage-grouse-friendly alternatives, but there is no certainty that this will not change. Within the Cooperating Agencies there is a dread that a "bait-and-switch" scenario may replace the Preferred Alternative with one of the sage grouse alternatives at the last minutes.	3027-1
1016	1016-3	4. Hot Springs County's 2002 Natural Resources Plan for State & Federal Lands mandates sage grouse mitigation. Specifically, on Page 62 the Plan states: Hot Springs County supports sage grouse recovery efforts which are implemented by management techniques that do not negatively affect the general we/fare/economy of the County. Therefore, the County has identified habitat improvement (mechanical, chemical, irrigation, controlled fires, fire suppression policies, reseeding, and grazing), predator control and revision of hunting seasons if necessary as acceptable management techniques. Management techniques which negatively affect the economy, especially restrictions and stipulations on grazing and mining/oil/gas operators, are strongly discouraged by the County. Hot Springs County is currently in the process of updating its Natural Resources Plan. However, in its current draft form the language of the paragraph quoted above is retained with only a few minor changes. In summary, the 2002 HSC Natural Resource Plan mandates that efforts which do not impact the socio-economic fabric of the County must be pursued prior to any measures which do have the potential to impact the County's economy. The Big Horn RMP should be amended to contain similar language	3036-2

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1016	1016-2	2. Socio-Economic Impacts to local communities are not being adequately addressed. This is also a NEPA requirement (section 1502.22), and is elemental to the environmental review process. Typical examples of these impacts include reduced funding to local school districts, County operational funding, infrastructure maintenance and repair (i.e. bridges, highways), and other major local services due to reductions in tax revenues from oil, gas, and mineral operations on BLM lands. It is important to note that oil & gas revenues and property taxes fund approximately 80 percent of Hot Springs County's operating budget, and the overwhelming majority of that production activity in the County occurs on BLM lands. While oil & gas production has been steadily decreasing over the past four decades, the increasing unit value of these resources has allowed revenues to remain consistent. Increasing regulations and restrictions on this activity - - particularly those addressing sage grouse habitat-will accelerate this drop in production and subsequent decrease in revenues, very likely outpacing the ability of the rising value of these commodities to keep pace with reduced production. Furthermore, these regulations should consider that the United States now has nationwide strategic considerations which render it undesirable to discourage oil and gas production. I have attached two pie-charts (HSC 2012 Valuation and HSC 2012 Tax Dollars Distribution) that illustrate the overwhelming importance of oil & gas revenues to schools and other local government operations in Hot Springs County. It is not unreasonable for us to expect that potential adverse impacts to local residents and local communities should be given the same detailed scrutiny as potential adverse impacts to sage grouse	3036-2
1016	1016-1	1. Cumulative Impacts are not adequately addressed. This had been a problem from the outset, and appears to be the result of a misinterpretation of NEPA's original intent, perhaps due to limited funding and personnel. These impacts must include seasonal restrictions, buffer zones, habitat expansion, surface restrictions, etc., and have already combined to create a substantial damper on the local economy. Addressing cumulative regulatory impacts is a NEPA requirement, and must include all existing or proposed regulations from other state and federal agencies. In the Big Horn Basin, these would include-but not be limited to-the ongoing Shoshone Forest Management Plan, the Big Horn River TMDL Study, and current Wyoming Game & Fish Department and U.S. Fish & Wildlife Service practices. Several of these involve existing or proposed regulations which combine to dramatically impede activities on public lands in the Big Horn Basin, such as oil and gas production, bentonite mining, public access, recreation, etc.	3008
1017	1017-130	With respect to projections of oil and gas development, the LGCA believes that the BLM significantly underestimated the potential for recent and upcoming technologies to develop existing resources. The LGCA is concerned about potential impacts on grazing that are not explicit in the SEIS. The land use plans are clear in that they are opposed to any reductions in grazing, particularly if they are not backed up by scientific data.	3027-2

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1017	1017-129	The LGCA fully supports the goals of multiple use and sustained yield, balancing increasing and competing demands for resources on public lands while serving the best interests of the residents of the Bighorn Basin. The LGCA finds both Alternatives E and F unacceptable in their current form.	3027-1
1017	1017-122	The LGCA Conservation Districts and Counties each have Land Use Plans which address goals, objectives, and policies for lands within the counties. The BLM has not adequately considered the counties' land use plans or the importance of oil and gas to Washakie. Hot Springs or Big Horn Counties in the SEIS. Hot Springs County has brought to the BLM's attention that 80% of their budget comes from oil and gas production, but this fact has not affected the BLM's analysis of the potential impacts to the oil, gas, minerals, and socioeconomic resources. Big Horn County's Comprehensive Land Use Plan also recognized the importance of industry. Policies directly related to the SEIS are excerpted below.	3027-2
1017	1017-121	According to Table 4-22 the impacts to livestock grazing are identical for Alternatives A, D, and F. Please provide support for your analysis .	3017-5
1017	1017-119	We request that this impact on livestock grazing, and therefore on the socioeconomic resource, be included in the assessment.	3017-5
1017	1017-118	Please address the cumulative impacts of oil and gas restrictions, including increased length of permitting due to additional management measures.	3008
1017	1017-117	The LGCA requests that the BLM incorporates the potential social and economic impacts summary tables provided in our PDSEIS comments into the SEIS.	3036-1
1017	1017-116	The cumulative impacts section includes the following statement on page 4-147: "While the reduction from Alternative A to alternatives B and E would still be substantial, the stability of state and private production would moderate the change in federal policy." This statement does not take into consideration the changes in tax revenue for private versus federal lands. In addition, the analysis should also consider changes to community health if oil and gas production is increasingly pushed onto state and private lands, which constitute a small portion of the area in the region. Also included in this section (page 4-19) is the statement that: Despite the potential for cumulative impacts resulting from various operations in the Planning Area, overall cumulative impacts of BLM and non-BLM actions are not anticipated to have long-term adverse impacts on livestock grazing on public lands, since anticipated impacts to grazing lands would occur gradually over the life of the plan, except in Alternatives 8 and E where the impacts of livestock grazing withdrawals would be substantial. The LGCA believe that the impacts from changes in other RMP revisions need to be analyzed in conjunction with changes in this RMP to determine the cumulative impact of the current environmental movement to remove grazing from public lands .	3036-1

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1017	1017-115	The SEIS asserts on page 4-137 that "Geographically, the change in job opportunities -and related impacts on housing and community services - would be spread across the Planning Area and would be spread over time." These are assumptions that were made within the analysis itself, rather than results of the impact analysis. Where the impacts would occur and at what time period was not analyzed. The LGCA would like to clarify that there are small communities within the planning area which will experience large impacts from small changes. A $5 million difference in revenues over two decades is a significant effect to our small counties. And, by making the assumption that the impacts will spread across the planning area, the BLM is failing to provide required monitoring and mitigation measures for adverse impacts that may arise to particular communities.	3036-2
1017	1017-114	The following remark is included in the summary of impacts from Alternative F on page 4-136: "In comparison to Alternative A, the average annual number of jobs supported by recreation activities and livestock grazing would increase, while the number of jobs supported by oil and gas would decrease by approximately 4%." According to Table 4-22 the impacts to recreation are constant across all alternatives and the impacts to livestock grazing are identical for Alternatives A, D, and F. The conclusion that jobs in livestock grazing would increase with the additional seasonal and other restrictions in Alternative F is inconsistent with the experience of the LGCA. Please provide support for your analysis. Furthermore, while we understand that the use of 2008 data facilitates comparison between the four original and two new alternatives, we are concerned that employing 2008 figures has the effect of understating the true economic impacts to county, state, and federal revenue streams.	3036-1
1017	1017-113	The LGCA also request that additional language be included in the analysis on page 4-135 to clarify the summary of impacts. In our experience, an increase in management stipulations results in the decrease of future economic opportunities. This means that Alternatives E and F are in conflict with the land use plans that emphasize maintaining multiple-use in order to maximize future economic opportunities. Additionally, there is a high level of impact due to the seasonal and discretionary closures.	3036-1
1017	1017-110	While we understand that the impacts are low based on IMPLAN results, the inclusion of additional constraints in Alternatives E and F that were not analyzed has the potential to create high impacts. Our requested solution is to state a range of impacts from low to high based on outcomes of further analysis. This will ensure that the reader who skims the document and focuses on the summary tables to understand impacts is receiving accurate information. Also, this will provide the opportunity to incorporate monitoring and mitigation plans to ensure the health of local communities should seasonal and travel restrictions create high impacts. Prior to the PDSEIS, the LGCA submitted the following language for inclusion in the PDSEIS. This language was not included in the SEIS. We request that it be included in the Final RMP.	3036-1

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1017	1017-109	Our comments prior to the PDSEIS focused on the potential for Alternatives E and F to greatly impact the social and economic conditions in the planning area. While the BLM did include language on the uncertainty of impacts in the PDSEIS, which was expanded in the SEIS, the summary conclusions still state that there will be low impact to most social and economic conditions. By leaving the summary and related tables unchanged, the BLM is failing to ensure that needed monitoring and mitigation plans will take place.	3036-2
1017	1017-108	Another major concern is the lack of analysis of restrictions placed on ROWs and seasonal use, as well as management discretion contained in the two new alternatives.	3033-1
1017	1017-107	As the LGCA has previously expressed, the summary of the level of impacts by alternative (Table 2.6, page 2-43) is misleading to readers and policy makers. The conclusion that the alternatives will have low impacts on the social and economic conditions of the planning area are based on assumptions that ROW restrictions, changes to the Travel Management Plan, seasonal restrictions, and management actions with discretionary decision-making will have no impact grossly understates the likely impacts. The LGCA requests that Table 2-6 be revised to clarify the range of potential impacts (low to high) and to include language that recognizes the uncertainty of the level impact as provided in the analysis.	3036-1
1017	1017-106	Page 2-24 of the SEIS states: The BLM closes the same acreage in the Planning Area to livestock grazing as alternatives A and D (5,171 acres). Alternative F manages grazing lands consistent with Alternative D, except that in the Greater Sage-Grouse Habitat Core Habitat Areas ACEC where the BLM prioritizes the consideration of sage-grouse habitat objectives and management considerations over livestock grazing objectives through the imposition of restrictions on livestock grazing location and timing, and range improvements projects. The location and timing of grazing is critical to ranch viability in the planning area. Ranchers move herds to allotments on specific days in order to grow enough hay to feed the cattle through the winter. If a small window of time is closed in a specific allotment the operations for a ranch may be impacted for the entire year. We request that this impact on livestock grazing, and therefore on the socioeconomic resource, be included in the assessment.	3017-5
1017	1017-105	Lastly, we believe that the cumulative impacts are understated. Cumulative impacts should also address the impacts of the changes in other RMP revisions within Wyoming. There is currently a strong push by the environmental community to remove livestock grazing from public lands. The movement's effect on management actions outlined in RMP revisions across Wyoming and Idaho must be addressed in this analysis. Also, cumulative impacts of oil and gas restrictions, including increased length of permitting due to additional management measures, should be addressed.	3008

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1017	1017-104	Additionally, as with the Draft EIS, the SEIS socioeconomic analysis fails to provide an adequate analysis of the dispersion of impacts across the planning area. There are some communities in the planning area that are primarily ranching communities, while others are population centers for oil and gas workers. Small changes in livestock grazing policies have the potential to create large impacts in small ranching communities. By aggregating impacts across the region, the BLM and LGCA are missing the opportunity to develop proper monitoring and mitigation measures during the planning process and within the ROD.	3036-2
1017	1017-103	The LGCA believes that Alternative E and F should be more accurately portrayed as having restrictive impacts on economic activities in the planning area. We request that if any of the management actions from these two alternatives are included in the preferred alternative, or if Alternative E or Fare selected by the BLM, that a comprehensive socioeconomic monitoring and mitigation plan be included in the ROD. Further, at present the summary conclusions in the SEIS are not consistent with the analysis performed in the document. We are concerned that a cursory reading of the document shows only a low to medium impact from Alternative F, when in fact the impacts to the resource are unknown at this time due to ROW, travel, seasonal restrictions, and management discretion. Further analysis is needed to determine the socioeconomic impacts with any level of certainty for both Alternatives E and F.	3036-2
1017	1017-102	While a limited amount of the narrative that was provided prior to the completion of the PDSEIS was incorporated, we were impressed with the level of responsiveness from the BLM in integrating the majority of our recommendations on the PDSEIS in to the current SEIS. At this point in the process, the major change the LGCA requests is that the BLM incorporates the potential social and economic impacts summary tables provided in our PDSEIS comments into the SEIS. These are included again below for your convenience (Table 2 and Table 3).	3036-1
1017	1017-101	We support the 5% disturbance cap, which when combined with other collaborative conservation efforts provides sufficient measures for the protection of sage-grouse populations in the Bighorn Basin Planning Area. The LGCA requests that the 3% disturbance cap in Alternative F be changed to 5%.	3035_4
1017	1017-98	We support the State of Wyoming's Executive Order 2011-5 regarding greater sage-grouse conservation and request that the BLM use only Core Area habitat designations across all alternatives. We insist that the BLM work with the State of Wyoming to adhere to the Executive Order.	3035_1
1017	1017-96	We are concerned about the restriction of herbicide use within ACECs, particularly about the BLM's capacity to manage invasion plant species in existing, potentially expanded, and newly proposed ACECs. This is critical for the ACECs designated for Key or Core sage-grouse habitats, where weed management would greatly benefit sage-grouse. We suggest the BLM consider a pilot program where herbicide use would be allowed in all new acreage brought into the ACEC designation that is Core Area or Key sage grouse habitat for any noxious weed infestation that totals more than 5 acres.	3014

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1017	1017-93	We encourage the BLM to add the replacement of windmills with solar pumps for stock water tanks and ponds to BMPs for greater sage-grouse. This technology has proved highly beneficial and effective in the Pinedale Planning Area for providing domestic livestock with water sources, producing overflow water that increases vegetative cover and forage production for sage-grouse, and removing the raptor perches provided by the windmill structures. Please see livestock grazing comments for more details on the BLM Pinedale planning efforts.	3035_6
1017	1017-91	The LGCA is concerned that the BLM claims to be following Wyoming's Core Area policy in Alternative F, yet uses a 3% disturbance cap, not the 5% disturbance cap outlined in Wyoming's Core Area strategy. We feel this represents an excessive restriction. A recent review of the BLM's NTT Report corroborates our belief: According to the NTT, the report "provides the latest science and best biological judgment to assist in making management decisions." In reality, the NTT report represents a partial presentation of scientific information to justify a narrow range of preferred conservation measures and policies that will be imposed as land use regulations by the BLM. In contrast, an objective scientific review would have led to a broadening of conservation alternatives for decision makers to choose from. (Ramey II 2013)	3035_4
1017	1017-89	We understand the need to balance the development and maintenance of industry and commercial activities with the management of healthy fish and wildlife populations. We therefore support the State of Wyoming's Executive Order 2011 -5 regarding greater sage-grouse conservation. Copeland et al. (2013) predict that using Wyoming's "Core Area" policy combined with $250 million in targeted easements could reduce projected losses of sage-grouse populations to 9-15%, cutting anticipated losses by one-half statewide and nearly two-thirds within sage-grouse core breeding areas (Copeland et al. 2013). These projected losses were calculated based on projected future build-out of oil and gas, wind energy and residential development.	3035_1
1017	1017-88	The history of horse management in the Fifteen Mile HMA is described on page 3-119 of the Draft RMP. We find the wild horse estimates by the BLM especially problematic in the context of the NTT Report directing the agency to incorporate sage-grouse habitat objectives within HMA management plans for those HMAs within Key and Core sage-grouse habitat areas. Please consider revising HMA management in light of Record 113 (page 2-36 of the Draft RMP), which authorizes the BLM to prioritize evaluation of all Appropriate Management Levels based on indicators that address structure/condition/composition of vegetation and measurement specific to achieving sage-grouse habitat objectives within Key and Core sage-grouse habitat.	3045

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1017	1017-81	Record 50 in Table 2.5 provides for the following management action under Alternative F: "Where burned sage-grouse habitat cannot be fenced from other unburned habitat, the entire area (e.g., allotment/pasture) should be closed to grazing until recovered:' Please amend this management action by specifying the acreage of burned greater sage-grouse habitat that would trigger an area (allotment/pasture) closure. This can be done either by establishing a minimum burned acreage or a percentage of greater sage-grouse habitat within an existing allotment. We suggest the following language: Where recently burned sage-grouse Core Area habitats exceed 20% or sage-grouse general habitats exceed 40% of a specific pasture or allotment that cannot be fenced from other unburned habitat, the entire area (e.g. allotment/pasture) should be closed to grazing by domestic livestock until area recovers. Recovery is based upon BLM's recovery formula.	3035_6
1017	1017-80	The LGCA is strongly in favor of using the Greater Sage-grouse Core Habitat Areas, as designated by the Wyoming Governor's Office. across all alternatives (Wyoming Office of the Governor 2011). We request that the BLM omit the use of Key Areas in the Final RMP and EIS.	3035_1
1017	1017-78	Please include language in that acknowledges the impacts wild ungulates and feral horses may have on the quality and composition of key forage species.	3045
1017	1017-75	The Draft RMP states on page 3-98: Management challenges for big game species include poor habitat conditions, fire management, drought, increased development and urbanization, habitat fragmentation, motorized vehicle misuse, disease, hunter access, and the impacts of livestock grazing management on the frequency, quality and composition of key forage species. The above text singles out domestic livestock as the only grazing impact on big game species. This is inconsistent with the SEIS language in Section 3.4.9, which suggests that grazing and browsing from wild ungulates (deer, pronghorn, moose, elk, mountain goat, and bighorn sheep) impact special status species habitat. Please include language in section 3.4.6 that acknowledges the impacts wild ungulates may have on the quality and composition of key forage species. Wild ungulates have the capacity to alter and impact frequency, quality and composition of key forage species as well. Wild or feral horses, depending on how an agency chooses to classify them, are ungulates too. Grazing and browsing by these horses influence frequency, quality and composition of key forage species. The LGCA requests language to this effect is included in section 3.4.6.	3045
1017	1017-69	Please provide additional explanation of how the BLM national greater sage-grouse planning strategy led to the decision to propose the two new ACECs, when neither the NTT nor the statewide BLM specify that ACECs are a required designation for sage-grouse habitat protection. Since Alternatives E and F are almost the same as B and D, please address what about ACEC designation in particular responds to the directives in these above-discussed memoranda and directives.	3001
1017	1017-68	Please clarify how the additional layer of proposed ACEC designation meet the stated objectives beyond what is already provided in Alternatives B and D.	3001

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1017	1017-67	The BLM national greater sage-grouse planning strategy provides the following language as directive for treatment of sage-grouse in the RMP revision process: Based on the identified threats to the Greater Sage-Grouse and the FWS timeline for making a listing decision on this species, the BLM needs to incorporate explicit objectives and desired habitat conditions, management actions, and area-wide use restrictions into LUPs by the end of FY 2014. The BLM's objective is to conserve sage-grouse and its habitat and potentially avoid an ESA listing. (BLM 20ll a) Further: The NTT-developed conservation measures were derived from goals and objectives developed by the NTT ....These goals and objectives are a guiding philosophy that should inform the goals and objectives developed for individual land use plans. However, it is anticipated that individual plans may develop goals and objectives that differ and are specific to individual planning areas. "(BLM 2011a) (emphasis added). The LGCA interprets this statement as providing flexibility to individual land use plans for crafting their own area-specific goals and objectives. The SEIS, however, treats ACEC designation as arising naturally from the BLM directives above, rather than actually being just one of many conservation strategies that would have met the conservation measures referenced above. The SEIS states on page 4-122: The proposed Greater Sage-Grouse Key Habitat Areas and Greater Sage-Grouse Core Habitat Areas ACECs were developed in response to the greater sage-grouse habitat management policy guidance set forth in WY BLM Instruction Memorandum (IM) No. WY-2012-019 (BLM 2012a), and in accordance with the BLM Washington Office IM No. 2012-44 (BLM 2012b), BLM National Greater Sage-Grouse Land Use Planning Strategy. Proposal and consideration of these ACECs represent proactive conservation measures that reduce or eliminate threats to greater sage-grouse to minimize the likelihood of and need for listing of this species under the ESA. Please provide additional explanation of how the BLM national greater sage-grouse planning strategy led to the decision to propose the two new ACECs, when neither the NTT nor the statewide BLM specify that ACECs are a required designation for sage-grouse habitat protection. Since Alternatives E and F are almost the same as B and D, please address what about ACEC designation in particular responds to the directives in these above-discussed memoranda and directives.	3001
1017	1017-64	The goals and objectives for Special Designations are as follows on page 2-163: Goal SD 1: Protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or process, or to protect life and safety from natural hazards. Objectives: SD1.1: Utilize special designations to meet resource protection needs within appropriate geographical areas. SD 1.2: Provide for appropriate interpretation of sites of high public interest. How does the additional layer of proposed ACEC designation meet these objectives beyond what is already provided in Alternatives B and D? The creation of Alternatives E and F does not appear to the LGCA to address the goals and objectives more substantially than the existing alternatives.	3001

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1017	1017-63	The LGCA continues to support the Governor of Wyoming's Executive Order for Greater Sage-grouse (Wyoming Office of the Governor 2011), which established core areas for protection. We believe that this order provides for sage-grouse and sage-grouse habitat protection while avoiding unnecessary additional restrictions. The latest scientific findings corroborate the strength of core areas designation in protecting sage-grouse adequately to prevent an ESA listing (Copeland et al. 2013). The BLM should work with the State of Wyoming and with the LGCA to determine what conformance to the Executive Order means specifically for this planning area.	3035_1
1017	1017-60	Correct the boundaries of the Alternative F VRM Class II for the Sheep Mountain Anticline ACEC to provide a 1/4-mile buffer of the adjacent VRM Class IV to fully encompass the bentonite potential areas depicted in the BLM-developed bentonite potential GIS file.	3043
1017	1017-59	Until the impacts associated with Alternatives E and F are fully analyzed and understood, we request that the BLM dismiss these alternatives.	3027-1
1017	1017-57	While applying a leasing screen during the RMP/EIS revision process to ensure consistency with proposed protections for greater sage-grouse is justified, the first modifying statement does not provide clear or consistent management direction. More importantly, it is not clearly described in the Draft RMP/EIS or SEIS how the BLM intends to evaluate oil and gas leasing decisions for these areas that address resources of concern and better fit the MLP criteria. Given that there will be no changing circumstances, updated policies, or new information not already examined in the RMP/EIS revision, how would the MLP analysis differ from that performed during the revision and why would it be required?	3023-6
1017	1017-55	Alternative F withdrawals and VRM Class II restrictions encompass the Sheep Mountain Anticline ACEC and the VRM Class II east and west boundaries coincide with the BLM-developed potential for bentonite GIS layer boundaries. The VRM Classes are definitive boundaries on the map and management of the VRM boundaries should take place strictly within the area boundaries, not on areas outside the boundaries or on a viewshed basis. For example, do not conclude that operations in Class IV areas detract from the visual resources of the adjacent Class II because the operation can be viewed from within the Class II. This conclusion would result in an inaccurate determination of undue environmental degradation for a Plan of Operations in the adjacent class boundary. Therefore, the boundaries of the Alternative F VRM Class II encompassing the Sheep Mountain Anticline ACEC should be modified to provide an additional l/4-mile buffer of the adjacent Alternative F VRM Class IV to more fully encompass the bentonite potential areas depicted in the BLM-developed bentonite potential GIS file.	3043
1017	1017-54	While it is acknowledged that there will be a decrease in earnings and output under Alternative F when compared to Alternative D, the increase in additional timing limitations included in Alternative F are not adequately analyzed or presented. Until the impacts associated with these alternatives are fully analyzed and understood, we request that the BLM dismiss Alternatives E and F.	3023-6

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1017	1017-53	The Wyoming Enhanced Oil Recovery Institute (WEORI) estimates that another 1.3 to 2 billion barrels of oil can be recovered from the Bighorn Basin as a result of enhanced oil recovery (EOR) operations using C02 to displace stranded oil (Wyoming Enhanced Oil Recovery Institute 2011). The LGCA agrees that large reserves of oil can be recovered with the implementation of C02 EOR in the planning area and believes that Alternative E would have significant impacts that have not been disclosed. The same holds true for Alternative F. The SEIS states (page 4-143): Based on the IMPLAN model, regional earnings and output under Alternative F for the modeled sectors (oil and gas, grazing, and recreation) would be similar to but slightly less than under Alternative D due to additional NSO restrictions for oil and gas development in greater sage-grouse Core Habitat Areas. This NSO restriction would reduce estimated oil and gas development when compared to alternatives A and D.	3023-6
1017	1017-52	Further, Sublette County Commissioner Joel Bousman has indicated that several innovative approaches to wildlife mitigations exist (Bousman pers. comm.). These including the possibility of the broad scale purchase of conservation practices as payment for ecosystem services, as described in the BLM Socioeconomics Strategic Plan 2012-2022 (BLM 2013). One practice in particular that the BLM should consider is coordination and assistance with cost-sharing in the conversion from windmill water developments to solar power. This practice was surprisingly successful in the Pinedale Planning Area, as the conversion took away raptor perches, thereby reducing a risk to sage-grouse. At the same time, overflow water was newly available into mid-September, which kept some plant communities and key forb species in a more productive state, increasing habitat quality for sage-grouse clutches.	3035-7
1017	1017-51	The LGCA also suggests that the BLM Bighorn Office communicate with the BLM Pinedale Office to take advantage of their experience with sage-grouse related conservation measures. Sublette County, which is within the Pinedale Planning Area, has been extensively involved in project and planning level BLM projects and has experience with developing effective mitigations for sage-grouse, including improved livestock distribution, fencing, and water developments. Their range improvements are consistent with NTT recommendations. Generally, ranching and cattle water developments provide water resources that the sage-grouse depend upon. The retirement of grazing leases could reduce water availability to sage-grouse, while effective mitigation measures to existing allotments has been shown to benefit sage-grouse	3035_6
1017	1017-49	Provide the impacts for management actions under Alternative F that limit, reduce, or prohibit AUMs.	3017-3

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1017	1017-48	Please clarify the management actions language in Table 2.5 as discussed above. "Our review of the Draft RMP's glossary definition of surface disturbing activities indicates an inconsistency with the Rawlins, Casper, Kemmerer, and Grass Creek RMP glossaries. Only the Bighorn Basin Draft RMP considers livestock grazing as a surface disturbing activity. BLM IM No. WY-2007Â029, "Guidance for Use of Standardized Surface Use Definitions," is relevant to the incorrect definition of "surface disturbing activities" in the Draft RMP. The 1M directs BLM managers to standardize the definitions of commonly used terms in RMPs and E1Ss. Review of the five definitions below indicates that the BLM has failed to implement the directive. Rawlins RMP: Surface Disturbance: Any action created through mechanized or mechanical means that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation. Examples of surface disturbance include construction of well pads, pits, reservoirs, pipelines, and facilities (e.g., parking lots and tanks). Casper RMP: Surface-disturbing Activities (or Surface Disturbance): The physical disturbance and movement or removal of land surface and vegetation. These activities range from the very minimal to the maximum types of surface disturbance associated with such things as off-road vehicle travel or use of mechanized, rubber-tired, or tracked equipment and vehicles; some timber cutting and forest silvicultural practices; excavation and development activities associated with use of heavy equipment for road, pipeline, power line and other types of construction; blasting; strip, pit, and underground mining and related activities, including ancillary facility construction; oil and gas well drilling and field construction or development and related activities; range improvement project construction; and recreation site construction. Kemmerer RMP: Surface-disturbing Activity: An action created through mechanized or mechanical means that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation. Examples of surface disturbance include construction of well pads, pits, reservoirs, pipelines, and facilities (e.g,, parking lot and tanks). Grass C reek RMP: Surface-Disturbing Activities (or Surface Disturbance): The physical disturbance and movement or removal of the land surface and vegetation. It ranges from the very minimal to the maximum types of surface disturbance associated with such things as off-road vehicle travel or use of mechanized, rubber-tired, or tracked equipment and vehicles; some timber cutting and forest silvicultural practices; excavation and development activities associated with use of heavy equipment for road, pipeline, power line and other types of construction; blasting; strip, pit and underground mining and related activities, including ancillary facility construction; oil and gas well drilling and field construction or development and related activities; range improvement project construction; and recreation site construction. Bighorn Basin Draft RMP: Surface-Disturbing Activities: These are Public Land resource uses/activities that disturb the endemic vegetation, surface geologic features, and/or surface/near surface soil resources beyond ambient site conditions, Examples of surface-disturbing activities include: construction of well pads and roads, pits and reservoirs, pipelines and power lines, and most types of vegetation treatments (e.g. prescribed fire, etc.). NOTE: Some resource uses, commodity production and other actions that remove vegetative growth, geologic materials, or soils (e.g., livestock grazing, wildlife browsing, timber harvesting, sand and gravel pits, etc,) are allowed, and in some instances formally authorized, on the Public Lands. When utilized as a land use restriction (e.g., No Surface	3017-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1017	1017-46	The only text in Appendix P precedes Table P-3, '"Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Core Habitat Areas." It reads as follows: "The determination of retirement of grazing privileges of allotments or portions of allotments in Greater Sage-grouse Core Habitat Areas would be made upon site specific National Environmental Policy Act analysis." The LGCA has several questions here. What goal, objective, or management action would trigger a NEPA analysis? In other words, would grazing lease retirement be the proposed action itself, or would it be considered indirectly, as a necessary part of Greater sage-grouse Core Habitat Area management? Secondly, why is there no chart or language regarding allotment treatment under Alternative E? Please indicate here that Alternative E would cancel all grazing allotments in Key Areas. Lastly, please provide an explanation of the actions and impacts of the three management categories, "custodial," "improve," and "maintain," in relation to the NEPA analyses cited above. Are Custodial and Improve category allotments slated for retirement of grazing privileges under Alternative F, as their definition in the Draft RMP/EIS Glossary can be read to imply? Please clarify if this is or is not the case. If it is, the socioeconomic effects analysis must include the impacts of such management actions. Please see Socioeconomic Resource comments.	3017-1
1017	1017-45	In sum, the LGCA believes that Alternative F has indirect, direct, and cumulative impacts to the livestock grazing resource which have not been adequately addressed in the SEIS. We request this analysis be included in the Final RMP/EIS.	3017-3
1017	1017-44	The LGCA requests that the BLM incorporate these impacts into the analysis in the socioeconomic resources section of the SEIS. We have the same comments regarding the text on page 4-121: Within priority sage-grouse habitat, objectives and management considerations that benefit greater sage-grouse are incorporated into all BLM grazing allotments through AMPs or permit renewals, and additional restrictions would be placed on riparian/wetland and wet meadow areas to promote recovery or maintenance of appropriate vegetation and water quality. Under Alternative F, grazing and trailing would also be avoided within lekking, nesting, brood-rearing, and winter habitats of priority sage-grouse habitat during periods of the year when sage-grouse are utilizing such areas. A focus on greater sage-grouse habitat considerations in the Greater Sage-Grouse Core Habitat Areas ACEC, over consideration that would provide greater benefits to livestock grazing management, would result in adverse impacts from seasonal and other closures and a reduced ability to perform vegetation treatments. Management considerations under Alternative F would result in similar beneficial impacts to forage availability as alternatives A and D, except within the Greater Sage-Grouse Core Habitat Areas ACEC. Additional vegetation management restrictions within priority sage-grouse habitat would reduce the availability of livestock forage over a larger acreage than alternatives A and D. In addition, Alternative F would create seasonal and spatial limitations on grazing activities within the Greater Sage-Grouse Core Habitat Areas ACEC.	3036-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1017	1017-43	The LGCA agrees that "such a requirement could adversely affect livestock grazing in a substantial portion of the Planning Area since sagebrush may take multiple years to reestablish." We ask that the impacts to the livestock grazing and the socioeconomic resource be adequately characterized here, given that sagebrush ecosystem recovery could take decades. The same comment applies to the adverse effects on the resource that would result from the following actions, described on page 4-121: The management of surface-disturbing activities and livestock grazing near surface water and riparian/wetland areas under Alternative F is the same as Alternative D, except in the Greater Sage-Grouse Core Habitat Areas ACEC. In these areas surface disturbance limitations would result in beneficial impacts to vegetation health and forage productivity compared to alternatives A, C, and D, but would limit the ability of permittees to implement surface-disturbing rangeland improvement projects. Alternative F manages grazing use of riparian/wetland and wet meadow areas consistent with Alternative D, except in the greater sage-grouse Core Habitat Areas where closures to hot-season grazing and adjustments to the seasonal distribution of livestock may apply. Alternative F applies the same wildlife and special status species management action as Alternative D, except in greater sage-grouse Core Habitat Areas. Under Alternative F, grazing in lekking, nesting, brood-rearing, and winter habitats would be seasonally avoided. These restrictions on location and season of use would have adverse impacts on forage availability for livestock grazing compared to alternatives A and D, where these restrictions do not apply.	3017-5
1017	1017-42	Please disclose who the responsible party will be for performance and funding of the myriad monitoring and data collection activities required above. Is it the permittee? The BLM? Also, please disclose the impacts to the resource and to the socioeconomic resource as a result of these management actions. The description of Alternative F management actions continues, again without an impacts assessment, as follows on pages 4-120 to 4-121: Alternative F would result in the same acreage of prescribed fire treatment as alternatives A and D, although the emphasis of protecting and enhancing greater sage-grouse habitat for treatments in Core Habitat Areas under Alternative F could reduce the benefits to livestock grazing forage availability compared to those alternatives. In particular, Alternative F excludes livestock grazing in burned Core Habitat Areas (35 percent of BLM-administered surface lands) until woody and herbaceous plants achieve sage-grouse habitat objectives; such a requirement could adversely affect livestock grazing in a substantial portion of the Planning Area since sagebrush may take multiple years to reestablish (Manier et al. 2013). Similar to Alternative E, the fire and fuels management of Alternative F may also result in an increased risk of forage loss due to catastrophic fire.	3017-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1017	1017-41	Page 4-118:The use of herbicides to control invasive species would be minimized within the Greater Sage Grouse Core Habitat Areas ACEC under Alternative F. Flash burners, mowing, and selected handcutting would be prioritized in these areas. Therefore, Alternative F may restrict grazing permit holders to more labor-intensive methods to control weeds when compared to Alternative D. Our concern with this directive is that ranchers will be restricted to using labor-intensive methods to control weeds and that the impacts of this management prescription have not been entirely disclosed in the impacts analysis. Please see the socioeconomics comments in this document regarding this issue.	3017-4
1017	1017-40	The LGCA is very concerned about the impacts analysis for Alternative F. It does not come close to disclosing the range of adverse impacts to the livestock grazing resource that are inevitable under the management actions described below. Page 4-116 of the SEIS states: "Livestock grazing management under alternatives A, 0, and F-the alternatives most likely to apply management actions on a case-by-case basis-would generally result in a continuance of current grazing practices." This conclusion is unsupportable, given that management actions developed for protection of sage-grouse core habitat often limit or prohibit grazing (see below). Please change this sentence to indicate that livestock management would substantially change under Alternative F. Below we excerpt descriptions of management under Alternative F that would have significant adverse impacts on livestock grazing. Please disclose these impacts to the resource in this section as well as in the socioeconomic resource section of the Final RMP/EIS. Alternative F Page 4-118: The use of herbicides to control invasive species would be minimized within the Greater Sage Grouse Core Habitat Areas ACEC under Alternative F. Flash burners, mowing, and selected hand-cutting would be prioritized in these areas. Therefore, Alternative F may restrict grazing permit holders to more labor-intensive methods to control weeds when compared to Alternative D.	3017-3
1017	1017-37	We ask that the Final RMP/EIS document include language that acknowledges the positive effect that grazing has on sage-grouse habitat when BMPs regarding seasonal rotation and stocking rates are followed.	3035_6
1017	1017-35	The SEIS states in Table 2-6 that that the current AUMs of 305,887 will only be reduced by 1-2% over the life of the RMP/EIS under Alternatives A, C, D, and F. According to this assessment, impacts to livestock grazing result only from management actions that directly change AUM allocations or otherwise restrict livestock grazing. There are no impacts disclosed under the array of Alternative F management actions that will inevitably change AUM allocations. As noted in detail below, these impacts are considerable. The LGCA also requests that the RMP include language that limits the decreases to AUMs to no more than 1-2% over the life of the plan, and that any restrictions that result in further decreases beyond the 1-2% are significant and require a full NEPA analysis.	3017-3

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1017	1017-34	"For all HMAs within priority sage-grouse habitat, prioritize the evaluation of all AMLs [sic.; AMUs] based on indicators that address structure, condition, and composition of vegetation and measurements specific to achieving sage-grouse habitat objectives." We recognize that the BLM is hamstrung by horse management priorities. But there is nothing in here about managing horses at minimum populations. We are concerned that if there are management actions conducted to address range conditions, the burden of those actions is going to fall on the agricultural community and not on horse management.	3045
1017	1017-33	"Any vegetation treatment plan must include pretreatment data on wildlife and habitat condition, establish non-grazing exclosures, and include long-term monitoring where treated areas are monitored for at least 3 years before grazing returns. Continue monitoring for 5 years after livestock are returned to the area, and compare to treated, ungrazed exclosures, as well as untreated areas." Please disclose the vegetation treatments to which this management action applies, and indicate if grazing is deferred while pretreatment data is collected.	3017-4
1017	1017-32	"Encourage partners to monitor effects of retiring grazing permits in sage-grouse habitat." Please identify the partners that would perform monitoring.	3035_6
1017	1017-31	Regarding structural range improvements and supplements, the "[p]otential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction." Our concern is that the burden of monitoring, and potentially treating, invasive species that establish themselves post-construction falls entirely on the rancher. This is especially problematic when considering that the establishment of the invasive species in the area may not have been caused by the new structures and supplements, but may have happened concurrently.	3017-4
1017	1017-30	"Design post-fuels-management projects to ensure long-term persistence of seeded or pre-treatment native plants. This may require temporary or long-term changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the fuels management projects." This directive may lead to confusion and inconsistent management in the event that seeded or pre-treatment native plants are not flourishing. Please provide specific language on the what, where, and degree of "persistence" necessary for seeded or pre-treatment native plants after fuels management activities.	3011
1017	1017-29	"Rest treated areas from grazing for three full growing seasons unless vegetation recovery dictates otherwise." Please clarify how vegetation recovery will be determined.	3017-4

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1017	1017-28	'Design post-restoration management to ensure long-term persistence. This could include changes in livestock grazing management, wild horse and burro management, travel management, or other activities to achieve and maintain the desired condition of the restoration effort that benefits sage--grouse." Please modify this language for clarity, so that the record gives precise limits to the extent of management actions. As it reads, this management direction can be interpreted to allow for the prohibition of all livestock grazing, access. or "other activities" as long as a case is made that such restrictions help "achieve and maintain the desired condition of the restoration effort that benefits sage-grouse."	3001
1017	1017-22	Table 4-16, Acres of Management in Lands with Wilderness Characteristics (page 4-115), is indicative of the BLM's problematic and inconsistent direction regarding LWCs. First, footnote I illustrates the muddled understanding the BLM has of the state of this resource: "Due to differing scales of analysis, numbers do not add to the total acreage for LWCs in the Planning Area" (page 4-115). We request clarification of these multiple scales of analysis. Further, we request that the BLM decide on one scale of analysis in order to adequately characterize the resource.	3046
1017	1017-21	The BLM's inventory of LWCs included in the Draft RMP/EIS remains problematic because it is still the de facto inventory relied upon in the SEIS. Crystal Creek and Sheep Mountain both have contorted borders that are a reflection of a desire to maintain land as LWC despite its roaded nature. The redesignation of inventoried roads that exist within LWCs as a new "border" is disingenuous. From the west side of the Crystal Creek LWC, one can see cars driving up and down the mountain. From the east, one can see the Georgia Pacific wall board plant. The BLM indicated to one LGCA member to pretend there was a curtain around this LWC, a directive which violates the viewshed requirements for LWCs. We ask that the LWC inventory be updated responsibly to reflect the current state of the resource. As it stands now, the addition of new borders amounts to gerrymandering, and sets a dangerous precedent. Further, the BLM's LWC inventory leaves out seismic trails and silt retention systems, which should be included in the updated inventory. Please see Appendix.	3046
1017	1017-19	SEIS Table 2-5, Detailed Alternatives, Record 60, provides for the following management action under both Alternatives E and F (page 2-27): Conduct restoration of roads, primitive roads, and trails not designated in travel management plans in priority habitat. This also includes primitive routes/roads that were not designated in Wilderness Study Areas and within lands with wilderness characteristics that have been selected for protection in previous RMPs. This management action gives us pause. It can be interpreted to call for the restoration of all roads and trails within LWCs that are protected in "previous RMPs." It effectively gives carte blanche to rewilding efforts of all of the LWCs, especially those that no longer contain wilderness characteristics nor are being actively managed for their current, past, or (now apparently) potential future wilderness character. We find this management action to be in violation of the principles of multiple use and sustained yield, and driven by a wilderness agenda.	3046

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1017	1017-18	The LGCA is opposed to the designation of the 571,288 acres of Lands with Wilderness Characteristics under Alternatives B and E (Page 2-10 of SEIS). We also oppose the continued designation of 52,485 acres of LWCs under Alternatives D and F. Our reasons are twofold: one, we feel that this management designation is irresponsible and incorrect, considering that the LWC inventory relied upon by the BLM is inadequate. As communicated in several memoranda since the availability of the Draft RMP/EIS in 2011, we have urged the BLM to remove the LWC designation from lands that are actually roaded and have manmade structures, as they no longer contain wilderness characteristics.	3046
1017	1017-10	It is requested that the BLM adopt Alternative C ROW corridors in the Final RMP/EIS. The LGCA suggests that ROW avoidance/mitigation areas be removed from areas designated as oil and gas management areas and corridors under all alternatives. This includes segregating avoidance and mitigation areas into two separate analyses so that it is clear to the public which areas should be avoided and which areas will require mitigation.	3033-1
1017	1017-9	Please clarify why only carbon dioxide emissions were included in the calculations in Tables 4-3 and 4-4.	3002
1017	1017-8	Please provide a reference for this statement that C02 from prescribed fires is "typically considered to be counterbalanced" by increased productivity of existing larger vegetation and new growth .	3002
1017	1017-7	Footnote 1 for Tables 4-3 and 4-4 reads as follows: "Carbon Dioxide Equivalent is a measurement that allows an aggregate comparison of multiple greenhouse gases, created by multiplying the emissions of each gas by its relative global warming potential. For this analysis, however, metric tons of Carbon Dioxide Equivalent includes only carbon dioxide (C02) emissions." Since the analysis does not include any additional greenhouse gases, please remove the word "Equivalent" in the titles of both tables and delete the footnote in order to avoid confusion. Secondly, why were the other greenhouse gases not included in the calculation? The omission of methane from the table is especially confusing, given the following statement on page 4-6 states, "CH4 is more than 20 times as effective as C02 at trapping heat in the atmosphere and accounted for 8.2 percent of GHG emissions in 2008 (based on C02 equivalents (EPA 2010)." Lastly, please explain why the carbon dioxide analysis was conducted for 2018 and 2028, rather than the years 2015 and 2024, as in all other air emission analyses.	3002
1017	1017-6	On Page 4-6, the SEIS states that ''Wildland fires, including prescribed burns, would also result in C02 emissions. However, C02 from fires, particularly prescribed fires, is typically considered to be counterbalanced by the increased productivity of existing larger vegetation and new growth of vegetation post-fire." While it is possible that prescribed fires would have such a benefit, it seems that large wildfires may only be partially balanced by vegetative re-growth, and such re-growth may take years to accomplish. Please provide a reference for this statement that C02 from prescribed fires is "typically considered to be counterbalanced" by increased productivity of existing larger vegetation and new growth.	3002

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1017	1017-5	On Page 4-4 the SEIS states that "Alternative E would result in the lowest levels of emissions in 2015 and 2024 and, therefore, it is unlikely that emissions under this alternative would contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) or Wyoming Ambient Air Quality Standards WAAQS)." It does not follow logically that just because it has the lowest emissions, Alternative E will not exceed NAAQS or WAAQS. Please indicate whether this statement is based on modeling predictions, on the logic that since current air quality in the planning area is within National and Federal Standards thus the future air quality must also be within standards, or on some other reasoning.	3002
1017	1017-4	Lastly, the LGCA continues to support the Wyoming Governor's Executive Order 2011 -5 regarding Greater Sage-grouse Core Habitat, and Executive Order 2013-3 regarding Sage-Grouse Core Habitat grazing adjustments. We request that all key habitat designations and management stipulations in the Final RMP and EIS be changed to Core, in keeping with Wyoming's directive and priorities. We also request that BLM work with the State of Wyoming and the LGCA to determine what conformance to the Executive Order means specifically for the Bighorn Basin Planning Area.	3035_1
1017	1017-2	This leads us to one of our major concerns about the SEIS: we would like to see in the final the inclusion of a full characterization of the socioeconomic impacts of Alternatives E and F. We request that the BLM fully characterize the socioeconomic impacts of new alternatives both quantitatively and qualitatively. The LGCA wants the information contained in the Final RMP and EIS to allow decision makers and our constituents to understand the impacts of additional management restrictions. The potential impacts to the socioeconomic, livestock grazing, and minerals resources are considerable under both Alternatives E and F. We would like the Final RMP and EIS to adequately measure the impacts to these resources under Alternative E, which is very restrictive of multiple uses and sustained yield, but also of Alternative F. At various times throughout the SEIS development process, BLM staff members have communicated to the public and to the LGCA that the difference between Alternative E and F is not significant, and/or that the difference between Alternative D and F are also insignificant in terms of impacts to grazing, oil and gas, and therefore socioeconomics. Our analyses of the management actions actually indicate the opposite: Alternative E and F both have major impacts.	3036-1
1018	1018-6	Record #50 " It is unrealistic to assert that an entire allotment /pasture should be shut off from grazing if the burned area can't be fenced. This is completely unnecessary and extreme. It reflects an absence of on the ground realities. These allotments can be huge, burned areas can be huge and fencing unrealistic. It again reflects the obvious agenda against livestock grazing under the guise of caring about restoration.	3011
1018	1018-5	Record #49 " Alternative F: It is counterproductive for sage grouse to exclude livestock form grazing in burned areas until wood and herbaceous plants achieve sage-grouse habitat objectives. Woody shrubs in this ecology could take as long as 60 years to re-establish and in the meantime grasses could compete with them. Livestock grazing should be permitted during this time frame, if in fact sage-grouse stewardship is on the radar screen.	3011

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1018	1018-4	Chapter 4.3 Fire and Fuels Management: Proactive Management section " Marginalizing and restricting the use of fire within areas of environmental concern will only worsen the invasive weed problem already ahead of land managers. We need all tools to help control invasive weeds and not worsen the weed problem by slowing management. Proactive fire management must not move slowly, it must continue at a rapid and consistent pace to improve habitat.	3011
1018	1018-3	Chapter 2, Table 2.3: Alternatives E & F not necessary to put 1,857,485 acres or 1,786,241 acres under the restrictions of Areas of Environmental Concern (ACECs). While sage-grouse may be present, it does not mean that they will be negatively impacted or the area degraded if left open to the public. This document and these alternatives seek to manage for one species---the sage-grouse to the detriment of all other resources. Alternative E adds 9 additional Areas of Critical Environmental Concern (ACECs) to the restricted use picture: The nine proposed ACECs are Chapman Beach, Clarks Fork Basin/Polecat Bench West Paleontological Area, Clarks Fork Canyon, Foster Gulch Paleontological Area, McCullough Peaks South Paleontological Area, Rainbow Canyon, Rattlesnake Mountain, Sheep Mountain, and Greater Sage-Grouse Key Habitat Areas. Where is the demonstrated justification for this closeout? The American public can co-exist with many value systems and has for decades.	3001
1018	1018-2	Chapter 2, Table 2.2: No lands open for Desert Land Entry. No justification for this, as any such entries would take into account sage-grouse life cycle if they were present. These entries, while underutilized should remain an option to the American public	3016-1
1019	1019-3	Transmission Line Impacts on Wildlife May Be Overstated. Basin Electric is a member of the Avian Power Line Interaction Committee (APLIC), an organization that works with utilities, resource agencies and the public in a collaborative way to develop practical, effective solutions to potential avian problems such as nesting, electrocution, and collision with power lines. As indicated in APLIC's September 26, 2013 comment regarding the Buffalo Field Office Draft Resource Management Plan, recent studies suggest the effect of energy infrastructure on sage grouse may be overstated. As such, many of the proposed restrictions and conditions for BLM ROW use may be unnecessary. Echoing APLIC's position, stipulations for sage grouse should not include any mitigation requirement unless it is based on valid science, not anecdotal evidence or casual observation. Further, the science should be specific to the sage grouse, not surrogate species such as the prairie chicken.	3049

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1019	1019-2	Above-ground facilities are not allowed in many cases on BLM-administered preferred range of alternatives. Only buried utilities would be allowed. As a G&T cooperative, Basin Electric may need to construct additional 230 kilovolt (kV) or higher voltage transmission lines the Planning Area. It is generally not economically feasible to bury power lines with voltages higher than 34.5 kV. The cost for high voltage transmission lines is already significant at more than $400,000 per mile for 230 kV lines to over $1,000,000 per mile for 345 kV lines. If placed underground, this cost would be increased by a factor of 10 to 20 times. Furthermore, underground power lines would require continuous excavation along the entire route, which in turn creates significantly more disturbance than overhead construction. Underground power lines may be less reliable and are more difficult to maintain. Line breaks may be difficult to locate, resulting in long outages for customers. Additional ground disturbance would be necessary because excavations would be required to facilitate repairs.	3033-2
1019	1019-1	Restrictions and Limitations on new ROW Alternatives under consideration by the BLM propose restrictions or limitations on ROW ranging from 1,003,194 to 2,943,655 acres in the Planning Area. It is important to note the total area included in the Planning Area is only about 5.6 million acres, including all lands (federal, state, and private). Any new limitations on ROW use, including uses for electric distribution and transmission lines within the Planning Area, would have a significant negative impact on Basin Electric's ability to site new infrastructure. The increased restrictions are expected to increase costs for infrastructure that may utilize BLM lands. Alternatively, longer routes (with concomitant increases in surface disturbance and cost) may be necessary to avoid BLM lands. In any case, new BLM ROW restrictions are expected to impact electric utility customers through increased costs and time delays for new projects.	3033-2
1020	1020-6	The EORC continues to feel strongly that the Bighorn Basin RMP should carefully consider the large enhanced oil recovery potential in and near the existing oil fields in the basin and the management option chosen by the Bureau of Land Management (BLM) should be developed to accommodate the associated facilities to the largest extent feasible. Of critical importance to the future of C02 and EOR development is the provision for adequate infrastructure to deliver C02 to the basin.	3023-3
1020	1020-5	EORC recommends that BLM consider development of unconventional reservoirs in Bighorn Basin when evaluating alternatives during the RMP process. There is a strong likelihood that unconventional development opportunities may exist within the deeper portions of the basin; i.e. the center of the basin.	3023-3
1020	1020-4	Likewise, Alternative F would have a large impact on EOR development opportunities within the basin due to increased restrictions. Under Alternative F, 62% and 58% of the proven and possible EOR development areas in the basin, respectively, would be subject to moderate constraints; and increase of 18% and 23% (as compared to Alternative C). Additionally, less land is available for development under standard restrictions by 17% and 25% as compared to Alternative C.	3023-3

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1020	1020-3	It is our opinion that Alternative E would have a large impact on EOR development in the basin. Under this alternative, 62% and 57% of the proven and possible EOR development areas in the basin, respectively, would be subject to major constraints and/or administratively unavailable to development including portions of existing active oil fields in the basin. In Alternative C only about 4% and 5% of the proven and possible development areas, respectively, would be subject to the same limitations with little or no impact to most of the currently producing fields in the basin. Assuming that no development would occur in areas with major constraints or those administratively closed, Alternative E could reduce overall recovery from proven areas by between 0.8 billion to 1.2 billion barrels of oil or about half of the production that is likely to result from EOR C02 recovery in the Bighorn Basin. The corresponding net reduction of severance taxes and ad valorem taxes paid to state and county governments would range from $7.4 to $11.5 billion dollars. Reduced oil development in the affected counties will reduce direct employment, indirect employment, sales taxes, and property taxes.	3036-1
1020	1020-2	While it is impossible to predict what these additional moderate constraints would mean to project specific development, it is reasonable to conclude that development in some additional areas (as compared to Alternative C) would be slowed and possibly eliminated due to costs associated with additional constraints. Activities, such as drilling, would still be allowed, but would only be allowed to occur during shortened seasons. The cost of these constraints to individual projects is impossible to accurately estimate but in some areas with multiple seasonal closures it is expected that the cost would eliminate some future oil and gas development.	3023-6
1020	1020-1	EORI staff conducted a Enhanced Oil Recovery technical analysis of the economic impact on oil related revenue with respect to Alternatives C, E and F. From an EOR perspective, both Alternative E and Alternative F would be less desirable than Alternative C because they both pose additional constraints to oil and gas development in areas that may be redeveloped using C02 EOR.	3023-3
1021	1021-19	Wyo-Ben supports conservation of sage grouse habitat, as long as such conservation does not dominate at the expense of other resources, and where responsible, sound science supports such conservation. We strongly dispute the idea expressed throughout the SEIS that the NTT report, and Alternative E (and portions of F), represents the best available science on Sage Grouse management and should form the basis for BLM's sound management objectives in the revised RMP. As a rebuttal to this idea, Wyo-Ben directs the BLM, by reference to Dr. Rob Roy Ramey II's September 19t\ 2013 "Review of Data Quality Issues in A Report on National Greater Sage-Grouse Conservation Measures Produced by the BLM Sage Grouse National Technical Team (NTT)." There, Dr. Ramey describes the many scientific inconstancies and inaccuracies contained in the NTT report that are a concern for Wyo-Ben.	3035_1

Table D-1. Individual Comments and BLM Response Index (Continued)

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1021	1021-18	Specifically regarding bentonite mining, Alternative E promotes poor ecology and unnecessary disturbance, even with a 3% cap. Modern bentonite reclamation occurs concurrently with mining taking place in an engineered, continuous castback sequence. The pit that is being opened casts overburden, subsoil and topsoil into the pits behind it. Under the proposed Alternative, this extremely effective reclamation and conservation practice would no longer be possible. Once the disturbance threshold is met, the entire continuous sequence would stop. Soils that normally would be spread live would sit idle. Backfilling and re-vegetating the open pit would no longer be possible. This will force the mining company to use archaic bank stockpiling techniques for overburden, topsoil, and subsoil which effectively doubles the disturbance required for each mine site. Such practices are scientifically-demonstrated to have longer re-vegetation times and may result in poorer vegetative production along with a higher incidence of weeds. Ultimately, as a result of this forced larger footprint, the portion of the mineral estate that can be developed is cut in half: Only 1.5% of the surface may effectively have the bentonite removed. In addition to unintended environmental consequences, the standards suggested in Alternative E are in direct conflict with the rights conferred under the General Mining Law of 1872. While such rights are not unfettered, an arbitrary, non-statutory standard that effectively removes 98.5% of the estate from development for an undefined-but-decades-long waiting period open the RMP to legal action by mining claimants. Recommendations: 1) BLM must eliminate reference to a 3% disturbance cap in favor of developing site specific management plans where conservation goals are desirable 2) Respect the rights of mining claimants under the 1872 Mining Law, who rely on access to the mineral estate for their viability 3) Develop conservation plans for mine operators that allow for contemporaneous reclamation with the smallest possible footprint of disturbance	3020
1021	1021-17	If BLM does not use one of the existing Alternatives for its final plan but instead choses, or is required, to blend parts from various Alternatives, then neither the SEIS nor the Draft RMP will have adequately addressed the potential effects of combination. This will not allow BLM to meet its NEPA analysis responsibility. Recommendation: If a hybridized Alternative is used for the final plan then BLM must prepare a new Environmental Impact Statement that examines the combined effects of this new Alternative and submit this to the public for comment	3027-1

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1021	1021-16	On page 2-31, Table 2-5 explains at Record 84 that, for both Alternative E and F, nonfederal surface estate over federal minerals should be managed with the same conservation measures as those applied to lands where the federal government owns both the surface and the mineral estate. Even though this acknowledges the long standing legal doctrine that mineral estate rights trump surface estate rights it fails to acknowledge that the federal government has no right to exercise any management of the private surface unless and until the mineral estate is developed, and then only with regard to that development. At Record 85, the Table incorrectly ignores the superior rights of the mineral estate, assuming that when the non-federal minerals under federal surface are developed it can arbitrarily apply Fluid Mineral BMPs to the surface used during development even where minerals subject to the Mining Law are being developed. Recommendations: 1) BLM must recognize that the management of private surface overlying federal minerals is exclusive to the surface owner 2) BLM must acknowledge the superior right of private mineral under federal surface and apply surface management practices specific that do not hinder the development rights of the mineral owner 3) Recognize the provisions of 43 CRF 3809.31(d) regarding Stockraising Homestead Act Lands that no Plan of Operations is required for authorization except where there is no landowner consent	3019
1021	1021-15	The SEIS repeatedly comments on Validity Testing of mining claims under the 1872 Mining Law. Wyo-Ben does not disagree with the use of validity tests in the context of mineral patenting as allowed by the Mining Law, but does disagree with the arbitrary and capricious use of such tests for any other purpose. We also strongly oppose delay of mining authorizations and activity while waiting for non-mineral patent related validity examinations. Recommendations: 1) BLM should uniformly apply validity tests in order to determine compliance with the General Mining Law of 1872, and not as a means to enforce unrelated resource management goals such as Special Status Species 2) BLM should not use validity tests to unnecessarily restrict or delay legitimate mineral activity; BLM should state when and where validity testing will be performed and how examinations may affect authorizations 3) BLM should publish validity criterion as means to inform the public and mining community	3020
1021	1021-14	Table 4-9 is confusing, suggesting that Big Game Habitat will close or otherwise restrict locatable mineral development. BLM does not have the discretion to restrict locatable mineral development in big game habitat. The BLM does not have authority to manage game species, as this oversight is reserved for the states. Regardless of authority, Wyo-Ben has and will continue to voluntarily work with BLM and Wyoming Game and Fish regarding crucial wintering habitat. Recommendations: 1) Annotate or clarify Table 4-9 on what "closed" means 2) Recognize the unique right of the states to manage game animals and birds 3) Avoid authoritative management in favor of cooperative management with non- discretionary mining activities where wildlife concerns exist	3049

Table D-1. Individual Comments and BLM Response Index (Continued)

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1021	1021-13	BLM must re-evaluate the socioeconomic impact of the SEIS policies on the Big Horn Basin using realistic models and up-to-date data, including the impact on all natural resource industries operating in the Basin. In doing this, BLM must: a. meet the NEP A threshold for socioeconomic analysis and avoid demotion of socioeconomics relative to wildlife and other resource analyses b. Recognize probabilistic economic outcomes from forced reductions in output as a result of locatable mineral activity restrictions c. Evaluate the national economic significance of the potential loss of a strategically important and unique mineral like bentonite d. Provide a realistic human population, lifestyle, and economic analysis with the effects of each alternative e. Evaluate the socioeconomic effects of delayed permitting due to mineral restrictions and RMP conflicts	3036-1
1021	1021-12	The socioeconomic impact on the Big Horn Basin resulting from the impact of the restrictions described in the SEIS on bentonite mining was ignored on pages 4-134 and 4-135, where only oil and gas (commensurate in size with bentonite) and lesser industries were noted. Because of the dependence of the economy of the Big Horn Basin on natural resource industries and the predominance of federal lands in the Basin, the policies described in the SEIS will have a highly-significant impact on the economy of the area. The economy of Big Horn County is virtually completely reliant on the extractive industries, and bentonite mining is a major contributor to the economies of Washakie and Hot Springs Counties as well. If employment in the bentonite industry is reduced, due to the policies in the SEIS, the communities of Lovell, Greybull, and Basin will face a crisis.	3036-1
1021	1021-11	Mining is also a premium employer with the highest average wages and benefits in the county. Finally, the Wyoming Mining Association estimates that each mining job creates 3 additional jobs, underscoring dependence of as many as 3600 jobs in Big Horn County.	3036-2
1021	1021-10	The Cumulative Impact section does not even list locatable minerals as a line item in its 4-22 and 4-23 charts, and in 4-24 mining is lumped together with Oil and Gas. Moreover, the information is incorrect. Per the Big Horn County Land Use Plan (2009) mining is the single largest employer in Big Horn County with over 900 direct jobs. Since that time, employment has increased	3036-1
1021	1021-9	The SEIS is woefully inadequate in researching the impact to the local economy as a result of the actions required by either Alternative E or F. Any financial burden placed on operators tests the highly-competitive international marketplace at the expense of domestic bentonite production.	3036-1
1021	1021-8	Consider the economic effects from delays and expenses should EIS's replace Environmental Assessments for mining authorization in ACECs	3020
1021	1021-7	3) BLM must develop habitat management solutions that are alternatives to the use of ACEC's, which selectively encumber land uses other than Sage Grouse conservation	3001
1021	1021-6	Acknowledge that only Congress may withdraw large segments of land from mineral location	3020

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1021	1021-5	An Environmental Impact Statement may be required by BLM to meet the NEPA requirements for mining authorization in ACEC's as a result of the avoidable synthetic conflict created by the new designation. Traditionally, much less costly Environmental Assessments have been adequate but for new lines on the map. EIS's do not generate superior results, despite the additional research, time, and expense. Likewise, the artificial creation of widespread ACEC's establishes conflict where none existed previously, favoring conservation over mineral development. Finally, withdrawal is a virtually-irrevocable designation that forever removes a critical mineral resource from society.	3020
1021	1021-4	Both Alternative E and F use ACEC's as a regulatory mechanism for restricting locatable mineral development. At a minimum, Notice Level Activity such as exploration will require a Plan of Operations, which is an additional burden in time and expense without any identified environmental or ecological benefit. The SEIS mentions this impact to bentonite operators, but not the effect or economic burden.	3020
1021	1021-3	Under 4.2.1 Locatable Minerals, Alternatives E utilizes a mineral withdrawal in the form of an ACEC which specifically favors sage grouse conservation over mineral development in 1.75 million acres. This is not consistent with FLPMA's recognition of the importance of mining on the federal estate, nor is it consistent with BLM's multiple use mandate and direction under the Mining and Minerals Policy Act.	3020
1021	1021-2	The State of Wyoming manages game animals and retains the sole authority for that function. BLM's use of the word "habitat" in place of "sage grouse" does not grant authority for game management. Alternative F, in that regard, is at least partially consistent with the State of Wyoming's Core Habitat Plan, but is superfluous in light of the State's existing and exclusive authority for game management. In addition, the BLM already has guidance from other BLM generated manuals and instructional memoranda that would be recognized by the USFWS as meeting their Policy for Evaluating Conservation Efforts (PECE). For example, BLM manual 6840, a manual prepared to guide the conservation of candidate and other special status species, was not referenced in the NTT report and thus not used for conservation recommendations in alternatives E or F (NWMA review of NTT report). Finally, the State of Wyoming has developed an encompassing plan in two related Executive Orders that provide substantial protection to sage grouse habitat in locally developed Core Areas (BHB RMP SEIS Page 3-3). Recommendations: 1) Recognize the State of Wyoming as the sole authority to regulate sage grouse as game animals 2) Eliminate the use of habitat management or habitat conservation as de facto authorization to manage sage grouse	3035_2

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1021	1021-1	43 CFR 3809.420 states: (3) Land-use plans. Consistent with the mining laws, your operations and post-mining land use must comply with the applicable BLM land-use plans and activity plans, and with coastal zone management plans under 16 US. C. 1451, as appropriate. Wyo-Ben rejects any thought process that restrictions contained in a new RMP render locatable mineral development as subordinate to the RMP. On the contrary, BLM is fully-aware of its responsibility to manage land use consistent with the dominant mineral estate, both existing and future. Recommendation: Design the RMP Alternatives to be consistent with locatable mineral development pursuant to direction from the BLM 3809 Handbook (2012), section 5.2.3	3020
1022	1022-19	Recommendation: Strengthen the prescription in the preferred alternative to exclude wind energy development in key habitat areas. Outside key habitat areas, require that wind energy development be sited at least five miles from active sage-grouse leks (Manville 2004; Jones 2012) and at least four miles from the perimeter of sage-grouse winter habitat.	3032
1022	1022-18	Recommendation: While eliminating grazing in key habitat areas would best support sage-grouse conservation and recovery, the selected alternative in the proposed RMP and final EIS should at least adopt management prescriptions included in Alternative F, with additional minimum standards described above, for grazing within and outside key habitat areas. The proposed action should also support voluntary grazing permit retirement in sage-grouse range.	3035_6
1022	1022-15	Management plans should adopt a conservative approach to grazing in sagebrush steppe to maintain and restore native vegetation and reduce impacts on sage-grouse. Management objectives should be based on, in priority order, potential natural community within the applicable Ecological Site Description, Connelly et al. (2000: 977, Table 3), or other objectives that have been demonstrated to be associated with increasing sage-grouse populations. Utilization levels should not exceed 25 percent annually on uplands, meadows, flood plains and riparian habitat (Holecheck et al. 2010; BJ.M & USFS 1994). Habitat objectives should be applied to all sage-grouse habitat areas and plans should include the following three conservation measures: (1) grazing should maintain 2: 18 cm grass height in sage-grouse nesting and brooding-rearing habitat (Connelly et al. 2000; Braun et al. 2005); (2) livestock grazing should be restricted where cheatgrass (Bromus tectorum) occurs in sagebrush steppe to avoid contributing further to its incursion on the landscape (Reisner et al. 2013); and (3) grazing permit retirement should be prioritized in sage-grouse habitat to lessen impacts on the species (see SGNTT 2011: 17).	3017-3
1022	1022-14	Recommendation: The selected alternative in the proposed RMP/ final EIS should make key habitat areas administratively unavailable for new fluid mineral leasing, and adopt prescriptions in Alternative E to direct development of leased mineral estate, except that it should require larger buffers to protect sage-grouse leks outside of key habitat areas.	3023-3

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1022	1022-13	Recommendation: Identify restoration habitat to support habitat connectivity and sage-grouse range expansion in the Bighorn Basin, and adopt standards in Alternative E (Records 20-27, 30) .to maintain and restore sagebrush steppe in the final preferred alternative.	3035-7
1022	1022-12	Recommendation: Map sage-grouse winter habitat in the proposed RMP and final EIS. Prohibit surface disturbance or disruption year-round in winter habitat within and outside key habitat areas in the final preferred alternative.	3035_2
1022	1022-11	Recommendation: The selected alternative in the proposed RMP/ final EIS should adopt recommendations in the NTT report, Alternative E, and other recent findings on sage-grouse by implementing a 4-mile no surface occupancy buffer to protect sage-grouse leks and limiting surface disturbance to one developed site and no more than three percent total disturbance per section.	3035_4
1022	1022-10	It is unclear if the total included on Table 4-9 in the SEIS is acres of key sage-grouse habitat areas in existing or proposed ACECs, or both.	3035_3-2
1022	1022-9	Alternative E would designate greater sage-grouse key habitat areas as an ACEC, totaling 1,857,485 acres, including 1,231,383 acres of BLM surface ownership (SEIS 2-11, Table 2-3; see also SEIS; 4-58, Table 4-9) (although the SEIS also indicates the key habitat areas ACEC is 1,436,941 acres, SEIS: ES-3). In contrast, the DRMP analyzed only 138,172 acres for expanded or new AC ECs that might have benefited sage-grouse, and the preferred alternative only proposes to designate a small portion of this total -16,925 acres- in the final plan (Defenders analysis; DRMP 4-381, Table 4-118). In total, existing and/or proposed ACECs1 in the preferred alternative would specially protect only 23,144 acres of sage-grouse key habitat areas (SEIS 4-58, Table 4-9). Recommendation: Designate sage-grouse key habitat areas as an ACEC in the proposed RMP and final EIS with more protective management prescriptions like those in Alternatives E or F to give sage-grouse the best chance at recovery in the Bighorn Basin.	3035_1
1022	1022-8	Recommendation: Adopt key habitat areas proposed in the preferred alternative and Alternative E, but add missing habitat and connective corridors depicted on the "core areas" map (Version 3) (see SEIS Q-3, Figure Q-1), which would also add more sage-grouse leks to key habitat areas (see DRMP Map 34). Do not allow key habitat areas to be reduced in size over the life of the plan.	3035_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1022	1022-6	By comparison, Alternative E in the SEIS, which strives to protect remaining habitat and limit effects of harmful land uses on sage-grouse, is more likely to support the species' conservation and recovery in the planning area. Alternative E would specially designate key sage-grouse habitat as an ACEC (SEIS 2-11, Table 2-3; SEIS ES-12) and apply stronger restrictions on resource use in key habitat areas (SEIS 4-76), which would result in less surface disturbance in key habitat areas (SEIS 476), less habitat fragmentation and degradation (SEIS ES 4-78), and fewer additional acres invaded by weeds (SEIS ES-7, 4-77) than any other alternative, making it the most beneficial alternative for sage-grouse (SEIS 4-78). The cumulative impacts of land uses on all land ownerships in Management Zones I and II is anticipated to have the least effects on sage-grouse in the Bighorn Basin under Alternative E (SEIS 4-154). federal agencies may supplement and improve analyses and modify management alternatives, including the proposed action (40 C.F.R. § 1503.4(a)). The BLM should modify the preferred alternative in the DRMP to better support sage-grouse conservation and potentially preclude the need to list the species under the ESA. Alternative E can be a model for how to improve conservation measures in the preferred alternative. The following recommendations are based on a comparison between the two alternatives as presented in Table 1, "Sage-Grouse Conservation Issues in the Bighorn Basin Resource Management Plan Revision Project."	3035_1
1022	1022-5	Unfortunately, the preferred alternative in the DRMP is unlikely to prevent further population declines in sage-grouse. The plan concurs that the more habitat conserved, the greater the benefit to species, and that prohibiting surface-disturbing and disruptive activities in sage-grouse habitats is more protective of grouse than "avoiding," let alone permitting, continued development that may harm the species (DRMP 4-221). But the preferred alternative does not specially protect remaining tracts of sagebrush steppe on public land and would permit livestock grazing and a host of energy and non-energy mineral development in key habitat areas to within 0.6 miles of sage-grouse leks (see Table 1). The plan acknowledges that small lek buffers are less effective for conserving sage-grouse than larger buffers (DRMP 4-228). The preferred alternative instead relies on additional restoration and reclamation requirements to conserve sagebrush habitats in development areas (rather than restricting surface-disturbing activities) (DRMP 4-222, 4-246), even though it is difficult to successfully restore xeric sagebrush steppe (DRMP 4-223). Threats to sage-grouse from various land uses and development of public resources under the preferred alternative would generally be the same as current management in the planning area (SEIS 4-155, Table 2b).	3035_1

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1022	1022-3	Finally, we noticed that neither the SEIS (nor the DRMP) considered important new research on sage-grouse and sagebrush steppe. The BLM's National Sage-Grouse Habitat Conservation Strategy (2004) commits the agency to "use the best available science and relevant information to develop conservation efforts for sage-grouse and sagebrush habitats." Planning criteria in the SEIS assures that the BLM will use "appropriate resources ... to identify greater sage-grouse habitat requirements · and best management practices" (SEIS 1-5). We have identified new information in Appendix 1 related to sage-grouse and sagebrush steppe that was published during preparation of the SEIS and should be considered in the proposed RMP/final EIS.	3035_2
1022	1022-1	The BLM produced the SEIS more than two years after releasing the DRMP. We are concerned that new information analyzed in the SEIS to develop Alternatives E and F was not also considered in development of the other four alternatives (Alternatives A-D) in the DRMP. The resultant, bifurcated plan is comprised of a SEIS that incorporates most of the latest research on sage-grouse and a DRMP that is outdated by the voluminous new information produced on sage-grouse since the draft was released in 2011. Alternatives A-D, including the preferred alternative (Alternative D) would be improved by incorporating information in the NTT report, Greater Sage-Grouse Conservation Objectives Team Final Report (COT report), Summary of Science, Activities, Programs, and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse (Centrocerats urophasianus) (aka "Sage-Grouse Baseline Environmental Report") (Manier et al. 2013), and GREATER SAGE-GROUSE: ECOLOGY AND CONSERVATION OF A LANDSCAPE SPECIES AND ITS HABITATS" (aka "greater sage-grouse monograph") (Knick and Connelly 2011).	3035_2
1023	1023-17	The Supplemental Draft RMP/EIS should state that: "The BLM will determine how to apply RMP management direction to split estate lands on a case-by-case basis. The BLM will generally defer to the resolution of surface use issues reached between the surface owner and the operator. "	3019
1023	1023-16	The Supplemental Draft RMP/EIS states that, under Alternatives E and F, the BLM is to:"Incorporate BLM required design features or mitigation for any authorized mineral activity for federal mineral estate, regardless of surface ownership." Supplemental Draft RMP/EIS at 2-16 (emphasis added). This statement is inappropriate, inadequately respects private property rights, and is inconsistent with BLM policy. Under the procedure contemplated in Onshore Order Number 1, an operator must engage in good-faith negotiations with the private surface owner to reach an agreement for the protection of surface resources and reclamation of the disturbed areas. The BLM should respect this process. The Final RMP/EIS should expressly state that surface use issues on private surface will be resolved primarily between the surface owner and the operator and that the BLM will not apply RMP management direction that conflicts with the agreement reached between the surface owner and operator.	3019

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1023	1023-13	But after adopting the State of Wyoming habitat designations, Alternative F abandons the State of Wyoming management direction for those areas. For example, Alternative F adopts management direction to limit the density of disturbance to 3 percent of sagebrush habitat per 640 acres. Sec Supplemental Draft RMP/EIS at 2-17. Under State of Wyoming EO 201I -5, the density disturbance cap is 5 percent rather than 3 percent. The BLM should not deviate from the Wyoming Greater Sage-Grouse Core Area Protection plan in this manner.	3035_4
1023	1023-12	Alternative F of the Supplemental Draft RMP/EIS states that it adopts the habitat designations contained in "Version 3 of the State of Wyoming EO Greater Sage Grouse Core Area of Protection." See Supplemental Draft RMP/EIS at 2-1. As explained above, Denbury supports the adoption of Version 3 of the Wyoming Plan because Version 3 takes into account past management decisions to authorize oil and gas development in certain areas.	3035_1
1023	1023-10	Second, a one million acre ACEC would be incredibly burdensome to manage. For example, the BLM must report annually to the Director on the management of the ACEC. BLM Manual 1613.63. The report must address, among other things, "management measures undertaken and completed during the previous fiscal year .... " Preparing this report alone for an area covering 1,000,000 acres would be incredibly burdensome. And where does it stop? If the BLM designates an ACEC covering priority habitat for Sage Grouse, why would it not designate an ACEC covering priority habitat for other species? Wildlife management should not occur through the ACEC mechanism in this manner.	3001
1023	1023-9	First, ACECs have historically been used for discrete smaller portions of a BLM planning area that are carved out for special or enhanced management. This allows the BLM to manage the ACEC in accordance with BLM policy, which directs the BLM to: "give priority to the designation and protection of ACECs." See BLM Manual 1613.6. How can the BLM give "priority" to an area that covers one third of the planning area?	3001
1023	1023-8	Alternatives E and F of the Supplemental Draft RMP/EIS would designate ACECs for Greater Sage Grouse covering over one million acres. The Greater Sage-Grouse Key Habitat Area ACEC would cover 1,231,383 acres while the Greater Sage-Grouse Core Habitat Area would cover 1,116,124 acres. See, e.g., Supplemental Draft RMP/EIS at 3-6. These ACECs would cover approximately one-third of the 3.3 million acre planning area. Designation of these ACECs would achieve no purpose, would create management difficulties, and sets a bad precedent for future BLM management.	3001
1023	1023-7	1 Similarly, under Exhibit E the BLM must apply an NSO condition of approval to proposals to develop existing leases, subject to limited exceptions. See Supplemental RMP/EIS at 2-30. Such a use restriction violates valid existing oil and gas lease rights and cannot lawfully be imposed.	3023-2

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1023	1023-6	The Final RMP/EIS should expressly state that all sage grouse mitigation will be evaluated on a case-by-case basis prior to being imposed on existing lease development and will only be imposed where consistent with existing lease rights.	3035-7
1023	1023-5	The Final RMP/EIS should recognize and disclose the BLM's limited authority to impose new management direction on proposals to develop existing oil and gas leases.	3023-2
1023	1023-2	When identifying lands for inclusion in Priority Habitat, the BLM should exclude those lands in developed fields with potential for future C02 EOR projects. These are lands that have already been disturbed, but that can produce large volumes of oil from within the existing development footprint. Designating these lands as "Priority Habitat" has a high cost, with little biological reward. The BLM can better meet its multiple use mandates by focusing its conservation efforts elsewhere, while allowing resource development to occur within developed fields. Page 6 of Exhibit 1 is a map of the largest oil producing fields in the BHB. The BLM should exclude the areas in and around these fields from Priority Habitat designation because these fields have high C02EOR potential. At the very least, the BLM should help harmonize its Priority Habitat designations with future potential C02 EOR projects by adopting Version 3 of the State of Wyoming Core Habitat Areas maps (which takes into account certain existing land uses such as oil and gas development).The BLM should exclude areas with future C02 EOR potential from priority habitat designation	3023-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1024	1024-21	The Supplement is a high level planning document that must maintain management flexibility to address multi-use of public lands. Anadarko recommends the Supplement incorporate the concept of and programmatic flexibility to develop enhanced sage-grouse mitigation coupled with expanded use authorizations ("Enhanced Mitigation/Expanded Use Authorizations"). Anadarko encourages the BLM to utilize the concepts provided in the recent draft BLM Regional Mitigation Policy in conjunction with ensuring reasonable access for energy development. See DRAFT-REGIONAL MITIGATION MANUAL SECTION-1794 (IM No. 2013-142).Anadarko strongly encourages the BLM to incorporate in the RMP management objectives and directive that permit development of an Enhanced Mitigation/Expanded Use Authorizations Program. Such a program should be developed in coordination with the State of Wyoming, promote the policy objective in the JM-2013-142, and seek input from stakeholders including industry. Tools that could be utilized in such a program could include: - A biologically-based framework for mitigating impacts associated with a reasonable access mitigation program that includes exceptions to wildlife timing stipulations. - Allowance for the prioritization of potential mitigations sites. IM 2013-142. For example one idea could be to utilize a two-mile buffers within core areas. - Possibly structure mitigatory efforts within two-mile buffers around sage-grouse leks, consistent with the work by Doherty et al. (2010). This possible approach would provide tangible benefits to sagebrush steppe species at a regional landscape level. - Possibly target restoration of habitats within the two-mile buffer around sage-grouse leks. Within these two-mile lek buffers, existing disturbance and fragmentation profiles could be mapped so that reclamation and enhancement efforts can be focused, monitored, and assessed. Consider case-by-case focused habitat improvements within two-mile lek buffers. This mitigation could be exchanged for timing stipulation exceptions granted by the BLM.	3035-7
1024	1024-20	General Comment 4: Definition of Occupied leks s should Be Supported by Data and Analysis The BLM needs to define "occupied lek," a term used throughout the Supplement and Draft RMP, and the process by which leks are deemed unoccupied. In particular, the BLM appears to be applying stipulations (see Map 31 thru 34) to leks where male-grouse have not been observed for many years. Does lek monitoring continue when a lek nears a status of being non-occupied to allow determination of unoccupied status? How and who makes a determination of how a lek is going to be monitored? Recommendation: The BLM should include in the Final RMP a table indicating the status of all PRB leks. Leks that have had no birds in attendance for three years should be considered unoccupied when applying timing stipulations. Anadarko also recommends the BLM include in the Final RMP a map indicating all unoccupied leks. If leks that have had no birds in attendance for multiple years are still treated as occupied, Anadarko recommends the Final RMP include an explanation for that determination.	3035_2

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1024	1024-19	General Comment 4: Definition of Occupied leks s should Be Supported by Data and Analysis The BLM needs to define "occupied lek," a term used throughout the Supplement and Draft RMP, and the process by which leks are deemed unoccupied. In particular, the BLM appears to be applying stipulations (see Map 31 thru 34) to leks where male-grouse have not been observed for many years. Does lek monitoring continue when a lek nears a status of being non-occupied to allow determination of unoccupied status? How and who makes a determination of how a lek is going to be monitored?	3035_2
1024	1024-18	2. Impacts to Sage-Grouse Will Be Reduced During Future Development Due To Technological Changes In How Reservoirs Are Targeted, Wells Are Drilled, And Field Operations Are Conducted. Technological changes over the past ten years have dramatically shifted drilling technology from vertical well bores to directional and horizontal well bores, with the consequence that disturbance and fragmentation levels are declining at the same time that reservoir recovery rates are increasing. This technological shift is reflected in Figure 6 where oil and gas drilling permits issued in the State of Wyoming over the last decade are shown. Figure 6 indicates that horizontal drilling permits have increased 40-fold over the last decade, while directional drilling permits have increased by a factor of eight. On the other hand, vertical well permits and completions have decreased by approximately 50 percent over that same time period.	3035_9
1024	1024-17	In summary, oil and gas impacts to sage-grouse in Wyoming are not uniform across its entire range and depend heavily on the proximity to development. Suggesting oil and gas development has led to wholesale sage-grouse population declines across Wyoming is not supported by the degree of historic development in comparison to the overall sage-grouse range in addition to the best available scientific information. The Supplement provides no basis for the assertion that oil and gas development has caused sage-grouse declines in the BHB planning area.	3035_2
1024	1024-16	When considering impacts and mitigation measures for sage-grouse one method of assessing oil and gas impacts is to look at the development intensity within the two-mile buffer around a Jek, as done by Doherty et al. (2010). Following this methodology, statistical analysis regression models of lek attendance and well density have been developed. Their results indicate a greater than 80 percent probability that leks will persist in the Wyoming Basin when the well count within the two-mile radius around a lek is less than 60 well pads. This corresponds to a spacing density of approximately five well pads per square mile (60 wells/12.4 square miles). Perhaps more importantly, their results indicate that at one well pad per square mile or less (corresponds to as many as 12 wells per the two-mile radius or within 32.2 km2 of a lek) impacts from oil and gas development on sage-grouse are not detectable: "Impacts were indiscernible at 1 -12 wells per 32.2 km2." This result is consistent with the proposed one well-pad per square mile criterion for sage-grouse core areas outlined in the Wyoming Core Area Policy, and provides insight into the nature of localized impacts associated with oil and gas development within a two-mile buffer around a lek.	3035_4

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1024	1024-15	General Comment 3: Oil and Gas Activities Must Be Considered Under the Lens of Today's Technologies in Use and Actual Development 1. Spacing Density through Wyoming's Core-Area Policy Protects Sage-Grouse from Impacts The Supplement suggests a primary threat to sage-grouse is energy development at 3-2, 3-3, 4-l 52, and 4-153 Impacts associate with oil and gas development as presented in the Supplement does not consider the most current and available data. As presented below, peer reviewed literature indicates that 75 percent of all leks (current and historic, active and inactive) in Wyoming are not expected to have discernible impacts from oil and gas activities according to the criterion of less than 12 wells within the two-mile buffer. Moreover, no less that 89 percent of all Wyoming leks are expected to persist given current levels of oil and gas development.	3035_2
1024	1024-14	Anadarko disagrees with the necessity and justification of the BLM to propose sage-grouse conservation measures that go beyond the requirements of Wyoming's Core Area Policy. The BLM should not expand development restrictions to sage-grouse populations outside of core areas. See discussion below in Section !J.D. Given the success of the Core Area Policy, any proposed measures that exceed those within the Core Area Policy are unwarranted and unnecessarily restrict other important uses of public lands, such as oil and gas development.	3035_1
1024	1024-13	General Comment 2: The Wyoming Core Area Policy, Endorsed by the FWS, Is Effective to Conserve Sage-Grouse on a Landscape Scale. Energy development impacts in Wyoming on sage-grouse are, and will continue to be, mitigated by the Wyoming Core Area Policy. The Wyoming Core Area Policy is designed to protect sage-grouse populations and impot1ant habitats on which they depend into the future and provide certainty for the species. Table 3 indicates that 1,508 leks or 64 percent of all leks in Wyoming are afforded protection through the Core Area Policy. Considering the number of lek that had over ten males counted in 2012, 483 (from a total of 626) or 70 percent of the most productive leks were in core areas. There were 741 active leks in core and 272 active leks in non-core. Hence, 73 percent of active leks counted in 2012 were in core areas. A recent analysis of future urbanization and energy development in Wyoming concluded, ''No leks located within core areas are predicted to be extirpated with the core policy in place" (Copeland et at., 2013).	3035_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1024	1024-12	In summary, earlier scientific information based population predictions on a constant rate of decline that in retrospect is flawed. This constancy is represented in Figure 4 above, where the log linear decline curve of negative 3.4 percent as suggested by Garton et al (2011) is employed to project forward populations, hardwiring the population to go to extinction levels in the future. If historical decline rates have not been constant, then future rates of annual decline cannot be based on an assumption of a constant rate of decline over the previous 42year period. Garton et al. (2011) recognized this limitation when they noted "Forecasting future viability requires the assumption that future conditions will continue the same trajectory or trend observed in the past. We reiterated this assumption repeatedly in our presentation of results." The BLM has incorrectly relied on Garton et al. (2011) for modeled future population trends and fashioned mitigation measures to address supposed downward trends. See Supplement at 3-4. With the information presented herein, the BLM should reexamine the necessary mitigation measures based on the updated information on sage-grouse populations.	3035_2
1024	1024-11	Historical Rate of Decline Modeling Is Inaccurate Sage-grouse population modeling data relied upon in the Supplement is inaccurate, raising concerns that the management decisions based on the modeling is overly burdensome and unreasonable given the actual facts. For example the Supplement references USFWS conclusions based on modeled population estimates prepared by Garton et al. (2011) that directly contradict actual data. The Supplement further suggests that sage-grouse are threatened in some areas by wildfire, encroachment of native conifers, overstocking of domestic livestock, and both renewable and non-renewable energy development. See Supplement at 3-3. No data is provided to indicate that these threats -present in some parts of the overall sage-grouse range -are present and to what degree they are present in the BHB planning area. Such generalizations about threats do not meet the "hard look" requirements of NEPA. For example, Figure 3 below indicates fire perimeters in 2012. No significant fires occurred in priority sage grouse habitat in the Wyoming Basin SMZ in 2012. Speculating that fire is a significant threat in the BHB planning area requires more analysis than simply stating it is a threat. A geographical analysis of historical fire perimeters and data suggesting this is increasing in the BHB planning area, juniper encroachment perimeters, renewable energy footprints and other data should be added to the Supplement to support the conclusion therein. Connection of these data to population trends would indicate whether BLM assertions have merit. The BLM should use the most accurate and current data when developing mitigation measures that have significant impacts restricting other uses of public lands.	3035_2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1024	1024-10	Finally, taking historical hunting harvest rates into account, the trends forward from 1995 may represent the best scientifically available data from which to make persistence projections and encompass modern temporal changes in species management that promote more appropriate management of sage-grouse populations. As indicated above on Figure 1 and Figure 2, this more recent data suggest that sage-grouse populations overall are relatively stable to increasing over this time period in the Wyoming Basin SMZ.	3035_2
1024	1024-9	Anadarko comments that the BLM must consider the more recent scientific data as provided herein and not solely rely on Garton's conclusions when making management decisions. Forward looking projections based on this modeling are predicated upon an assumption of constancy and in review of the significant pressures of past overharvest and more recent temporal changes in species management, the ability to project forward population parameters is burdened by an inappropriate analysis that in its current fonn biases the foreseeable future to provide for a negative outcome. The fundamental nature of the modeling exercise and assumptions it is built upon demand caution in its utilization as a tool by which management decisions should be based.	3035_2
1024	1024-8	"An appropriate harvest rate has not been determined for Greater Sage-Grouse populations. Harvest equal to 5-10% of the fall population may be appropriate but assumes detailed and specific knowledge of population size in September or October. Given the uncertainty in abundance estimates for breeding season population, expecting any state to adequately determine the size of any population of Greater Sage-grouse in fall is not realistic ...Thus, harvest management should be based on spring populations size. Managers could propose harvest of a percentage of the spring breeding population estimate, perhaps 5%; devise and implement survey protocols to obtain breeding season population size (Reese and Bowyer 2007); and subsequently be assured that hunter harvest would not likely exceed the threshold to become additive." Recent scientific data, as noted above, suggest that a harvest percentage of "perhaps five percent" of the spring population may be appropriate if state wildlife agencies "devise and implement survey protocols" to "be assured that hunter harvest would not likely exceed the threshold to become additive." This new information sharply contrasts the USFWS 2010 Listing Decision conclusions (which relied heavily on Garton et al. 201 1 data) relied upon in the Supplement at 3-4 to identify future population projections. The Supplement at page 3-4 notes that populations have remained stable over the last decade yet: "Even so, population modeling suggests that declines will continue over the long-term (USFWS (2013)."	3035_2
1024	1024-7	Historical sage-grouse data identified that decline rates correlate with periods of potential overhunting as shown in Figure 2. Unfortunately upon a survey of scientific literature on sage-grouse populations this information appears to have been overlooked and not taken into consideration in projecting future populations. Figure 2 represents the U.S. Fish and Wildlife Services (FWS) hunting harvest data and breeding population estimates as derived from Garton et al. (20 II). Harvest as a percentage of reconstructed population estimates is also shown on the secondary y-axis.	3035_2

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1024	1024-6	1. Reduced Hunting Harvest Rates Correlate with Increasing Sage Grouse Populations Historical sage-grouse populations have been affected by a number of factors, including hunting. A reduction in hunting pressure in the mid-1990s correlates with stable to increasing sage-grouse populations since that time. Figure 1 shows historical population trends within the Wyoming Basin Management Zone (SMZ), which encompasses the BHB. The "rate of population change" fundamentally shifted around 1995 for not only the Wyoming Basin SMZ but also for each of the six additional SMZs that encompass the entire range of the sage-grouse. Of note, hunting regulations also changed in 1995 for some portions of the range, including Wyoming, which limited hunter harvest rates, altered season dates, and lowered overall hunter participation. (see FIGURE 1 in PDF) Wyoming Basin SMZ Population estimates (minimum number of males) (from Garton et al. 2011)	3035_2
1024	1024-5	General Comment 1: The BLM Must Consider Data That Demonstrate Sage-Grouse Populations Are No Longer Declining As Suggested By Earlier Literature. Review of available lek count data and historical hunting harvest rates indicate sage-grouse populations are stabilizing and, in fact, are likely to increase in the future without further restriction on oil and gas activity and development. This is due to a combination of factors Increased costs and reduced access to oil and gas resources result in reduced tax revenue to state and Federal governments. including: (I) the Wyoming Core Area Policy, (2) BMPs used by the oil and gas industry, and (3) changes in the management of hunter harvest rates as implemented since the mid1990s, which are discussed in more detail in General Comments 2 to 5. Studies3 predicting future decreasing population trends are demonstrably flawed and fail to account for historical hunting harvest data. The BLM must recommend land management practices not on past flawed data, but on current more accurate data as presented herein.	3035_2
1024	1024-3	The BLM is obligated to manage lands for multi-use. 43 C.F.R. § 1732(a)-(b). This obligation must be reflected in the Supplement. In balancing multiple uses, the BLM should not require conservation measures that are unsupported by science and that unnecessarily infringe on leaseholder rights. Anadarko requests that the BLM reconsider the sage-grouse measures set out in the Supplement at Appendix G (page G-1), among others, and discussed in more detail in Section II.D below, in light of the scientific information contained in these comments and the practical and economic implications of imposing mitigation measures not supported by scientific data.	3035_2
1024	1024-2	Current scientific information discussed herein establishes that sage-grouse populations in the BHB planning area are not at as great a risk as once considered to be. This updated and crucial information must be incorporated in to the planning decisions and proposed mitigation of the Supplement.	3035_2

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-89	Under EPCA BLM is required to identify impediments to oil and gas development. It was the intent of Congress that access to energy resources be improved as indicated in EPCA and EPAct. BLM recognized the intent of the both Phases I and II of the EPCA review when it issued Instruction Memorandum 2003-233, Integration of the Energy Policy and Conservation Act (EPCA} Inventory Results, into the Land Use Planning Process. Consequently, BLM Field Offices are now required to review all current oil and gas lease stipulations to make sure their intent is clearly stated and that stipulations utilized are the least restrictive necessary to accomplish the desired protection. Moreover, the IM directs that stipulations not necessary to accomplish the desired resource protection be modified or dropped using the planning process. Since the purpose of integrating the EPCA results into planning is intended to determine whether existing resource protection measures are inadequate, adequate or excessive, we recommend that BLM reevaluate its management decisions accordingly and make requisite changes to the final planning documents	3027-1
1025	1025-88	COMMENT: As history has shown, as the technology of any given industry evolves so does the science that creates BMP's. The oil and gas industry developed the concept of BMPs whereby unique, state-of-the-art mitigation measures could be utilized voluntarily by an operator on a project-by-project basis while taking into account cost, feasibility and desired outcomes. BLM has since hijacked this effort, which was initially directed at devising innovative solutions, by attempting to mandate these measures on all projects without the flexibility needed to determine their efficacy and feasibility. The mandatory application of BMPs/RDFs as outlined in the SEIS is a perfect example of this unworkable approach. Appendix L contains design features found in the NTT report that require a myriad of measures aimed at protecting Sage-grouse. However, no documentation is provided showing that any of these RDFs have been proven effective over time. Where is the scientific evidence available that demonstrates these RDFs would result in a reduction of impact to Sage-grouse and its habitat? Similar to the approach taken by the BLM's Washington Office, the NTT is relying upon a one-size-fits-all approach that fails to take into account local conditions, including unique habitat and threats, and socio-economic factors. As such, the NTT BMPs are needlessly restrictive, scientifically unfounded, and ignore specific cause and effect mechanisms. Most egregiously, they were designed without any benefit of tracking and testing of the effectiveness of currently required BMPs and mitigation measures. Moreover, many the NTT BMPs fail to acknowledge that a variety of valid existing rights are held throughout the planning area_ It is crucial for BLM to acknowledge these rights and honor them, regardless of the BMP(s) selected for implementation, and that the Bureau may not have the legal authority to require implementation of these measures unilaterally.	3035_3-1
1025	1025-87	We support BLM's intention to adopt EO 2011-5 with respect to adaptive management strategies. However, monitoring/adaptive management objectives would only be appropriate for large scale projects, e.g., 500 well EIS, not individual wells. It would be impossible to correlate a population decline with a project of one or two wells, even over a 5-year period.	3035-7

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1025	1025-86	APPENDIX T In accordance with the Authority outlined in the Federal Land Policy and Management Act (43 U.S.C. 1701-1782) P.L. 98-450 (98 STAT 2718), the Federal Government (BLM) existing in cooperation between the State of Wyoming Oil and Gas Conservation Commission (WOGCC), entered into a Memorandum of Understanding (MOU) concerning well spacing. Specifically, the MOU provides that "BLM will offer input for state spacing hearings, regarding Federal minerals, and will accept WOGCC spacing decisions with no formal ratification measures." We recommend that BLM specifically address how it intends to comply with this MOU with respect to mineral development and surface disturbance as described in Appendix T.	3023-2
1025	1025-83	The NTT recommends management of produced water through removal or re-injection. COMMENT: 40 CFR 435.50 (Subpart E) provides that produced water from onshore facilities west of the 98th meridian may be used in agriculture or wildlife propagation. There is a considerable lack of surface water in semi-arid Bighorn Basin and beneficial use of surface discharge water by ranchers and wildlife is essential. The suggested management of removing produced waters as suggested by the NTT would result in huge habitat and water resource losses to Sage-grouse. Moreover, the Wyoming Department of Environmental Quality, Water Quality Division, already has jurisdictional oversight of the surface discharge monitoring program on non-tribal lands in Wyoming. Therefore, it would be wholly inappropriate for BLM to attempt to implement this poorly conceived NTT BMP in the Bighorn Basin. It is important for BLM to clarify how the BMPs/RDFs will interface with the specific NSO and CSU requirements outlined in the preferred Alternative D of the RMP/EIS, as well as the NSOs and CSU requirements in Alternatives E and F which are the subject of the Supplement. Moreover, the SEIS does not specify whether all of the RDFs apply to core (priority) habitats only or whether some (or all) apply to both core/priority as well as general Sage-grouse habitat. BLM needs to clarify where it envisions each of these measures would be applied. Additionally, BLM needs to specify whether there will be a process for granting waivers, exceptions or modifications due to site limitations or engineering considerations which establish the design approach as infeasible. The SEIS has failed to incorporate the qualifiers "if feasible, where feasible and unless technically unfeasible" in order to acknowledge that not all measures will have blanket applicability in all cases and that feasibility is a valid concern. Instead, the SEIS mandates measures with no attention given to whether the practice is even feasible based on project-specific factors.	3044
1025	1025-82	The NTT also recommends pest management through a number of pesticide applications. However, mosquitos are already sufficiently managed and there are new technologies other than larvicides that have been proven effective to controlling mosquito populations.	3035_3-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-81	NTT suggests management of a number of structural modifications for water impoundments. COMMENT: Such a program can only be viewed as a needless waste of federal taxpayer dollars because the Wyoming State Engineer's Office (WSEO) already has the legal jurisdiction to review and approve construction plans associated with State waters. Additionally, the NTT recommends management of produced waters through re-injection at facilities through Underground Injection Control (UIC) Permitting which would also constitute a needless duplication of the UIC Permitting Program already under the jurisdiction of the Wyoming Oil and Gas Conservation Commission (WOGCC). Establishing these new federal programs would be a waste of manpower and tax dollars because they would merely attempt to duplicate State programs.	3044
1025	1025-80	"Increase the size of freshwater ponds to accommodate a greater volume of water than is discharged" COMMENT: In an effort to avoid Cx. Tarsalis breeding, this BMP would increase larval habitat for Culicoides sonorensis, a vector of blue tongue disease. The proposal to trade one viral vector habitat for another can hardly be construed as beneficial to the Bighorn Basin. Without question, the mortality impact of Culicoides sonorensis on wild ruminants' populations would be far more devastating than WNv in Wyoming's Bighorn Basin semi-arid region. In fact, not only are food sources such as white-tail and mule deer populations currently under attack in Montana by epizootic hemorrhagic disease virus (EHDV), cattle infections have also been reported resulting in economic loss due to EHDV elsewhere (Ruder, M.G., Parasites and Vectors 201, 5:236). Therefore, these management approaches on produced waters clearly are not in the best interests of the Bighorn Basin mammalian food sources or mammalian related economics.	3023-1
1025	1025-79	The NTT suggests a multitude of BMPs (16) to manage West Nile Virus. COMMENT: According to data from the Centers for Disease Control (CDC) the risk to avian species from West Nile virus (WNv) has declined to virtually nothing since 2003. This is an example of where only a portion of the available information is used to address the impacts, in this case of WNv on Sage-grouse, resulting in onerous and unfounded mitigation requirements. We recommend that rather than focusing on the minimal threat of WNv, BLM more appropriately focus its attention on the highly significant issue of rampant predation of Sage-grouse.	3035_3-1
1025	1025-78	Remove standing and encroaching trees within at least 100 meters of occupied sage grouse leks and other habitats (e.g., nesting, wintering, and brood rearing) to reduce the availability of perch sites for avian predators, as appropriate, and resources permitted. COMMENT: Apparently, the NTI is unaware that trees are actually rare occurrences within the Bighorn Basin. Consequently, we question the advisability of removing a tree simply because a lek exists.	3035_2

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1025	1025-77	Power-washing all vehicles and equipment involved in vegetation treatment and firefighting activities prior to entering the area to minimize the introduction of undesirable and/or invasive plant species. COMMENT: This BMP fails to describe how the wash areas and runoff associated with wash stations will be handled. Can the fluid and associated substances be hauled off, injected or disposed of at a facility onsite and are special permits required? This BMP attempts to address concerns regarding a perceived problem but fails to fully consider the ramifications of such a requirement. What solution does BLM intend to utilize for the general public or recreationalist crossing Public Lands on motorized and non-motorized forms of transportation and how this issue will enforced?	3014
1025	1025-76	Use only close-loop systems for drilling operations. COMMENT: Closed loop systems for drilling operations are utilized in most sensitive areas already where they are technically feasible and economically viable for the operator. We recommend that BLM consider the impact that additional truck traffic hauling fluids out of the area could have on Sage-grouse habitat. It must also be recognized that additional truck traffic may require road upgrade, which could defeat the purpose of the BMP. It may be more reasonable to install Sage-grouse safe fences in the majority of instances.	3035_9
1025	1025-75	Cluster disturbances, operations and liquid gathering facilities outside priority areas. COMMENT: Based on the recent release of IM 2013-152 "Commingling" and existing rules governing "Off Lease Measurement", does the BLM have a plan in place to approve these requests for commingling and off lease measurement of oil and gas for areas where wells may be located within priority areas and the pipelines and treating facilities are located outside priority areas? Due to the limited disturbance and parameters outlined throughout this document, this will likely become an issue for future development within the Sage-grouse habitat and BLM needs to have a plan in place to address these issues.	3035_9
1025	1025-74	It is important for BLM to collaborate with WGFD and to also recognize that as a landowner, the Bureau must also be a contributor to the overall collection of information. Additionally, we recommend that the State maintain a database of information and recommendations for BMP's, additional studies and monitoring activities that are based upon the best available science. Limiting the data repository to one entity that handles information, mapping and recommendations will eliminate confusion for the public, multiple conflicting reports and overall mistrust.	3035-7
1025	1025-73	It is unclear why there is a discrepancy (males and females versus males only) between the two referenced planning documents in their protocols regarding monitoring of Sage-grouse, particularly if Wyoming Game and Fish is responsible for data collection in both cases. If this information is to be used to "identify connections between the overall monitoring program and then management decision process", there should be single set of recommended indicators to detect change in resource conditions range wide. We recommend that Wyoming BLM adopt a strategy that includes the monitoring of females and males rather than just males. Appendix C acknowledges that "state fish and wildlife agencies have the primary responsibility for population level management of wildlife, including population monitoring"	3035-7

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-72	The SEIS does not provide any relevant detail regarding the type of monitoring strategy BLM is contemplating. Nor does it explain how its monitoring strategy will interface with BLM's AIM strategy and how monitoring will be utilized to gauge the effectiveness of RDFs which are the subject of Appendix L (See further comments below). Further, it is not specified what entity will be charged with collecting the monitoring data on oil/gas leases. BLM needs to explain in the SEIS how this data could be used to adaptively feed back into the monitoring process and refine adaptive management needs on a planning area basis. Also, BLM needs to include a discussion on what types of findings, or more specifically, what type of numeric thresholds, might trigger adaptive management.	3035-7
1025	1025-71	Page 4-144: "Projected tax revenues for Alternative F due to oil and gas production on BLM-administered surface would average $35.5 million per year for federal royalties, $17.1 million per year for state severance taxes, and $19.7 million per year for local ad valorem taxes." COMMENT: This is a decrease across the board in tax revenue (federal, state and local). This represents a total reduction of over $5 million in annual royalty and tax revenue. The local tax decrease from Alternative A to Alternative F would be almost $3 million, an impact the Bighorn Basin communities would most certainly notice.	3036-2
1025	1025-70	Alternative F Page 4-143 : "...regional earnings and output under Alternative F for the modeled sectors (oil and gas, grazing, and recreation) would be similar to but slightly less than under Alternative D due to additional NSO restrictions for oil and gas development in greater Sage-grouse Core Habitat Areas. This NSO restriction would reduce estimated oil and gas development when compared to alternatives A and D." COMMENT: Here again is another instance of attempting to downplay the differences between alternatives D and F. Table 4-22 on page 4-139 shows a decrease under Alternative F in regional earnings of $5 million and a decrease in output of $33 million annually. These numbers are significantly less, and cannot be characterized as similar or just slightly less.	3036-1
1025	1025-68	4.8.2.2 Summary of Impacts by Alternative Page 4-137: "Alternative A would result in the second-highest level of economic activity, and alternatives D and F the third-highest." COMMENT: Both alternatives D and F cannot rank third-highest, they should be listed as ranking third and fourth highest respectively. This is another instance of the attempt to align Alternatives D and F as similar and only slightly different, when a review of the BHB SEIS shows there are some significant modifications in the land management which result in significantly different socio-economic impacts .	3036-1

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1025	1025-67	Page 4-137: "As described under Alternative D, Alternative F employs a balanced management approach and would continue BLM's current practice of allowing multiple-uses of public lands, as opposed to a single species management. However, under Alternative F, additional measures related to conservation of resources (particularly in greater Sage-grouse Core Habitat Areas) would place additional emphasis on wildlife habitat concerns over economic development compared to management under alternatives A or D." COMMENT: BLM continually states with regard to Alternative F that it represents a balanced management approach, however, additional measures related to conservation of resources place additional emphasis on wildlife habitat. Many of these additional measures related to conservation of Sage-grouse habitat referenced are scientifically unsupported and inconsistent with EO 2011-5.	3036-1
1025	1025-66	Page 4-137: "Economic opportunities in the Planning Area under Alternative F would be slightly less than under alternatives A and D. Alternative F would also result in greater beneficial effects to air quality, wildlife, and other resources that improve quality of life related to natural characteristics than under alternatives A, C, or D." COMMENT: Yet again, this paragraph illustrates BLM's continued alignment of Alternative F with Alternative D. It states that economic opportunities would be "slightly less" under Alternative F in comparison to Alternative D. However, review of Table 4-21 on page 4-134 of the BHB SEIS reveals that under Alternative F, there would be a decrease in annual earnings due to activities on BLM-administered surface of $4.9 million. This number does not support the statement "slightly less", but rather "significantly less" would be a much better characterization. Further, with regard to the second sentence in this paragraph which states, "Alternative F would also result in greater beneficial effects to air quality, wildlife, and other resources that improve quality of life related to natural characteristics than under alternatives A, C, or D," there is the insinuation that less oil and gas development will result in better air quality, wildlife, and other resources. We would like to point out that responsible oil and gas development will not adversely impact air quality, wildlife or natural characteristics. Oil and gas development in the Bighorn Basin has a very favorable historical record of responsibility for all environmental concerns. It is objectionable that the agency is sacrificing the growth of the Bighorn Basin by relying upon flawed assumptions with no science to back them up.	3036-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-65	Page 4-137: "Alternative F would also result in slightly reduced tax base from oil and gas production compared to alternatives A and D. Geographically, the change in job opportunities-and related impacts on housing and community services-would be spread across the Planning Area and would be spread over time." COMMENT: This statement is erroneous in that the impacts to job opportunities, and the related impacts on housing and community services, would be more immediate and not something that would take place over time. Table 4-25 on page 4-142 shows focal ad valorem production tax revenue from Alternative A to Alternative F will decrease by close to $3 million annually and the decrease from Alternative 0 to Alternative F will be $1.5 million annually. These are large decreases in local tax revenue that would be felt right away by the communities in the Bighorn Basin.	3036-2
1025	1025-64	Page 4-136: "Alternative F may result in a slight decrease in job opportunities compared to Alternatives A and D, potentially causing a slight decrease in population compared to those alternatives. At this time, the impact to individual communities is not known until further research is conducted." COMMENT: Again there is the attempt to align Alternative F with alternatives A and D, when clearly they are different. The social and economic impacts from Alternative F have been shown throughout this section of the BHB SEIS to be more than slight. Also, it is again stated that further research is needed to understand the true impacts, showing the analysis to be incomplete and, therefore, inaccurate.	3036-1
1025	1025-63	Alternative F Page 4-136: "For purposes of this analysis it is assumed that ROW; transportation, and seasonal restrictions would not impact commercial or recreational activities, although the impact is unknown at this time." COMMENT: The BHB SEIS is mainly about the addition of restrictions on disturbance in greater Sage-grouse Core Habitat Areas, which will include ROW, transportation and seasonal restrictions. All parts of this analysis need to take into consideration the impacts these additional restrictions WILL incur. For example, decreasing the allowable disturbance threshold in Sage-grouse Core Habitat Areas from 5% to 3% will cause severe impacts to oil and gas development, which will, in turn, cause severe impacts to the communities of the Bighorn Basin. Failure to fully and adequately review the economic and social impacts that could result from changes in public land management make this analysis seriously flawed, rendering this report incomplete and inaccurate.	3036-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-62	Alternative E Page 4-134: "...impacts on population would be the same as those described under Alternative 8, which would include a decrease of 669 jobs (approximate 46 percent decrease) compared to Alternative A." Impacts on Housing and Community Services, Page 4-135, Line 6: "The exact geographic distribution of these changes is not possible to predict because tax losses in specific jurisdictions would be driven by undetermined well locations; however, the restriction on oil and gas development under Alternative E affect broad areas of land throughout the Planning Area, so the reductions in tax revenues would likely affect all communities that currently produce oil and/or gas." COMMENT: As with Alternative B, Alternative E would adversely affect the economic and social well-being of all communities in the Bighorn Basin. This can be seen in the substantial decrease in jobs (46%) and resulting reduction in tax revenues. The overarching implications of decreases at this level would be detrimental to the area and its culture.	3036-2
1025	1025-61	Page 4-133: Alternative F in the table is listed as having, "Low to medium impact (due to restrictions and requirements for livestock grazing operators in Core Habitat Areas.)" COMMENT: This statement is deliberately misleading. BLM knows full well that the additional restrictions and requirements in Core Habitat Areas imposed by Alternative F would also be impactful to oil and gas activities, and as stated above, oil and gas development is the largest contributor to the social and economic well-being of the communities of the BHB.	3036-1
1025	1025-60	Page 4-132: "Alternatives D and F balance management emphasis between resource conservation and resource use, but are generally closer in line with resource use and development. Alternative F imposes additional constraints on disturbance in greater Sage-grouse Core Habitat Areas when compared to Alternative D. Based on analysis in the Economic Conditions section, these additional constraints would restrict further economic activity in the oil and gas sector when compared to Alternative D. Impacts of Alternative F on population and public services associated with impacts on economic activity would be slightly more restrictive than those of Alternative D." COMMENT: This paragraph claims that "impacts on economic activity would be slightly more restrictive than those of Alternative D." However, a review of Table 4-20 on page 4-133, lists the impacts from Alternative D as being low, whereas impacts from Alternative F are listed as low to medium. If the statement above were truly the case, Alternative F would be listed as having low impact. Of note is the fact that alternatives B and E, the alternatives that would pose the greatest impact to the social conditions in the Bighorn Basin, with the highest reductions in oil and gas workforce numbers and tax benefits, are both listed as having medium impact. No matter which way you look at it, any additional restrictions to oil and gas development, the largest contributor to the social and economic well-being of the BHB, would have adverse effects on the BHB communities. We again point out that Alternative F would impose additional constraints that are both largely unsupported by science and inconsistent with the Governor's Sage-grouse Executive Order 2011-5.	3036-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-59	Section 4.8.1.2 Summary of Impacts by Alternative Page 4-131: "Social conditions are fundamentally influenced by economic conditions. Employment and income improve or detract from social conditions and quality of life; communities in the Planning Area have developed cultures associated with economic activities such as natural resource extraction, ranching and recreation. Given the large portions of public land within the counties of the Planning Area, BLM management decisions have the potential to influence the community character and identity, even if the economic impact is measured by this analysis is minimal. " COMMENT: We agree that BLM management decisions, as well as employment and income, have significant influence on the quality of life and social conditions of the Bighorn Basin communities. These areas area is dependent on high paying oil and gas jobs in addition to the tax revenue realized from oil and gas exploration and production activities. The addition of more restrictive policies for oil and gas development, as described in alternatives E and F, will seriously limit economic development and job creation in the planning area, detracting from the social conditions and quality of life in these communities.	3036-2
1025	1025-58	Our previous comments to the Bighorn Basin DEIS/RMP dated September 7, 2011 regarding socio-economics remain the same and by this reference are incorporated herein. We would like to further add the following with regard to the Bighorn Basin Supplemental EIS (BHB SEIS) and alternatives E and F. BLM has failed to adequately disclose the importance of oil and gas resources in the Bighorn Basin.	3036-2
1025	1025-57	The publication of Samson et al (2004) does not address sagebrush ecosystems in Sage-Grouse MZI. This paper addresses prairie grasslands in the Great Plains, which represents a much larger area. Samson et al (2004) also does not differentiate between prairie grasslands and sagebrush steppe. Therefore, it is unsuitable as a reference. We recommend that final RMP/EIS present information (including a map) on the amount of sagebrush habitat that has been converted to agricultural uses within the Bighorn Basin planning area specifically. The SEIS does not specify whether all of the RDFs apply to core (priority) habitats only or whether some (or all) apply to both core/priority and general Sage-grouse habitat. BLM needs to clarify where each of these measures is envisioned to be applied and identify whether, consistent with the Lander Proposed RMP/EIS and EO 2011-5, 5 Taylor, Dzialak and Hayden-Wing, Greater Sage-grouse Populations and Energy Development in Wyoming, 2007; Greater Sage-grouse Populations and Energy Development In Wyoming-2010 Update Taylor, Russell and Taylor 2011 there will be a process to consider exceptions due to site limitations or engineering considerations which establish the design approach as infeasible.	3035_2
1025	1025-56	We recommend that BLM fully consider the results of the studies conducted by Ramey et al {2011) and Taylor et al (2007) in addressing the effects of oil and gas development on Sage-grouse and Sage-grouse habitat. In addition, most of the recorded effects on Sage-grouse populations have been based on lek counts. These studies indicate that oil and gas activities have reduced lek counts in the vicinity of oil and gas developments but have not shown that population losses have occurred.	3035_2

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-55	Alternatives E and F in the SEIS do not directly address Sage-grouse winter concentration areas/habitat since these Alternatives are focused on management within Sage-grouse CHA and KHA ACECs. However, Alternatives B and D in the BHB Draft RMP provide stipulations that apply within Sage-grouse winter concentration areas under Alternatives E and F, respectively.	3035_2
1025	1025-54	It is important for BLM to limit the application of this TLS to "suitable" Sage-grouse habitat. EO 2011-5 specifies that activities in nesting and early brood rearing habitat may be approved year round on a case-by-case basis in "unsuitable habitat." Seasonally restricting oil and gas operations to protect unsuitable Sagegrouse habitat is entirely unjustified. As such, we recommend that BLM place the same qualifier, "suitable habitat," on this TLS as outlined in Record 77. The prohibitions on surface disturbing/disruptive activities in nesting and early brood-rearing habitat are unwarranted. While there may be some discrepancy in nesting/brood-rearing seasons due to elevation, geography, etc., the overall length of the season will be consistent regardless of location. For example, Sagegrouse in lower elevations tend to start mating approximately two weeks earlier than Sage-grouse at higher elevations; but, the overall length of the mating season remains the same. We are not opposed to starting or ending this TLS on different dates to account for geographic differences in Sage-grouse behavior. However, we oppose arbitrarily extending a TLS for nesting/early-brood rearing habitat by 2 Y. months because it is not biologically justified. We point out that the SGIT has determined that a 3 Y. month TLS for nesting/early-brood rearing is adequate throughout Wyoming.	3035_9

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-53	Sage-grouse habitat management for activities outside of Core Populations Areas is straight forward under EO 2011-5 -a maximum Y.-mile NSO and 2-mile seasonal buffer applied to occupied leks. It does not mandate the application of any stipulations outside of Core Areas. Additionally, EO 2011-5 provides that incentives to enable development of all types outside Core Areas should be established, including stipulation waivers or modifications, even if it results in reduced numbers of Sage-grouse outside of Core Areas. We are concerned that management outside of KHAs under Alternatives B and E is inconsistent with and greatly exceeds what is provided for under EO 2011-5. Specifically, the 0.6 mile NSO around occupied Sage-grouse leks, CSU for discretionary actions, ROW exclusion areas around leks, and TLS in nesting and early brood rearing habitat within 3-mile lek buffer were not contemplated by EO 2011-5 because such stipulations directly contradict the foundational principal of the Sage-grouse Core/Key Habitat Area concept -control and restrict operations within these areas to protect important Sage-grouse habitat, while promoting and incentivizing development in less desirable Sage-grouse habitat outside these areas. EO 2011-5 recognizes this principal by providing incentives to enable development outside of Core Areas. The overly restrictive Sage-grouse habitat stipulations outside of Key Habitat Areas as proposed under Alternatives Band E conflict with this principal. Therefore, rather than adopting any variation of these management options, we urge BLM to adopt the Core Area Strategy contained in EO 2011-5 in the final planning documents because it represents the most scientifically valid approach to protecting important Sage-grouse populations and habitats.	3035_1
1025	1025-52	Neither the NTT nor the SEIS specify what activities will be included in the surface disturbance calculation. Properly managed livestock grazing on federal land has been shown to have beneficial impacts on the surface. This positive impact of livestock grazing has been acknowledged by BLM and the Wyoming Governor's Office. As such, it is not appropriate to consider livestock grazing as a disturbance that will count against the surface disturbance cap. Additionally, the surface disturbance cap is focused specifically on limiting surface impacts created by oil and gas operations. Therefore, the only surface disturbance that should be included in the disturbance cap calculation is that caused by oil and gas development.	3017-1
1025	1025-51	We recommend that BLM specify what mitigation and/or reclamation efforts will be considered, the process for determining what efforts will be considered, and how an operator will receive credit for restored habitat and offset mitigation. This will provide operators with certainty and an incentive for pursuing such projects. We also suggest BLM expand this exception to include reclamation of Sage-grouse habitat in addition to mitigation; reclaimed Sage-grouse habitat has been returned to its previous condition and thus should not be counted as disturbed in the surface disturbance calculation.	3035-7
1025	1025-50	Another discrepancy between Alternatives E and F and EO 2011-5 is the extent of the surface disturbance cap. Alternatives E and F propose a 3% cap while EO 2011-5 (and Alternative D) provides for a 5% cap on surface disturbance.	3035_4

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1025	1025-49	We recommend that BLM modify Alternatives D, E and F to comport with EO 2011-5. EO 2011-5 went through careful deliberations to ensure that a practical and scientific basis was utilized when identifying appropriate Sage-grouse protection measures. Using language such as "sage brush habitat" or "total Sage-grouse habitat" is unacceptably broad because it fails to focus on the real purpose of the surface disturbance cap, which is to protect the Sage-grouse. We urge BLM to acknowledge in the planning documents that not all sage brush habitat is Sage-grouse habitat and not all Sage-grouse habitat is suitable Sage-grouse habitat. To achieve protection of the Sage-grouse and its habitat, the surface disturbance cap need only apply to "suitable Sage-grouse habitat." As provided for in EO 2011-5, it is crucial for BLM to eliminate unsuitable Sage-grouse habitat from consideration when calculating the surface disturbance cap.	3035_1
1025	1025-48	The SEIS states that Key Habitat Areas outlined in Alternative E were based upon Version 2 of EO 2011-5 while the Core Habitat Areas described in Alternative F were based upon Version 3 of EO 2011-5. It is unclear why BLM would base one of the two new alternatives upon an outdated version of EO 2011-5 when Version 3 was available during the supplemental planning process. Further, we oppose the expansion of BLM's Key Habitat under Alternative E which encompasses nearly 72,000 additional acres because there is no scientific justification for this arbitrary expansion of habitat. Moreover, an ACEC designation coupled with a 3 percent disturbance cap would effectively prohibit any new oil and gas exploration and development within the highly important Bighorn Basin. We encourage BLM's adoption of the Version 3 Core Area provided in EO 2011-5 in the final planning documents, including the 5 percent disturbance cap.	3035_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-47	It is clearly inappropriate for BLM to dictate a specific technique for conducting geophysical operations. While heliportable drilling for seismic operations can be a useful BMP in certain, limited situations, there are abundant and equally effective BMPs that allow for the same or similar impact mitigation in Sage-grouse habitats which the SEIS fails to even mention, much less analyze. The following is an abbreviated BMP list that is recommended and applied by both BLM and the geophysical industry. These techniques have proven to be highly effective in minimizing or in many cases eliminating impacts to sage brush/Sage-grouse: Off-set tracking for all wheeled vehicles; Smooth or non-aggressive tires (vibrators); Limited or no "back-tracking" on the same route(s); Elimination of ATVs/OHVs off-road; Vibrating on existing roads; On-snow or frozen ground buggy drilling/vibrating; Hand raking of buggy/vibrator tracks visible from traveled roads. Application of a reasonable mix of the above techniques has been shown to successfully avoid impacts to sage brush. Extensive monitoring has shown that balloon tired four wheelers and foot traffic have very diffuse impacts, indeed much less effect on the environment than cattle grazing and wild horse traffic on public lands. Moreover, we question whether BLM has fully considered the safety, noise or economic ramifications of this proposal We also question BLM's justification for requiring helicopter-portable seismic exploration when seasonal restrictions will be utilized. BLM needs to clearly explain in the SEIS what is meant by "other restrictions that may apply." A mere statement that other restrictions may be imposed is far from adequate because it fails to meet the disclosure requirements under the National Environmental Policy Act (NEPA) and precludes the opportunity for public review and comment.	3039-2
1025	1025-46	Attempting to limit collection and use of scientific information would have no practical effect on mitigation of Sage-grouse impacts. We remind BLM that geophysical data and its interpretation do not stop at an arbitrary line on a map. Any attempt limit its interpretation would compromise the usefulness of the data on both sides of that boundary definition. This proposed wording and concept is totally unacceptable and beyond the BLM's authority to regulate and must be dropped in its entirety.	3023-4
1025	1025-45	This wording is dangerously confusing because it could be interpreted to prohibit the use and interpretation of geophysical information for areas within Sage-grouse core areas, which would be inconsistent with valid existing lease rights for oil and gas leases.	3023-4
1025	1025-44	The SEIS fails to discuss the application of both BLM and industry recommended BMPs and their effectiveness or the abundant independent monitoring of such BMPs in sagebrush ecosystems. It also fails to analyze less stringent mitigation to Sage-grouse population and habitat goals. Finally, such a restriction could abrogate valid existing lease rights granted because prohibiting geophysical exploration would be a major "taking" of lease rights.	3023-4

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1025	1025-43	Closure of these vast and substantial key Sage-grouse habitats to geophysical exploration is not a stated objective of the IM 2012-044 or the U.S. Fish and Wildlife Service (FWS) "Conservation Objectives: Final Report." Moreover, we found no language in any of these documents that recommends the wide-ranging requirement to disallow use of geophysical information either in or outside Sage-grouse habitat.	3023-4
1025	1025-42	RECORD 85 - Where the federal government owns the surface, and the mineral estate is in non-federal ownership in priority habitat, apply appropriate Fluid Mineral BMPs to surface development.COMMENT: In addition to the concern expressed regarding the previous record, we are concerned that in taking this action, the federal government be denying a mineral owner the ability to develop his minerals. Case law has already established that the mineral estate is dominant over the surface estate. It is agreed that, in the case of separate ownership of minerals and surface, the mineral owner may enter and use that part of the surface that is reasonably necessary for the efficient removal of the minerals. Further, such use does not require any payment for damages caused to the surface by the mineral owner so long as the use is reasonable.	3019
1025	1025-41	RECORD 84 -Where the federal government owns the mineral estate and the surface is in non-federal ownership, apply the conservation measures applied on public lands. COMMENT: The imposition of the identified conservation measures on federal minerals/private surface demonstrates DOI's intention to limit at all costs future oil and gas activities within the planning area, and indeed the entire Rocky Mountain region, while all other uses on private surface will proceed as the surface owner sees fit. We strongly object to this approach because it is predicated upon the scientifically flawed assumptions promoted by the NTT as discussed previously in these comments.	3023-2
1025	1025-40	RECORD 83 -Any oil, gas, geothermal activity will be reviewed based on evolving scientific knowledge of impacts. COMMENT: BLM can review any activity it wishes, but the agency must still honor valid existing rights as previously discussed in these comments. It does not have the authority to modify the lease agreement simply because new science may evolve.	3019
1025	1025-39	RECORD 80 -Consider offers to amend, cancel or buy out leases. RECORD 81 -Include conditions that require relinquishment of leases/authorizations if doing so will mitigate the impact of a proposed development or mitigate the unanticipated impacts of an approved development. COMMENT: We point out that while BLM may have the authority to approve offers to buy out a lease, the ultimate decision rests with the lessee rather than agency. Moreover, any attempt by BLM to amend, cancel, buy out or force relinquishment of a lease would constitute a breach of the federal lease contract and would found by any court to be an illegal "taking" and the lessee would be due just compensation. Valid existing rights must be honored regardless of any new mitigation measures that would exceed the terms of the lease. Additionally, what is meant by an "unanticipated impact?"	3023-2

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-38	RECORD79 Limit proposed surface disturbance to 3 percent for an area when permitting APDs on existing leases that are not yet developed. Consider an exception if additional mitigation is demonstrated to offset the resulting loss of Sage-grouse habitat. Implement additional mitigation when necessary in priority sage-grouse habitat. Implement additional mitigation first within the same population area where the impact is realized, and if not possible, then conduct mitigation within the same Management Zone as the impact, per 2006 WAFWA Strategy (page 2 17). COMMENT: See our previous comments regarding our opposition to the imposition of a 3 percent disturbance cap and the adoption of a Sage-grouse ACEC. Once again, we support the language in EO 2011-5, which provides that existing activities in areas already disturbed or approved for development within Core Areas prior to August 1, 2008 will not be made subject to new Sage-grouse stipulations. Existing activities in areas already disturbed or approved for developments include those within a defined project boundary such as: a recognized federal oil and gas unit, drilling and spacing unit, mine plan, subdivision plat, etc. Under EO 2011-5, they would be allowed to continue within the existing boundary, even if the use exceeds recommended stipulations recognizing that all applicable federal actions shall be allowed to continue. Additionally, we question BLM's authority to impose mitigation measures that a inconsistent with the rights granted under the lease.	3035_4
1025	1025-37	RECORD 78 -Complete Master Development Plans in lieu of APD-by-APD processing for all but wildcat wells. COMMENT: Such a provision is poorly reasoned and is particularly inappropriate for use in the Bighorn Basin. While master development plans (MDP) may be acceptable and beneficial in areas where new drilling takes place year round or where there is long term development planned, BLM has failed to consider the greater likelihood of periodic drilling or drilling within existing Federal Units on a well-by-well basis within the Bighorn Basin. Currently, the operator of a federal unit is required to submit a Plan of Development and a Review of Operations on a yearly basis. BLM needs to recognize that most Bighorn Basin operators drill only on occasion, rather than continuously. Very few, if any, are solely exploration companies. Therefore, we recommend BLM eliminate the requirement for an MDP within the Bighorn Basin.	3023-6
1025	1025-36	RECORD 71 -Apply a TLS condition of approval to prohibit surface-disturbing exploratory drilling activities during the nesting and early brood-rearing season in priority Sage-grouse habitat. COMMENT: First, this record fails to establish what timeframes BLM is considering. Second, BLM does not have the authority to impose a TLS COA on existing leases if the COA would exceed the terms of the lease. While BLM may believe the Yates decision gave it the authority to apply new restrictions at will, that belief is false. The case simply upheld the application of a COA based upon a site-specific circumstance. The decision did not give BLM authority to impose any COA it wishes on any lease. (See Yates, 176 IBLA at 157; William P. Maycock, 177 IBLA 1, 16-17 (2009). Case law has clearly established that once the BLM has issued an oil and gas lease that grants the right to access and develop, BLM has no authority to modify the terms of the lease in such a manner that would abrogate the lease rights granted.	3023-2

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1025	1025-35	RECORD 76-Apply an NSO condition of approval within 0.6 mile ofoccupied or undetermined Sage-grouse leks. Apply TLS condition of approval to restrict disruptive activity within 0.6 mile of occupied or undetermined Sagegrouse leks from March 15 to June 30. COMMENT: Each oil and gas lease contains lease covenants made by the lessee, which can be express or implied. Implied covenants are unwritten promises that impose duties on the lessee and protect the lessor. The courts generally recognize implied covenants such as the right to produce and market, protect from drainage, to reasonably develop, further explore, to operate prudently and properly, and to explore based on economic justification. BLM has no legal authority to impose mitigation measures, such as an NSO Condition of Approval (COA) if it would exceed the terms and conditions of previously issued lease. The BLM must acknowledge that it has no authority to abrogate the valid existing lease rights. We strongly recommend that BLM eliminate this record from the final planning documents. The surface occupancy stipulations proposed under Alternative E, including the 4-mile NSO around a lek, are entirely unreasonable because there is no scientific rationale to support such extreme measures. The 0.6 mile NSO around the perimeter of occupied Sage-grouse leks within KHAs provided under EO 2011-5 is adequate to protect Sage-grouse habitat. Increasing the size of a lek buffer by almost 700% is excessive and wholly unjustified. Placing a 4-mile NSO around all leks would unreasonably preclude development on thousands of acres of unsuitable Sage-grouse habitat. We recommend a more focused NSO of 0.6 miles that allows for a case-by-case analysis and determination of where development is feasible after consideration of habitat suitability and other site specific conditions. We strongly urge BLM to remove the Sage-grouse surface disturbance stipulations provided for in Alternative E from consideration for inclusion in the final planning document. In so doing, BLM would prevent undue restriction of surface use while ensuring consistent management of Sage-grouse habitat throughout Wyoming and clearly illustrate that the State of Wyoming and the BLM are dedicated to protecting and preserving Sage-grouse habitat to prevent a listing of the species under the Endangered Species Act. The 4.0-mile NSO under Alternative E and the 0.6 mile NSO under Alternative F refer to placing limitations on "surface disturbance" and "disruptive activity" respectively. This is in addition to precluding "surface occupancy" within these lek buffers. Since it is possible to have surface disturbing activities without actually occupying the surface (e.g. buried pipelines, buried power lines), this is a notable discrepancy between the SEIS and EO 2011-5 because it will unduly restrict potential surface uses in these areas. While EO 2011-5 prohibits "surface occupancy," it does not prohibit "surface disturbing activities;" rather it allows for authorization of "other activities" if protected resources are not adversely affected. It provides that for activities outside of Core Population Areas, no more than a .25 mile no surface occupancy standard will be applied to occupied leks. The BLM's proposed 0.6 mile COA directly conflicts with the 0.25 mile buffer provided for by the State for leks outside core areas, which allows much needed flexibility in the application of this stipulation and potential land use. We urge BLM to remove "surface disturbance" and "disruptive activity" from these stipulations to achieve consistency with the State.	3035_1

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1025	1025-34	RECORD 75 -Implement management actions regarding unitization and requirements for full reclamation bonds through implementation decisions (e.g., approval of an APD, Sundry Notice, etc.) and upon completion of the environmental record of review {43 CFR 3162.5}, including appropriate documentation of compliance with NEPA. Evaluate, among other things: Whether the conservation measure is "reasonable" {43 CFR 3101.1-2} with the valid existing rights. Whether the action is in conformance with the approved RMP COMMENT: See comments on Records 72 and 73.	3023-2
1025	1025-33	RECORD 73 -Require a full reclamation bond specific to the site in accordance with 43 CFR 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM or USFS will perform the work. COMMENT: Current bonding requirements already fully address reclamation in accordance with current regulation; therefore this proposal is excessive and unjustified. If an operator is in good standing and has a Statewide/Nationwide bond in place, there is no need to require any additional bonding. Moreover, this is inconsistent with IM 2013-151 which prohibits automatic bond increases without conducting a site-specific review that demonstrates an operator has failed to conduct all operations in a prudent manner and has a definitive history of serous noncompliance. We are concerned that BLM is attempting to unilaterally modify existing regulations without going through the rulemaking process to achieve the changes proposed in the SEIS. We strongly recommend that BLM eliminate this flawed proposal from the planning documents. We ask BLM to explain its plans for granting roll-over credits. Is BLM willing to give credit for interim reclamation efforts toward the total disturbance cap allowance? For example, as outlined in the EO 2011-5, reclamation credit is to be given for completion of habitat enhancements once a bond is released. These habitat enhancements may be used as credit for reclamation that is slow to establish in order to maintain the disturbance cap or to improve nearby Sage-grouse habitat.	3023-2

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1025	1025-32	RECORD 72 -Require unitization when deemed necessary for proper development and operation of an area or to facilitate more orderly (e.g., phased and/or clustered) development as a means of minimizing adverse impacts to resources, including greater Sage-grouse, so long as the unitization plan adequately protects the rights of all parties including the United States, according to the Federal Lease Form, 3100-11, Sections 4 and 6. COMMENT: This Record misinterprets the legal purpose of unitization as established by law as well as BLM's legal authority to require unitization. According to BLM's own draft Handbook on Unitization and findings by the Interior Board of Land Appeals, the principal purpose of establishing a unit is to facilitate exploration in undeveloped areas and to maximize the production of oil and gas and revenue for the federal government. Units are not established for the protection of resources but are based on economics and reservoir engineering designed to provide technical benefits to all unit participants. Moreover, significant surface acreage and mineral estate within the Bighorn Basin are held privately; and, BLM has no authority to require non-federal lessee and mineral owners to enter into federal units. Furthermore, EO 2011-5 provides that existing land uses within Core Population Areas will be recognized and respected prior to August 1, 2008, which directs that oil and gas activities will not be managed under Core Area stipulations.	3023-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-31	RECORD 71 -Apply an NSO stipulation within 0.6 mile of occupied or undetermined Sage-grouse leks {Map SEIS15). Apply a minimum lease size of 640 contiguous acres of federal mineral estate within sage-grouse Core Habitat Areas. â€¢ Lease smaller parcels only when 640 contiguous acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations, and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. Apply a TLS to restrict disruptive activity within 0.6 mile of occupied or undetermined sage-grouse leks from March 15 to June 30. COMMENT: It is unclear why BLM intends to utilize both an NSO and a timing stipulation within 0.6 miles of a lek. EO 2011-5 requires an NSO stipulation with 0.6 miles of a lek and a 4-mile TLS around a lek. It is confusing, however, why BLM would need a TLS if surface activities are already precluded through the imposition of an NSO stipulation within 0.6 miles of a lek. Leasing is allowed within Sage-grouse Core Area Habitat subject to Sage-grouse stipulations and the DDCT/ PIAA process established under EO 2011-5. Rather than making vast acreage administratively unavailable to oil and gas development through NSO lease restrictions, EO 2011-5 scrutinizes oil and gas development within Sage-grouse Core Populations Areas at the permitting stage and applies carefully reasoned Sage-grouse mitigation to such operations. The fluid mineral leasing restrictions proposed under Alternatives E and F are unnecessary and excessive. We recommend that BLM utilize the direction contained in EO 2011-5. Additionally, the proposal to make lands within the Sage-grouse KHA ACEC administratively unavailable for mineral leasing under Alternatives B and E is unwarranted and conflicts with BLM's multiple use mandate. There are circumstances under which leasing and development within these areas can occur without resulting in a negative impact to Sage-grouse habitat as discussed in EO 2011-5. While Sage-grouse Priority Habitat Areas (KHA and CHA) contain important Sage-grouse habitat, these areas also contain vast acreage of "unsuitable" habitat. It is of vital importance for unsuitable habitat to be identified in both a seasonal and landscape context, on a case-by-case basis, outside the 0.6 mile buffer around leks. This will provide proponents an incentive to locate projects in unsuitable habitat in order to avoid creating additional disturbance acres. At a minimum, BLM should make lands within Sage-grouse habitat available for possible leasing even if it is on a case-by-case basis. Moreover, developed acreage in unsuitable habitat must not be included in calculated disturbance acres as provided in EO 2011-5. Ongoing oil and gas operations within KHA boundaries in Wyoming must be allowed to continue subject to reasonable mitigation measures to protect the Sage-grouse. As such, we recommend that BLM adopt an oil and gas leasing policy consistent with EO 2011-5. Lastly, what is an undetermined lek? BLM must be able to determine whether or not a lek exists. Protecting undetermined leks is irresponsible and not scientifically valid. Unless the Game and Fish Department has identified an occupied lek in its annual report, there is no lek to protect. This comment applies to all subsequent references to undetermined leks in the SEIS .	3035_1

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-30	RECORD 62 - Consider closing designated roads in Sage-grouse priority habitat. COMMENT: Once again, BLM must recognize valid existing rights of lease holders and operators when considering new road closures. It is crucial for operators to have access to their well locations to perform routine maintenance and other production activities. Furthermore, prior to closing any existing roads in Sage grouse habitat, it is crucial for BLM to actually analyze whether the road in question is having a significant effect on the current Sage-grouse population in the vicinity. It may be found that there is no scientifically valid need to close a road, which would deny public access to public lands. BLM's proposed road closure proposal unnecessarily deviates from EO 2011-5 which states that areas already disturbed or approved for development in Core Areas prior to August 1, 2008 are not subject to new Sage-grouse restrictions. We recommend that BLM management remain consistent with EO 2011-5.	3039-1
1025	1025-29	RECORD 58 -Use existing roads or realignments in greater Sage-grouse priority habitat to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3 percent for that area, then evaluate and implement additional, effective mitigation necessary to offset the resulting loss of sage-grouse habitat. COMMENT: The 3 percent threshold cap must be changed to comport with the EO 2011-5 requirement of 5 percent. Also, before requiring additional mitigation, BLM must first ascertain what specific impacts new road construction may have on nearby leks to determine whether they are significant enough to warrant additional mitigation. The blanket assumption that impacts would be severe has not been scientifically or site-specifically confirmed.	3039-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-28	RECORD 52 -Locate new primary and secondary roads greater than 1.9 miles from the perimeter of occupied Sage-grouse leks inside core areas. Additionally, for new proposals, consider and evaluate an alternative that would locate new tertiary roads greater than 0.6 mile from the perimeter of occupied leks. COMMENT: The standard contained in EO 2011-5 for road construction and use within Sage-grouse Core Habitat Areas has already been adopted by the USFWS and applied by BLM Wyoming. The restrictions proposed under Alternatives E and Fare excessive, particularly where they would prohibit new road construction within 4 miles of active Sage-grouse leks and new road construction in occupied Sage-grouse habitat as proposed under Alternative E. This 4-mile protective buffer around leks is over two times the 1.9 mile buffer provided under EO 2011-5 for road construction. This buffer has not been scientifically documented as necessary. Precluding road construction in "occupied Sage-grouse habitat" and closing designated roads in Sage-grouse priority habitat also exceed the provisions of EO 2011-5. We also point out that a precise definition of "occupied" is not included in the SEIS. Moreover, application of these restrictions in sage-brush habitat that is used only seasonally or intermittently is not warranted. We recommend that BLM retain its use of the parameters established in EO 2011-5. We also recommend that BLM evaluate new road construction and its use in Sage-grouse habitat on a case-by-case basis assessing habitat suitability, Sage-grouse presence, and need. Further, we recommend that the SEIS clearly explain the significant difference between the requirement of 1.9 miles for a primary and secondary road and the 0.6 mile for a tertiary road and explain how each was derived. It also needs to clarify the widths of the roads as well as the uses that classify them as primary, secondary and tertiary. We also recommend that BLM adopt the guidance contained in EO 2011-5, which states that main roads shall be located for transporting production and/or waste products greater than 1.9 miles from the perimeter of occupied Sage-grouse leks. For example, other roads are to be located to provide facility site access and maintenance greater than 0.6 miles from the perimeter of occupied Sage-grouse leks.	3039-1
1025	1025-27	RECORD 23 -Require use of native seeds for restoration based on availability, adaptation (ecological site potential}, and probability of success. Where probability of success or adapted seed availability is low, nonnative seeds may be used as long as they support Sage-grouse habitat objectives. COMMENT: We appreciate that BLM has acknowledged that some native seeds may be unavailable at times. However, we recommend that BLM provide a general description of what would constitute acceptable alternative seed mixes in the SEIS.	3035-7

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-26	RECORD 21 -Include Sage-grouse habitat parameters as defined by Connelly et at. (2000}, Hagen eta/. (2007), or if available, State Sage-Grouse Conservation Plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within priority Sage-grouse habitat areas the highest restoration priority. COMMENT: This record is somewhat confusing because it fails to specifically acknowledge EO 2011-5, which already provides BLM with the habitat parameters required for the protection of the Sage-grouse. We advise against relying upon of the habitat parameters defined by Connelly and Hagen because these studies are overly broad and include marginal habitats that do not warrant the same level of protection as priority habitat areas. As provided for in EO 2011-5, BLM needs to focus its attention on site-specifically identified nesting, brood rearing and winter concentration areas. Furthermore, use of the term "restoration" instead of "reclamation" is of concern because regulatory expectations referenced in this record are vague. BLM needs to distinguish the between the terms "restoration" and "reclamation" because under Onshore Order No. 2, industry is not required to "restore" areas use for oil and gas operations. We presume that restoration activities in core areas is referring to previous disturbances, on-site or off-site, that were created prior to current standards of reclamation, which may be restored for reclamation credit. An opportunity for restoration would then provide the possibility of reclamation credits which could then be used to for future activities as provided for in EO 2011-5.	3035_1
1025	1025-25	RECORD 17 -Any existing towers must undergo review for adverse effects. Review will include minimizing wires and other collision hazards for sage-grouse and migratory birds, as well as adverse impacts of night lights (FAA requirement). COMMENT: Upon what scientific basis was this requirement derived? Does BLM have scientific documentation that demonstrates a high level of collisions with existing towers has occurred in the last 5 years by Sage-grouse or migratory birds? How does the mortality rate compare between existing towers (radio, TV, Cell, etc.) to those of wind farms, buildings and other fixed objects? We also recommend that BLM fully consider the FAA minimum standards for tower safety and lighting before adopting this type of requirement.	3033-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-24	RECORD 12 -Relocate existing designated ROW corridors crossing priority Sage-grouse habitat void of any authorized ROWs, outside of the priority habitat area. If relocation is not possible, undesignate that entire corridor during the planning process. COMMENT: BLM must recognize that some designated ROW corridors are already in use and that valid existing rights must be honored. Under what authority can BLM require modification of an existing ROW? In addition, given the recent release of IM 2013-152 "Commingling" and existing rules governing "Off Lease Measurement", what plan does BLM have in place to approve requests for commingling and off lease measurement of oil and gas where wells may be located within priority Sage-grouse habitat and the pipelines and treating facilities are to be located outside priority Sage-grouse habitat? Due to the limited disturbance and parameters outlined throughout the SEIS, this will likely become an issue for future development within priority Sage-grouse habitat and BLM needs to have a plan in place to adequately address these concerns. Further, BLM needs to clarify whether efforts to remove existing power lines and/or reclamation of unused features within existing leases or ROWs would be used as a means to offset the calculated disturbance threshold discussed in the Alternatives.	3033-2
1025	1025-23	RECORD 10 -Manage the ACEC as a ROW avoidance/mitigation area. Allow ROWs where it best minimizes Sage-grouse impacts, build new roads to the minimum standard necessary, and add the surface disturbance to the total disturbance in the Greater Sage-Grouse Core Habitat Areas ACEC if valid existing rights cannot be accessed via existing roads. If disturbance exceeds 3 percent for that area, implement additional effective mitigation on a case-by-case basis to offset the resulting loss of Sage-grouse habitat. Use existing roads to access valid existing rights that are not yet developed to the extent practicable. Allow new ROWs to access valid, existing rights and private and state inholdings where needed. COMMENT: We support BLM's recognition of valid existing rights and constructing roads to the minimum standard needed for the activity; but we object to the designation of an ACEC and BLM's proposed use of a 3 percent disturbance cap. We recommend that BLM adopt the requirements contained in EO 2011-5.	3033-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-22	RECORD 9 "Allow only below ground ROWs within designated ROW corridors. Do not limit the width of below ground ROW corridors as long as new linear facilities are constructed adjacent to existing linear facilities accounting for adequate separation for operating system integrity; safety (construction and operations); appropriate federal, state, and local statutes, regulations, and policies; and land use constraints. If a linear facility is moved away from an adjacent utility to avoid a resource conflict, the new linear facility will still be considered to be within the ROW corridor." "Construct new transmission lines between July 1 and March 14 (or between July 1 and November 30 in winter concentration areas) and within 0.5 miles on either side of existing 115 kV or larger transmission lines (Map SEIS-23)." COMMENT: Industry has offered to bury pipelines for years. However, BLM is proposing that multiple operators use the same ROW. It is unclear whether BLM has considered the legal implications of this requirement. First, how will it be determined which party will be responsible for a joint ROW. Has BLM considered how the liability with multiple facilities will be addressed, such as cost, safety and potential environmental risks? Only until these factors are clearly addressed would BLM's proposal be ripe for consideration.	3033-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-21	RECORD 8 -Evaluate and remove, bury, or modify existing power lines within priority Sage-grouse habitat areas on a case-by-case basis. COMMENT: Apparently, the NTT failed to consider the role valid existing rights would play in such decisions. It also failed to consider the existence of circumstances where the removal or modification of an existing right-of-way could result in more damage to the habitat than no action at all. Moreover, in some circumstances, above ground power lines are the best and only option that can be considered. For example, topography or terrain may limit the ability to bury power lines. Additionally, continued use and/or construction of new above ground power/transmission lines can be accomplished without negatively impacting priority Sage-grouse habitat (e.g. when placed in unsuitable Sage-grouse habitat identified within priority habitat boundaries or through the use of other, reasonable requirements). The prohibition on constructing above ground transmission lines in Sage-grouse Priority Habitat Areas as proposed under both alternatives is unwarranted and overly restrictive. We recommend that BLM retain needed flexibility by considering the use and construction of power/transmission lines on a case-by-case basis. This will allow BLM to account for site specific circumstances (e.g. topography and terrain) and actual Sage-grouse habitat suitability. Further, we remind BLM that it would likely be economically impossible for operators to modify existing power lines in mature fields due to the fact they produce significantly less income compared to new fields or those that have yet to be developed. Further, BLM does not have legal authority to require such changes. We also remind BLM that Recent State Director Review (SDR) decisions clarify the limits of the BLM's authority as it relates to overhead power lines built and operated by utilities on non-federal surface. SDR No. WY-2009-006 provides that BLM has no authority or jurisdiction over a third-party public utility company installing non-lease facilities on fee surface estate. While it may consider a non-Federal action through analysis and disclosure pursuant to NEPA, BLM's denial of overhead power is not binding on the third-party public utility company (SDR No. WY-2011-001, pg. 16). Even though BLM could find that significant impacts may occur if the overhead power lines were to be constructed; once approval has been granted for the power drops, the agency has no authority to preclude construction of infrastructure that is not a lease production facility (SDR No. WY-2011-001, pg. 16). BLM simply lacks jurisdiction to approve or deny non-lease facilities that are not owned or controlled by the operator and are located on split-estate fee surface (SDR No. WY-2011-001, pg. 17). Mandating burial of all power lines within Sage-grouse Priority Habitat, as proposed under Alternative E, will potentially preclude construction of infrastructure that is not a lease production facility and may prohibit a public utility from installing non-lease facilities on adjacent fee surface estate. As such, this stipulation exceeds the limits established in recent SDR decisions and must be modified.	3033-2

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-20	Consolidate anthropogenic features from development and transmission on the landscape, regardless of land ownership patterns or whether proposed actions occur in the Greater Sage-Grouse Core Habitat Areas ACEC. Allow high profile structures (higher than 12 feet) within greater Sage-grouse nesting habitat on a case-by-case basis. COMMENT: Once again, valid existing rights must be honored. Under what authority can BLM force the consolidation of development features or transmission line? We point out that EO 2011-5 recognizes valid existing rights: "Existing activities in areas already disturbed or approved for development within Core Areas Prior to August 1, 2008 are NOT subject to new Sage-grouse stipulations with the exception existing operations may not initiate activities resulting in new surface occupancy within 0. 6 mile of the perimeter of a Sage-grouse lek. Any existing disturbance will be counted toward the calculated disturbance cap for a new proposed activity. The level of disturbance far existing activity and rollover credit may exceed 5%". The EO was carefully crafted to respect valid existing rights and we strongly recommend that BLM adopt this same approach.	3035_4
1025	1025-19	RECORD 7-In the Greater Sage-Grouse Core Habitat Areas ACEC, the density goal includes either: Maintain or reduce the existing level of density of energy production and/or transmission structures on the landscape in sagebrush communities, or Manage the existing level of density of disturbance on the landscape so that anthropogenic disturbances do not exceed one disturbance per 640 acres within the Density and Disturbance Calculation Tool (DDCT) analysis (or best available tool) and cover less than 3 percent of sagebrush habitat. COMMENT: This proposal conflicts with EO 2011-5 and must be modified to remain consistent, particularly with respect to the disturbance cap. Moreover, we question how BLM intends to reduce the existing level of density of energy production and/or transmission structures while honoring valid existing rights. According to the Federal Land Policy and Management Act (FLPMA), the Mineral Leasing Act (MLA) and BLM's Planning 1600 Handbook, BLM does not have the authority to impose new stipulations on leases after they have been issued or to require abandonment of existing operations. Nor does BLM have authority to impose mitigation measures, such as COAs, that exceed the terms and conditions of previously issued leases. In sum, BLM cannot deprive operators of their rights to develop pre-existing leases in accordance with the terms under which they were issued. BLM is limited to negotiating with existing rights owners when seeking to impose newly developed restrictions.	3035_4
1025	1025-18	RECORD 6 -Designate greater Sage-grouse priority habitat within Core Habitat Area as the Greater Sage-Grouse Core Habitat Areas ACEC (Map SE/S-31 and Appendix F of the Draft RMP and Draft EIS; 1,161,234 acres). COMMENT: As previously stated, we object to the designation of an ACEC within the planning area because it would be unmanageable and would conflict with the process already established in EO 2011-5.	3001

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-17	RECORD 4 -Where suitable conservation actions cannot be achieved in priority habitat, seek to acquire state and private lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore sage -grouse habitat. COMMENT: We strongly object to BLM seeking to acquire state and private lands with intact mineral estate because the agency does not currently receive adequate funding to fully manage the lands already in federal ownership. Instead, we recommend that BLM work with private landowners to arrive at mutually agreeable programs while recognizing and respecting existing rights as well as acknowledging that a federally managed conservation approach is not always preferable or needed.	3016-2
1025	1025-16	RECORD 3-Examine applicability of categorical exclusions in priority habitat COMMENT: Categorical exclusions (CE) are provided by law and are intended to benefit the operator as well as BLM during the permitting process. Therefore, we object to BLM's proposal to consider excluding the use of CEs even in priority habitat. The decision to exclude the use of a CE must be made based upon site-specific conditions and the scope of a project proposal rather than on a unilateral decision in a planning document.	3027-1
1025	1025-15	Finally, it has been industry's experience that BLM rarely uses monitoring data of any type collected at BLM's direction. While we don't object to reasonable monitoring activities, it is incumbent upon BLM to establish a system or database whereby the monitoring data is available for future use by other government agencies, industry and the public. Otherwise, the effort is simply an expensive exercise in futility.	3035-7
1025	1025-14	With respect to split estate lands, BLM needs to specify how the rights of private landowners will be protected. As such, BLM needs to incorporate proper mechanisms for working with landowners and lessee's so as not to unnecessarily delay development activities. In addition, specific parameters need to be clearly articulated for any monitoring and mitigation plan, i.e., scope, requirements, costs and timing. We recommend that BLM work with operators, other land users as well as the Wyoming Game and Fish Department (WGFD) in order to establish a reasonable and workable monitoring program. Moreover, in order to avoid conflict and confusion, the monitoring program must be well-defined before it is required for project activities.	3019
1025	1025-13	In addition to eliminating or modifying RDFs to establish consistency with EO 2011-5, we recommend that BLM adopt limitations to the application of RDFs similar to the Lander Proposed RMP/EIS to institute consistency across BLM Field Offices.	3023-1

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1025	1025-12	RECORD 2 Incorporate BLM required design features or mitigation for any authorized mineral activity for federal mineral estate, regardless of surface ownership. Require development of wildlife monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations COMMENT: We recommend that BLM revisit its design features and mitigation to ensure they are technically feasible and appropriate and that they maintain the level of flexibility required when their use is considered on a site-specific basis. In accordance with current law and regulation, it is inappropriate for the RMP to establish site-specific requirements at a project level as is proposed in the SEIS. Moreover, many of the design features {addressed later in these comments) outlined in the NTT report reflect a distinct lack of understanding of the activity requirements during the oil and gas exploration and development process.	3023-3
1025	1025-10	According to BLM Manuai1613-ACEC, such designations are used to highlight areas where special management attention is needed to protect, and prevent irreparable damage to important values or processes. The description cited in the SEIS is inadequate. The ACEC included in the SEIS needs to be discussed and justified in more detail, including recognition of the wide scope of mitigation measures BLM has at its disposal to lessen the impacts on the Sage-grouse in areas where it is believed they pose a threat. Ironically, the statement fails to acknowledge that the single, greatest threat to the survival of the species is predation. Moreover, we seriously question BLM's ability to manage nearly 2 million acres as an ACEC and it is unclear why such a designation was even considered. BLM needs to more fully discuss this concept in the SEIS. Our opposition to an ACEC does not mean we do not support the delineation of Sage-grouse Core Habitat Areas and non-Core Habitat Areas as a Sage-grouse management strategy provided it is consistent with EO 2011-5. Labeling this area as an Area of Critical Environmental Concern (ACEC) (e.g. the KHA ACEC under Alternative E and CHA ACEC under Alternative F) is inconsistent with EO 2011-5 and is, clearly, unjustified to ensure adequate protection of Sage-grouse habitat. We are concerned that an ACEC designation of Sage-grouse Priority Habitat Areas has resource management implications that reach far beyond the Sage-grouse Core Habitat Area strategy, which already provides more than adequate protection of Sage-grouse habitat. As such, we urge BLM to abandon the use of an ACEC designation on Sage-grouse Priority Habitat Areas (i.e. Core Habitat Areas and Key Habitat Areas).	3001
1025	1025-9	RECORD 1 -ACEC-Proposed Greater Sage-grouse Priority Habitat: 1,786,244 acres; COMMENT: BLM has provided no clear rationale for designating Core Habitat Areas as an ACEC. In Appendix F, BLM simply provides the following statement regarding the proposed ACEC, "The area contains sagebrush habitat used by sensitive bird species and other wildlife, including the greater sage-grouse, a candidate species for listing under provisions of the ESA. These habitats are under threat from surface disturbance associated with mineral (including gravel pits) and ROW development, renewable energy developments, heavy recreational and motorized vehicle use, and invasive and nonnative species infestations. These activities threaten important greater Sage-grouse habitats, including breeding, later brood-rearing, and winter concentration areas."	3035_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1025	1025-8	Alternatives F. 2-1-Chapter 2 of the Draft RMP and Draft EIS is supplemented to include two new alternatives (alternatives E and F). COMMENT: We are strongly opposed to both of the new, unreasonably restrictive alternatives analyzed in the SEIS. Neither Alternative E nor Alternative F represent suitable management plans for the Bighorn Basin because both are unnecessarily restrictive on oil and gas resources and conflict with BLM's multiple-use mandate under FLPMA. Specifically, they would gratuitously limit the continued exploration and development of oil and gas resource, 2,296,279 acres under Alternative E and 291,294 acres under Alternative F. Moreover, an additional 1,320,277 acres under Alternative D and 261,282 acres under Alternative F would be available for oil and gas leasing only with NSO or other major constraints. The adoption of either of these alternatives would stymie future oil and gas development in the Basin creating a huge economic impact on local communities as well as compromising the continued generation of revenue to the US Treasury. Clearly, the significant loss of continued development of domestic oil and gas resources as described in this SEIS fails to recognize the ever-increasing need for domestic energy supplies which defies the requirements of the Energy Policy Act of 2005 and the needs of the nation as a whole. In addition to the comments above regarding the alternatives, we question why the SEIS does not present a new agency-preferred alternative based on the supplemental analysis. BLM tied the analyses of Alternatives E and F to the previously analyzed Alternatives B and D, respectively, and it is unclear whether Alternative F should be considered the new preferred Alternative, replacing Alternative D. We request BLM to clarify its intent. Nevertheless, we are opposed to implementation of or inclusion of management elements from either of these two newly analyzed alternatives because they are overly restrictive, unjustified and fail to meet BLM's multiple use mandate as detailed subsequently in these comments.	3023-3
1025	1025-7	Section 1.4.2 -The BLM will utilize the COT Report (USFWS 2013), the Western Association of Fish and Wildlife Agencies {WAFWA) Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et a/. 2004}, and any other appropriate resources, to identify greater Sage-grouse habitat requirements and best management practices. Page 2-1 - Management approaches applied to the new greater sage-grouse priority habitat ACECs were derived from recommendations on the management of greater sage-grouse by the Sage-Grouse National Technical Team (Sage-grouse NTT 2011) and public comments. COMMENT: While the SEIS states in Chapter 1 that it would use several different appropriate scientific sources to formulate its management options for Sage-grouse, apparently the reliance upon these other sources was either extremely limited or nonexistent. The fact that BLM has relied solely upon the extreme recommendations contained in the NTT report rather than utilizing all available science to develop its alternative management options is patently objectionable as previously stated. Our comments below cite several additional scientific references and studies which must be considered when developing a management approach for the Sage-grouse and its habitat areas.	3035_1

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1025	1025-6	The SEIS offers no explanation of what constitutes valid existing lease rights and how they relate to the new land use management options considered in the SEIS. We recommend that BLM clearly state in the Final EIS that the new stipulations proposed in the Preferred Alternative will not apply to lands already under oil and gas lease. Moreover, it must be made clear that BLM has no authority to impose these new restrictions through the use of Conditions of Approval (COA) on applications for permit to drill (APD) if they would abrogate the valid existing lease rights. These principles are particularly important given the fact that discussions regarding new protections for the proposed Areas of Critical Environmental Concern (ACEC) could impose debilitating limitations on existing leases that were not anticipated at the time the leases were purchased in good faith from the federal government. Such qualifiers are consistent with current rules and policies of the BLM and must be clearly disclosed in the planning documents. An acceptable example of appropriate language is included in the Rawlins RMP adopted in 2008, page 20.	3019
1025	1025-5	In addition to many of the design features included in the SEIS, of particular concern is BLM's departure from the disturbance cap of 5 percent provided in EO 2011-5. The SEIS suggests a 3 percent disturbance threshold be imposed that does not exceed one disturbance per 640 acres using the DDCT regardless of the use. The WY EO specifies a 5 percent disturbance threshold per 640 acres using the DDT and it does not limit such disturbance to one occurrence. This is an issue of significant concern because it will essentially shut off the Bighorn Basin to future oil and gas activities as well as other uses, such as grazing. Additional concerns with BLM's departure from the standards and stipulations provided in EO 2011-5 are discussed in detail below. Given the above concerns, we object to the management and mitigation proposals contained in the SEIS because they demonstrate a problematic disregard of the need for continued development of domestic energy resources, the tremendous economic impact implementation of either of these alternatives would have on the region, a lack of understanding of how the federal oil and gas program works as evidenced by ill-conceived measures that are either impossible to implement or are unduly restrictive and the fact that oil and gas activities do not have the catastrophic impacts on Sage-grouse assumed by the NTT report. We strongly recommend that BLM's final RMP/DEIS establish clear consistency with EO 2011-5.	3035_4

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1025	1025-4	CONSISTENCY WITH WYOMING EXECUTIVE ORDER 2011-5, GREATER SAGE-GROUSE CORE AREA PROTECTION, IS OF PARAMOUNT IMPORTANCE COMMENT: As BLM is aware, EO 2011-5 was developed through an extensive collaborative process in which all affected parties were represented. It has also garnered the support of USFWS, which stated in a letter to Wyoming Governor Matt Mead (June 24, 2011), that "if fully implemented, we believe the EO can provide the conservation program necessary to achieve your goal of precluding listing of the Sage-grouse in Wyoming." Moreover, the Service also noted in the letter that "the core population area strategy (EO 2011 -5) is a sound framework for a policy by which to conserve greater sage grouse ... " Additionally, the BLM Wyoming State Office issued a revised Greater Sage Grouse Habitat Management Policy, WYSO 2012-019, in February 2012 that applies EO 2011-5, and entered into a Memorandum of Understanding (MOU) with the State of Wyoming for use and implementation of EO 2011-5 on federal projects. As such, a Sage-grouse habitat management strategy on federal lands in Wyoming that is inconsistent with EO 2011-5 is unacceptable and unjustified.	3035_1
1025	1025-3	We are also confused by the BLM's SEIS press release, which indicates the agency was required to supplement the draft Bighorn Basin RMP/EIS "to allow the public to nominate areas within the study area as areas of critical environmental concern for Sage-grouse." We ask BLM to clarify the legal requirement that directs the Bureau to reopen the planning process to allow the "public" to specifically nominate a Sage-grouse ACEC simply because it was not considered in the original planning documents.	3001
1025	1025-2	We are concerned that BLM limited its analysis to the overly restrictive conservation measures recommended by the NTT during the planning process; we strongly oppose the inclusion of these conservation measures in the agency's preferred alternative and their adoption in the Final RMP/ROD. Additionally, it is our understanding that a planning document such as this is intended to be a programmatic overview of actions that could occur throughout the life of the plan. As such, the SEIS is far too prescriptive for a land use plan.	3035_1
1025	1025-1	We object to the two new alternatives analyzed in the SEIS to the Bighorn Basin Draft RMP and Draft EIS because they were limited to the scientifically unfounded conservation measures identified in the Greater Sage-grouse National Technical Team (NTI) Report on National Greater Sage-Grouse Conservation Measures (Sage-grouse NTI 2011). BLM Instruction Memorandum (IM) No. 2012-044, BLM National Greater Sage-grouse Land Use Planning Strategy, contains a very clear provision which allows BLM to adopt Wyoming Executive Order EO 2011-5, Greater Sage-Grouse Core Area Protection, in its entirety.	3035_1

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1026	1026-96	Finally, Devon encourages the BLM to eliminate BMP's for phased development. The United States Court of Appeals for the Tenth Circuit, which has authority over all of Wyoming, recently affirmed a BLM decision not to require a phased leasing resource management plan in the Buffalo Field Office specifically because such an alternative would delay the production of energy resources and was not otherwise practical. Biodiversity Conservation Alliance, et at. v. Bureau of Land Management, et al., 608 F.3d 709, 715 (10th Cir. 2010). The BLM need not analyze such an unreasonable and impartial alternative. Further, allowing oil and gas developers to secure leases in only one portion of a geologic basin or area at a time will limit and preclude exploration and development activities. Before an oil and gas operator will be willing to commit the millions of dollars necessary to drill even a single exploratory oil and gas well, it must secure a large enough lease position to justify the expense. If phased leasing was mandated by the BLM, the operator may be unable to secure such lease positions and new exploration would come to a halt, along with the economic benefits associated therewith.	3023-3
1026	1026-95	Finally, BLM should consider the adverse air quality impacts potentially associated with this management action. In many cases, oil and gas operators install power lines in order to reduce potential air emissions from compressors and other facilities. Requiring these lines to be buried in all circumstances may make it uneconomic to use electrical power which could lead to more air quality impacts from compressors.	3033-2
1026	1026-94	Appendix L., Best Management Practices and Required Design Features, Reclamation No. 4 "Implement irrigation during interim or final reclamation for sites where establishment of seedlings has been shown or is expected to be difficult due to dry conditions. Utilize mulching techniques to expedite reclamation." This RDF should be reworded to reflect that irrigation needs to be done in a way that will prevent vegetation from being unable to withstand drought conditions after the irrigation has been removed.	3042
1026	1026-93	Appendix L., Best Management Practices and Required Design Features, Reclamation No. 3 "Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community." If the disturbance is on private land, this requirement needs to be subject to the preferences of landowners.	3023-1
1026	1026-92	Appendix L., Best Management Practices and Required Design Features, Noise No. 3 "Locate new compressor stations outside priority habitats and design them to reduce noise that may be directed towards priority habitat." This requirement is overly broad and unnecessarily prescriptive. There are many items to consider when siting compressor stations, such as the engineering and design constraints inherent to gas gathering systems. With regard to directing compressor station noise away from priority habitat, proximity to other receptors, such as homes, also needs to be considered. This item needs to be subject to technical feasibility, as well as landowner preferences when private land is involved. Furthermore, it is inconsistent with Wyoming Executive Order and BLM Instruction Memorandum 2012 -019, and should be removed.	3035_3-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-91	Appendix L., Best Management Practices and Required Design Features, Noise No. 2 "Require noise shields when drilling during the lek, nesting, brood-rearing, and wintering seasons." This requirement is too broad and vague. First, the measure does not define the types of noise shields that are required. Further, the shield can take any number of shape and form. It is also important to realize that noise shields cannot be used at a site without being engineered for safety factors such as wind load. Shields are not merely installed near a noise source. They must be carefully anchored, potentially with a foundation, to meet wind load requirements depending upon the material used to build a "shield." Additionally, larger well pads may be needed to accommodate the configuration of a "shield" while increasing surface disturbance. It is also important to consider the attenuation of noise from a site to receptors such as leks, nesting, and brood rearing. Moreover, simply stating that noise shields are required during "wintering seasons" may not be necessary if the drilling is occurring where the noise attenuation would not be a problem. This requirement needs to be completely reworded to provide more direction and flexibility.	3035_3-1
1026	1026-90	Appendix L., Best Management Practices and Required Design Features, West Nile No. 3 "Build steep shorelines to reduce shallow water (greater than 60 em) and aquatic vegetation around the perimeter of impoundments. Construction of steep shorelines also will create more permanent ponds that are a deterrent to colonizing mosquito species like Cx. tarsalis which prefer newly flooded sites with high primary productivity." While the intent of steep shorelines may be advantageous for the control of mosquito species, it presents a hazard to mammals being able to escape from the impoundment. This is something that needs to be considered in administering this measure. This entire section on West Nile Virus is missing any reference to insecticide are effective in controlling mosquito larvae. We recommend this measure be included on the list of requirements.	3035_3-1
1026	1026-89	Appendix L., Best Management Practices and Required Design Features, West Nile No. 2"Increase the size of freshwater ponds to accommodate a greater volume of water than is discharged. This will result in un-vegetated and muddy shorelines that breeding Cx. tarsalis avoid. This modification may reduce Cx. tarsalis habitat but could create larval habitat for Culicoides sonorensis, a vector of blue tongue disease, and should be used sparingly. Steep shorelines should be used in combination with this technique whenever possible." These requirements need to be subject to the preferences of landowners. On split estate lands where the surface is owned by private landowners, BLM must defer decisions regarding what facilities remain on the land and the size of ponds to those private landowners.	3035_3-1

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1026	1026-88	Appendix L., Best Management Practices and Required Design Features, Operations No. 22 "Use only closed-loop systems for drilling operations, with no reserve pits." It is not always reasonable or feasible to require closed loop mud systems for drilling. Many drilling rigs are not equipped for closed loop drilling, which could complicate development in some situations. Further, even if a closed system were available on a drilling rig, some type of pit will be needed for placement of drilling cuttings. This requirement must provide the flexibility to allow this as an option.	3023-1
1026	1026-87	Appendix L., Best Management Practices and Required Design Features, Operations No. 21 "Design or site permanent structures to minimize impacts to sage-grouse, with emphasis on locating and operating facilities that create movement (e.g., pump jacks) or attract frequent human use and vehicular traffic (e.g., fluid storage tanks) in a manner that will minimize disturbance of sage-grouse or interference with habitat use." This requirement is unreasonable and lacks scientific justification. We are unaware of any studies on sage-grouse which correlate movement and distances relative to sage-grouse response. Considering the existing NSO from leks, pump jacks at a distance of at least 0.6 mile will not create an issue. We recommend this requirement be removed. Again, this requirement is inconsistent with the Wyoming Executive Order and BLM Instruction Memorandum 2012 -019 and needs to be removed.	3023-1
1026	1026-86	Appendix L., Best Management Practices and Required Design Features, Operations No. 20 "Restrict the construction of tall facilities, distribution powerlines, and fences to the minimum number and amount needed." It is unclear what is meant by "tall". Certain facilities, particularly those for compression or natural gas treatment, require the use of designs which incorporate vessels or equipment that, by their design, can involve height. Furthermore, fences are typically installed for reaso@ of security and safety. Although some flexibility is mentioned such as the "minimum amount needed", this requirement lacks specificity and the reality of what is needed to construct a facility and needs to be removed.	3023-1
1026	1026-85	Appendix L., Best Management Practices and Required Design Features, Operations No. 19 "Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use." Remotely monitoring a site may not always identify all operational considerations, so sometimes there is the need to go out and look at a well or facility. In order to conduct safe and effective oil and gas operations, certain inspection and maintenance activities must be conducted regularly. We recognize that limitation on some disruptive activities and access to well locations during critical seasons may be necessary, such as prohibiting construction activities (e.g. well pads, roads, pits) or limiting the number of trips allowed. Basic maintenance and operation activities are necessary to maintain safe, effective, and environmentally sound operations. Further, the economics associated with some leases may not allow telemetry to be installed. This requirement should be subject to operational considerations and economic viability. Moreover, this requirement is inconsistent with Wyoming Executive Order and BLM Instruction Memorandum 2012· 019 and needs to be removed.	3023-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-84	Appendix L., Best Management Practices and Required Design Features, Operations No. 17 "Place liquid gathering facilities outside of priority areas. To reduce truck traffic and perching and nesting sites for ravens and raptors do not place tanks at well locations within priority habitat areas." This requirement is confusing. Placing liquid gathering facilities inside priority areas would reduce truck traffic which would be advantageous in priority areas. Further, if liquid gathering or trucking is not allowed inside priority areas, there is no way to remove liquid production from the lease. This requirement conflicts with standard operational practices and is not feasible and needs to be removed.	3023-1
1026	1026-83	Appendix L., Best Management Practices and Required Design Features, Operations No. 16 "Apply a phased development approach with concurrent reclamation." The term "phased development" needs clarification. This means different things to different people. Devon opposes phased development which only allows certain portions of a leasehold or unit to be developed over time until that portion is plugged or abandoned before proceeding to another portion of the leasehold or unit. This is a clear violation of existing lease terms since this type of terminology has not been used in lease language before.	3023-2
1026	1026-82	Appendix L., Best Management Practices and Required Design Features, Operations No. 14 "Use directional and horizontal drilling to the extent feasible as a means to reduce surface disturbance in relation to the number of wells." The phrase "technically feasible and as part of the downhole design objectives" should be added to provide necessary flexibility to this requirement.	3023-1
1026	1026-81	Appendix L., Best Management Practices and Required Design Features, Operations No. 5 "Cover all fluid-containing pits and open tanks with netting (maximum 1.5-inch mesh size) regardless of size to reduce sage-grouse mortality." This requirement is not practical. Fine mesh netting is not only extremely difficult to deploy, but difficult to maintain, especially during winter with snow accumulation. It is unclear why tanks are included here, unless this is referring to open-top tanks. We urge BLM to remove this requirement or revise it reflecting these concerns. This is another requirement that exceeds the parameters of Wyoming Executive Order and BLM Instruction Memorandum 2012 -019 and, therefore, we recommend it be removed.	3023-1
1026	1026-80	Appendix L., Best Management Practices and Required Design Features, Operations No. 3 "Bury power lines to the extent technically feasible." This requirement is excessive and cost-prohibitive. We urge BLM to add flexibility that takes into account technical feasibility and economic considerations.	3033-1

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1026	1026-79	Appendix L, Best Management Practices and Required Design Features, Roads No. 6 "Establish trip restrictions or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition)." Remotely monitoring a site may not always identify all operational considerations, so there is sometimes the need inspect a well or facility. In order to conduct safe and effective oil and gas operations, certain inspection and maintenance activities must be conducted regularly. We recognize that limitation on some disruptive activities and access to well locations during critical seasons may be necessary, such as prohibiting construction activities (e.g. well pads, roads, pits) or limiting the number of trips allowed. Basic maintenance and operation activities are necessary to maintain safe, effective, and environmentally sound operations. Further, the economics associated with some leases may not allow telemetry to be installed. This requirement should be subject to operational considerations and economic viability.	3039-2
1026	1026-78	Appendix L., Best Management Practices and Required Design Features, Roads No. 2 "Locate roads to avoid important areas and habitats." This requirement needs to be subject to the preferences of landowners on split estate lands where the surface is owned by private landowners. BLM must defer decisions regarding road location with those private landowners.	3039-2
1026	1026-76	Devon is particularly opposed to the Required Design Features and Best Management Practices affecting fluid minerals on pages L-2 -L-3 of Appendix L. It would be impossible for an oil and gas operator to economically utilize all of the proposed Required Design Features contained in this section. The BLM needs to specifically modify Appendix L to indicate that it does not and cannot impact existing leases. Given the fact that the BLM cannot modify or alter Devon's existing rights, Devon is very concerned regarding the language in Appendix L suggesting that the Required Design Features will be imposed on both existing and new oil and gas development projects and leases within the Bighorn Planning Area. BLM does not have the authority to modify existing lease rights through the RMP planning process. As noted above, Devon is particularly concerned regarding the BLM's Required Design Features related to fluid minerals on pages L-2 -L-3 of Appendix L. Not only are some of the Required Design Features inconsistent, i.e. requiring closed-loop systems and requiring all pits to be fenced, the requirement to use all of the Design Features would be cost prohibitive and not possible in many situations. For example, in certain circumstances, it is impossible to use closed-loop systems for drilling operations because surfactants and other additives are included within the drilling mud making the use of tanks extraordinarily difficult. In other situations, closed-loop drilling systems cannot be utilized because of the amount of water produced during drilling operations would make i t impossible to utilize closed-loop systems.	3023-2
1026	1026-75	In the revised Bighorn RMPs and accompanying EISs, the BLM should also state clearly that an oil and gas lease is a contract between the federal government and the lessee, and that the lessee has certain rights thereunder.	3023-2

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1026	1026-74	Appendix L -Best Management Practices and Required Design Features The BLM has not adequately explained how the proposed Best Management Practices contained in Appendix L will be applied to existing leases. The BLM must expressly recognize that oil and gas leases are existing rights that cannot be modified.	3023-2
1026	1026-73	Because the monitoring framework is unquestionably a "substantial change" when compared to any of the alternatives included in the Draft EIS, the BLM should prepare and release for comment another supplement to the Draft EIS.	3035-7
1026	1026-72	Appendix C -Monitoring and Evaluation Devon applauds the BLM's decision to develop a monitoring framework for sage-grouse as part of the Bighorn RMPs. Unfortunately, in its rush to release the supplement to the Bighorn Basin Draft RMP, the BLM has likely violated the terms of NEPA. The BLM indicates that it will include a new monitoring framework in the proposed RMPs and Final EIS. Bighorn RMP/SDEIS, Appd. C-2. If the monitoring framework will be included in the proposed RMPs for the first time, Devon will not have an opportunity to review or submit comments regarding any of the specific monitoring criteria before they were proposed for inclusion in the Final EIS. It is wholly inappropriate under NEPA for the BLM to introduce radically new and different concepts and procedures in the Final EIS for the Bighorn RMPs, especially given the limited ability for companies such as Devon to submit comments or react to the new measures once a proposed RMP has been issued.	3035-7

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1026	1026-71	Section 4.8 -Socioeconomic Resources Devon agrees with the BLM's analyses demonstrating that Alternative F would have more negative socioeconomic impacts than Alternative D. Bighorn RMP/SDEIS, pg. 4-132. Devon strenuously disagrees with the BLM's assertion that Alternative E would have essentially the same economic impacts as Alternative B. Given the significant limitations on oil and gas development under both Alternative E and Alternative F, Devon has no doubt it would have far greater negative impacts than Alternative B or Alternative D. As the BLM is well aware, oil and gas development has a significant role in the economic well-being of the Bighorn Planning Area. The BLM's analysis demonstrates that oil and gas operations would provide between 63% and 74% of total employment under Alternative E or Alternative F. Bighorn Page 20 RMP/SDEIS, pgs. 4-135, 4-136. Given the importance of oil and gas development on the local economy, BLM should not adopt either Alternative E or Alternative F as both alternatives would cause significant decreases in employment within the area. Bighorn RMP/ SDEIS, pg. 4-134. Just as the economy is beginning to recover from the difficulties of the last several years, the BLM should ensure it is doing everything to foster, not limit, future employment within the Planning Area. For that reason alone, the BLM must not select Alternative E or Alternative F in the planning process. The BLM's analysis also demonstrates that oil and gas development also contributes significantly to earnings within the Planning Area. Bighorn RMP/SDEIS, pg. 4-139. The adoption of either Alternative E or Alternative F would have significant negative impacts to local earnings within the Planning Area. Bighorn RMP / SDEIS, pgs. 4Â·193 -4-140. The BLM should not adopt an alternative that would lead to either a ten percent or 40% decrease in employment as compared to Alternative A. Bighorn RMP / SDEIS, pgs. 4-134, 4-136, 4-140. Alternative E and Alternative F would also result in a significant decrease in federal mineral royalties, state severance taxes and ad valorem taxes and should not be adopted. Bighorn RMP /SDEIS, pg. 4-142. Given the significant adverse impacts associated with either Alternative E or Alternative F, neither must be adopted by the BLM.	3036-2
1026	1026-70	Section 4. 7 -Special Designation and Other Management Areas Devon is opposed to the creation of any new ACECs within the Bighorn RMPs. Devon is particularly opposed to the creation of a sage-grouse habitat area or greater sage-grouse key habitat areas under Alternative E and Alternative F. Bighorn RMP/SDEIS, pg. 4-122. Devon appreciates that the BLM tried to exclude private lands and developed oil and gas fields from its key habitat area ACEC, but Devon believes the ACEC is still far too large. Devon urges the BLM not to create any additional ACECs within the Planning Area. Once again, Devon is opposed to the BLM's description of Alternative F as placing a moderate constraint on oil and gas development. Bighorn RMP /SDEIS, pg. 4-127. Given the significant limitations imposed under Alternative F, it would be more accurate to describe the alternative as placing major constraints on oil and gas development. The BLM's assertion that Alternative F places only moderate constraints on oil and gas development is disingenuous and should be corrected in the final EIS.	3001

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-69	Section 4.6.3 -Rights-of-Way and Corridors When developing the final EIS for the Bighorn RMPs, the BLM should also ensure that it has identified ROW exclusion and avoidance areas as major constraints for oil and gas development. Limiting the access to and from federal oil and gas leases will have the very real impact of eliminating oil and gas development. For that reason, Devon is strenuously opposed to Alternative E that would restrict almost three million (3,000,000) acres within the Planning Area with either ROW exclusion or avoidance areas. Bighorn RMP /SDEIS, pg. 4-104, Map SEIS-22. Precluding ROWs with over 42% of the Planning Area would decimate oil and gas development. The BLM has not adequately analyzed the potential socio-economic impacts of effectively prohibiting oil and gas development on almost three million (3,000,000) acres within the Planning Area. Devon urges the BLM not to adopt Alternative E.	3033-2
1026	1026-68	Section 4.5.2-Paleontological Resources The BLM appropriately recognizes that the surface disturbing operations associated with oil and gas development often lead to the discovery of paleontological resources. Bighorn RMP /SDEIS, pg. 491. The BLM must ensure it does not impose unreasonable restrictions on oil and gas development as such responsible development may actually lead to the discovery of new paleontological resources within the Bighorn Planning Area.	3028
1026	1026-66	Section 4.4. 9 -Special Status Species -Wildlife As described earlier, Devon supports the BLM's creation of oil and gas management areas under Alternative C and Alternative D. Bighorn RMP/SDEIS, pg. 4-76. Devon believes the oil and gas management area under Alternative D should be enlarged to the same size as that under Alternative C. Further, Devon does not believe that big game restrictions should apply within the ACEC areas to the extent they overlap the oil and gas management areas. The BLM effectively eliminates the benefits associated with the oil and gas management areas by making them subject to seasonal restrictions.	3023-6
1026	1026-65	Section 4.4.5 -Fish and Wildlife Resources The BLM admits in Table 4-9 that it would be closing significant portions of the Planning Area to future leasing and development, not making them "administratively unavailable" as suggested elsewhere in the document. Bighorn RMP/SDEIS, pg. 4-57. As also described earlier, the BLM inaccurately suggests that under Alternative F, the greater sage-grouse core habitat area ACEC imposes only moderate constraints on oil and gas development. The limitations on surface disturbance, timing restrictions, and ROW restrictions make it abundantly clear that the sage-grouse ACEC restrictions under Alternative F should be described as major, not moderate. Devon urges the BLM to correct this misinformation when preparing the final EIS.	3035_9
1026	1026-64	Section 4.4.4 -Invasive Species Management The BLM should clarify that under all of the alternatives, including the no action alternative reclamation plans are required for all oil and gas drilling operations under Onshore Order Number 1, Section III, 4, j, 72 Fed. Reg. 10308, 10333 (Mar. 7, 2007). As currently described on page 4-51, the public may have the impression that reclamation plans are not always required for oil and gas development activities. Under current regulations, oil and gas operators will be required to prepare and submit reclamation plans with any and all applications for permits to drill.	3014

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1026	1026-63	Figure 4.3 and Map SEIS-7 must be updated and corrected for inclusion in the Final EIS for the Bighorn RMPs. The BLM suggests that under Alternative F, the vast majority, of the Planning Area would be open with only moderate constraints. Bighorn RMP/SDEIS, pgs. 4-22, 4-26. Given the significant limitations on surface disturbance imposed by the proposed Alternative F, the vast majority of the Planning Area, including the entire greater sage-grouse core area ACEC, should be identified as a major constraint for oil and gas development. It is disingenuous of the BLM to suggest that the area is subject to only moderate constraints when limiting the entire area to only three percent surface disturbance, especially when combined with the ROW avoidance area, limitations on the construction of transmission lines, and the other significant limitations imposed within the ACEC. The BLM must prepare new information in the final EIS clearly indicating that the lands within the greater sage-grouse core area ACEC are subject to major, not moderate, constraints.	3035_9
1026	1026-61	Section 4.2.5 -Leasable Minerals-Oil and Gas As already described above, Devon is opposed to the amount of lands that oil and gas development under Alternative E and Alternative F. The BLM needs to analyze and dislose to the public the significant impacts closing such a large area to oil and gas development will have not only on the area closed to leasing, but upon other lands. No reasonable operator will conduct exploratory development within the Bighorn Planning Area if it will be unreasonably difficult, if not impossible, to secure additional leases within the Planning Area. BLM must provide additional analyses regarding the negative impacts Alternative E and Alternative F would have upon oil and gas development within the entire Planning Area.	3023-6
1026	1026-60	Section 3.7.1 -Areas of Critical Environmental Concern As already discussed above, Devon does not believe the greater sage-grouse key habitat ACEC or the greater sage-grouse core habitat area ACEC meets the relevance or importance criteria necessary to establish a new ACEC. 43 C.F.R. § 1610.7-2.	3001
1026	1026-59	It was a significant mistake for the BLM to release this document prior to completing its review of Version III of the sage-grouse data. If there are substantial changes between the current BLM core habitat area and that proposed in the final EIS, the BLM may again be required to provide a supplement to the DEIS in order to ensure the public has the opportunity to carefully examine and understand the proposed changes to the RMPs.	3035_1
1026	1026-58	Devon is strenuously opposed to the BLM's use of the Core Habitat Area Version II to establish the BLM's key habitat areas for greater sage-grouse. As discussed earlier, Core Habitat Area Version II has been replaced by Version III. Wyoming Executive Order 2011 -5. The Wyoming Governor, in conjunction with experts and other operators, specifically developed Version III based on more recent and correct information. It is entirely inappropriate for the BLM to utilize Version II when describing its own key habitat areas. Further, it was inappropriate for the BLM to insist on the release of the Bighorn Basin Supplement to the DEIS prior to the agency completing its review of the Core Habitat Area Version III. Bighorn RMP/SDEIS, pg. 3-3. It would have been far more appropriate for the BLM to complete its review of Version III prior to releasing this document.	3035_1

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1026	1026-57	Given the fact the Wyoming population of sage-grouse is relatively healthy, and already protected by existing regulatory measures, Devon encourages the BLM not to adopt the onerous management restrictions provided for in Alternative E and Alternative F in the Bighorn RMP /SDEIS. Both alternatives provide excessive and unnecessary protections on greater sage-grouse to the detriment of all other resources. The BLM specifically recognizes that, within the Planning Area, sage-grouse habitat is largely intact. Bighorn RMP/SDEIS, pg. 3-3. Devon urges the BLM not to adopt either Alternative E or Alternative Fin the Bighorn RMPs given the significant protections already provided.	3035_1
1026	1026-56	The language in the Bighorn RMP /SDEIS does not sufficiently recognize the fact that geophysical surveys are designed to have very little impact and rarely cause adverse impacts to the natural environment. The BLM should develop language to encourage seismic exploration in the Bighorn RMPs.	3023-4
1026	1026-55	The BLM should ensure that nothing in the Bighorn RMPs eliminates or discourages the use of geophysical exploration or the approval of such exploration using categorical exclusions.	3023-4
1026	1026-54	Devon does not agree that the BLM should close the entire greater sage-grouse key habitat area ACEC to geophysical exploration or propose unnecessary restrictions on geophysical exploration. Bighorn RMP /SDEIS, Record No. 86, pg. 2-31. Overall, Devon believes that seismic exploration can actually reduce impacts to the environment because operators will be less likely to drill unsuccessful wildcat wells in previously undisturbed areas. The BLM should not place unnecessary requirements, limitations, or procedures on seismic and geophysical surveys.	3023-4
1026	1026-53	Devon also does not support the language in Record No. 83 that suggests that all oil and gas activities would be conducted to maximize the avoidance of impacts based on the evolving scientific knowledge. Bighorn RMP/SDEIS, Record No. 83, pg. 2-71. Such a restriction does not recognize Devon's valid existing rights. Read broadly, this language could be construed by opponents of oil and gas development to prohibit virtually any oil and gas development within the Planning Area even if unrelated research demonstrates there may be adverse impact. The BLM should modify this language to specifically state that oil and gas activities would be conducted in a manner to minimize impacts while still protecting existing rights.	3023-2
1026	1026-52	Devon is completely opposed to BLM's proposal that would explore options to amend, cancel, or buy-out leases, or include as COAs the relinquishment of leases within the Bighorn Planning Area. Bighorn RMP/SDEIS, Record Nos. 80, 81, pg. 2-31. The BLM simply does not have the authority to require operators to relinquish leases or to cancel existing leases.	3023-2

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1026	1026-51	Devon is concerned about BLM's proposal to require Master Development Plans ("MDP") on all but wildcat wells. Bighorn RMP/SDEIS, Record No. 78, pg. 2·30. First, the BLM has not defined a wildcat well. How will operators know when it will apply? Second, the BLM should allow infill development within existing fields without a MDP. Often only one or two wells are needed within existing fields to continue production levels, so a full MDP would not be an appropriated use of the BLM or operator's resources. Finally, Devon does not believe MDP should be required in designated oil and gas development areas.	3023-6
1026	1026-50	Devon is also opposed to the BLM's proposal to include timing limitations on existing leases to the extent they may be inconsistent with existing lease rights. Bighorn RMP/SDEIS, Record No. 77, pg. 2-30. Devon cannot use a RMP to develop COAs or other limitations that are inconsistent with existing lease rights.	3023-2
1026	1026-49	Devon is opposed to the BLM's proposal to include NSO restrictions within the entire sage-grouse key habitat area ACEC under Alternative E. Bighorn RMP /SDEIS, Record No. 76, pg. 2·30. As set forth above, the BLM does not have the authority to impose such radical restrictions on Devon's existing leases, even within a newly created ACEC. BLM does not have the authority to impose restrictions or limitations on Devon's existing leases. Devon is also concerned about the ACEC because it applies a four-mile NSO around leks, which is inconsistent with Wyoming Executive Order No. 2011-5. The Wyoming Executive Order and Sage-grouse Policy was carefully drafted with federal, state, and local scientists, experts, and users of the public lands. It is inappropriate to propose a management objective or alternative that is inconsistent with the State of Wyoming's Executive Order. This is particularly true since BLM has clearly signaled its intent to adopt the Wyoming Sage-grouse Policy. See Memorandum WY-2012·019 (Feb. 10, 2012). While the BLM may have been required to analyze this alternative to fulfill its requirements under NEPA, it is inappropriate for the BLM to select this alternative.	3035_1
1026	1026-48	As already discussed above, Devon is strenuously opposed to closing the entire sage-grouse key habitat area ACEC to future oil and gas leasing. Bighorn RMP/SDEIS, Record No. 74, pg. 2-29. This closure will have significant impacts on future oil and gas operations, particularly where operators are not able to secure a sufficient acreage block to develop the area.	3035_9
1026	1026-47	Devon is significantly opposed to Record No. 73 that would require full reclamation bond for all oil and gas operations. Bighorn RMP/SDEIS, Record No. 73, pg. 2-29. First, such a requirement is not consistent with the BLM regulations regarding the amount of bonds. Under the BLM's existing regulations, the agency is only to increase bond amount when an operator has a history of previous violations, a notice from the Office of Natural Resources Revenue that there are uncollected royalties due, or where there is a significant reason to believe the operator will default. 43 C.F.R. § 3104.5(b). Additionally, the proposed management objective is not consistent with the BLM's recently released Instruction Memorandum regarding bonds. Instruction Memorandum 2013·151 (Jul. 3, 2013).	3023-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-46	Second, requiring unitization for the protection of resources other than oil and gas is not appropriate or practical. The BLM Draft Handbook on Unitization recognizes that a central reason for unitization is the promotion of exploration in unproven areas.	3023-3
1026	1026-45	Devon is strenuously opposed to the BLM's management objective that would require unitization would be necessary to protect other resources. Bighorn RMP /SDEIS, Record No. 72, pg. 229. First, as set forth above, the BLM cannot impose new requirements on Devon's existing leases. Requiring operators to join federal units is a radical mitigation measure because it requires those lessees not designated as the unit operator of the federal exploratory unit to surrender control over all development operations to another party.	3023-3
1026	1026-44	As set forth above, the BLM needs to carefully define and explain the extent to which the proposed stipulations and management objectives contained in Alternative E and Alternative F would be applied to existing federal leases. The language in Table 2.2-5 suggests that the new requirements would only be applied to unleased federal minerals. Bighorn RMP/SDEIS, pg. 2-28. The majority of language in the remainder of the document suggests, however, that the limitations will be applied on both existing and new federal oil and gas leases within the Bighorn Planning Area. In particular, the language in Appendix L suggests that the Required Design Features will be imposed on both existing and new federal leases. As set forth above, in significant detail, given the limitations of its authority under FLPMA, the BLM cannot impose new stipulations or COAs inconsistent with Devon's existing lease rights.	3023-2
1026	1026-43	Devon is also opposed to the BLM's prohibition on new road construction within four (4) miles of active sage-grouse leks. Bighorn RMP/SDEIS, Record No. 54, pg. 2-25. Such a restriction is inconsistent with Wyoming Executive Order 2011-5 and should be eliminated.	3039-1
1026	1026-42	Finally, the BLM has not justified the seasonal closures proposed under Alternative E. The BLM specifically admits that winter conditions are generally not a limiting factor in the Bighorn Basin for sage-grouse because snow depths are not as severe as in other parts of Wyoming. Bighorn RMP /SDEIS, pg. 3-4. Given this fact, the BLM has not justified the seasonal closures and the closures should not be implemented under any alternative in the Bighorn RMPs.	3023-3
1026	1026-41	It also appears the BLM failed to consider the significant detrimental impact seasonal prohibition on oil and gas operations could have upon the local economy. By precluding production during several months of the year, the BLM would force operators to significantly reduce their workforces on an annual basis. The management action would create a seasonal boom and bust cycle with routine maintenance workers and pumpers being laid off annually. The inconsistent nature of the work would almost certainly reduce the number of local employees lessees are able to hire, which would restrict or eliminate the long-term beneficial impacts of the oil and gas development to the local economy. The BLM's current socio-economic analysis does not account for this cycle. The BLM must eliminate this proposed management action under Alternative E and Alternative F.	3036-2

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-40	The BLM would effectively eliminate all oil and gas development in areas where production would be limited. Further, the BLM has not analyzed or considered the damage that could be done to oil and gas wells if they are shut-in on an annual basis. The BLM has also not analyzed the very real threat that federal minerals would be effectively drained by offsetting wells on State of Wyoming and private lands if federal wells are annually shut-in. The BLM must prepare this analysis in order to disclose the significant adverse impacts that would be associated with the closure of oil and gas development on a seasonal basis, including the potential loss of federal reserves and royalties.	3023-3
1026	1026-38	Road closures will also prevent year-round production operations. Even the very threat of such a radical and unjustified restriction on production operations would seriously hamper future oil and gas development in the Bighorn Planning Area because oil and gas operators would be unwilling to invest the millions of dollars necessary to drill an oil and gas well if they would be unable to produce the wells throughout the year. The BLM's belief that any oil and gas wells would be drilled in big game winter range given such overly restrictive limitations on future production is specious.	3039-1
1026	1026-37	Further, seasonal road closures may prohibit routine maintenance operations. As the BLM is aware, many types of routine oil and gas operations and maintenance activities occur year-round on active, producing oil and gas wells. BLM must recognize the routine nature of these activities, many of which do not even require BLM approval prior to the operations. See 43 C.F.R. § 3162.3-2 {subsequent well operations). Under the current BLM regulations, no prior approval and, thus, no timing limitations, are imposed upon routine activities including routine fracturing or acidizing jobs, recompletions in the same interval, routine well maintenance, or bottom hole pressure surveys. 43 C.F.R. § 3162.3-2{b), {c). The Bighorn RMP/ SDEIS does not indicate whether, or if, it intends to impose timing limitations on these routine activities in apparent violation of the BLM's regulations. Further, the BLM has not indicated whether it intends to impose timing limitations on other routine subsequent operations including those that require prior approval. 43 C.F.R. § 3162.3-2{a). In the Bighorn Planning Area the BLM routinely approved subsequent well operations quickly and efficiently and without the imposition of timing limitations. Devon is concerned the BLM intends to prohibit such activities during certain portions of the year, which may strand production, limit operational efficiencies, and otherwise reduce development potential. In certain circumstances, the inability to quickly conduct repairs and other operations on producing wells may even lead to loss of a well or permanent damage to a reservoir. The ability to conduct repair and maintenance operations is also a significant safety and environmental issue because as issues arise, operators need to be able to quickly respond to the situation. Forcing operators to comply with seasonal limitations for these otherwise routine issues may create or exacerbate significant safety and environmental issues.	3039-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-36	Devon is also concerned that the BLM's proposed management action to apply seasonal road closures would propose significant safety concerns to existing facilities. To the extent the BLM applies the limitation on even routine maintenance in this action, it is very possible minor issues necessitating repairs will not be timely corrected, which could contribute to significant or even catastrophic spills and other hazards. Devon encourages the BLM not to adopt this radical alternative.	3039-1
1026	1026-35	Devon is strenuously opposed to the BLM's proposed management action under Alternative E that would impose seasonal road closures from March 15 to June 30. Bighorn RMP /SDEIS, Record No. 52, pg. 2-25. As the BLM is aware, current seasonal stipulations in most RMPs prohibit construction and drilling activities in specific crucial winter ranges, but do not prohibit routine production operations necessary to safely maintain facilities or other routine operations. It would be inappropriate for the BLM to preclude all production operations in crucial winter range areas. Such a decision would essentially preclude year-round production operations and would lead to a significant decrease in domestic energy production. Moreover, many species such as pronghorn and mule deer have been found to habituate to increased traffic so long as the movement remains predictable. See Reeve, A.F. 1984. Environmental Influences on Male Pronghorn Home Range and Pronghorn Behavior, PhD. Dissertation; Irby, L.R. et at., 1984; "Management of Mule Deer in Relation to Oil and Gas Development in Montana's Overthrust Belt" Proceedings III: Issues and Technology in the Management of Impacted Wildlife. The BLM has not justified seasonal limitations on production operations.	3023-3
1026	1026-33	Devon supports the BLM's desire to eliminate invasive and noxious weeds within the Bighorn Planning Area. Devon believes, however, BLM should modify the language in Record No. 33 under Alternative E suggesting it will restrict activities in sage-grouse habitat that may facilitate the spread of invasive plants. Bighorn RMP /SDEIS, Record No. 33, pg. 2021. Read broadly, opponents of oil and gas development could utilize this management action to suggest that any and all surface disturbing operations, including those associated with oil and gas operations, should be prohibited. The BLM should modify this language to specifically include that activities in sage-grouse habitat will only be modified to the extent appropriate given BLM's multiple use management objectives.	3014

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-31	Devon is opposed to the BLM's proposed management in Record Nos. 20 through 26 requires the "restoration" of sage-grouse habitat rather than reclamation as is normally required. See e.g., Onshore Oil and Gas Order No. 1, Ill, D.4.j, 72 Fed. Reg. 10308 (Mar. 7, 2007);. 'Wyoming Instruction Memorandum 2012-032 (Mar. 27, 2012). First, the BLM has not adequately identified or defined the difference between restoration and reclamation. Second, existing BLM policies for oil and gas development, including Onshore Order No. 1, do not require restoration of areas disturbed by oil and gas operations. See e.g., Onshore Oil and Gas Order No.1 , Ill, D.4.j, 72 Fed. Reg. 10308 (Mar. 7, 2007); Wyoming Instruction Memorandum 2012 ·032 (Mar. 27, 2012). Rather, BLM regulations and Onshore Orders specifically require the development of adequate reclamation plans. See e.g. , Onshore Oil and Gas Order No. 1, Ill, D.4.j, 72 Fed. Reg. 10308 (Mar. 7, 2007); Wyoming Instruction Memorandum 2012-032 (Mar. 27, 2012). The BLM must ensure that its proposed management actions under Alternative E and Alternative F are entirely consistent with existing BLM regulations and policies. See e.g., Onshore Oil and Gas Order No. 1, Ill, D.4.j, 72 Fed. Reg. 10308 (Mar. 7, 2007); Wyoming Instruction Memorandum 2012-032 {Mar. 27, 2012). Requiring restoration rather than reclamation suggests a very different standard.	3035-7
1026	1026-30	Devon appreciates, and encourages the BLM to adopt, portions of Record No. 10 that recognize that valid existing rights must be honored and that the BLM should not prohibit access to federal oil gas leases. As discussed above, unless the BLM authorizes access to leased lands within the Bighorn Planning Area, the federal government, the State of Wyoming, and local governments would be deprived of significant oil and gas revenue. Devon does not support the BLM's proposal under Alternative E and Alternative F to require maintenance or amendments to existing ROWs within grouse habitat. Bighorn RMP/S DEIS, Record No. 16, pg. 2-19. As set forth above, the BLM should not modify existing rights within the Planning Area. Absent a request for renewal of such authorization} Devon also questions whether the BLM has the authority to require modification of an existing ROW.	3039-1
1026	1026-29	Devon is strenuously opposed to the limitations on new rights-of-way ("ROW") within the Planning Area under both Alternative E and Alternative F. Bighorn RMP /SDEIS, Record Nos. 9, 10, 11, 12, pgs. 4-103 -4-106. Devon believes BLM has not sufficiently analyzed the significant extent these limitations on future ROW will have upon oil and gas operations. In particular, Devon is concerned about the management of the ACECs under Alternative E and Alternative F as ROW exclusion and avoidance areas. The BLM has not justified this substantial increase in the number of acres subject to ROW exclusion and avoidance areas. Devon is particularly concerned that the ROW excludance and avoidance areas will be utilized to significantly hamper or decrease oil and gas operations. The BLM must be willing to work with oil and gas lessees and operators to design access routes for proposed oil and gas development projects. Future limitations on road construction could impact Devon's valid and existing lease rights or its rights as the operator of a federal exploratory unit within the Bighorn Planning Area.	3033-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-28	Devon objects to the BLM's decision to require operators and other users to remove, bury, or modify existing power lines within priority sage-grouse habitat under Alternative E and Alternative F. Bighorn RMP/SDEIS, Record No. 8, pg. 2-17. Requiring operators to modify even existing power lines will require significant additional surface disturbance within sage-grouse priority habitat which may cause adverse impacts to the species.	3033-2
1026	1026-27	Devon is strenuously opposed to the density and disturbance limitations proposed under Alternative E and Alternative F. Bighorn RMP/SDEIS, Record No. 7, pg. 2-17. The proposed three percent disturbance threshold is inconsistent with Wyoming Executive Order 2011-5 and has not been independently justified by sufficient science.	3035_4
1026	1026-26	Devon also does not support the BLM's proposal to designate the greater sage-grouse core habitat area ACEC under Alternative F. Bighorn RMP/SDEIS, Record No.6, pg. 2-17. The existing state of Wyoming Core Area Policy provides sufficient protection for sage-grouse within Wyoming. The designation of an ACEC is neither necessary nor warranted. Further, Devon does not believe that the BLM has sufficiently justified the creation of an ACEC using the relevance and importance criteria contained in the BLM's planning regulations. 43 C.F.R. § 1610.7-2. Devon encourages the BLM not to create an ACEC to protect greater sage-grouse.	3035_1
1026	1026-25	Devon is very concerned about, and thus opposed to, BLM's proposal to designate the greater sage-grouse key habitat areas of critical environmental concern ("ACEC") under Alternative E. Bighorn RMP/SDEIS, Record No. 6, pg. 2-17. The greater sage-grouse key habitat ACEC is not only based on an outdated outline of the State of Wyoming Executive Order Greater Sage-grouse Core Area, the boundary has been further modified by the BLM to include additional productive habitats identified by the BLM. Bighorn RMP/SDEIS, pg. 4-122.The Wyoming sage-grouse Implementation Team and the Governor of Wyoming carefully developed the Core Area Policy for sage-grouse based on the best scientific information available and in cooperation with operators and the Wyoming Game and Fish Department ("WGFD"). The United States Fish and Wildlife Service approved the core area strategy. It is inappropriate to modify or alter the boundaries of the core area in a BLM Land Use Plan. Devon encourages the BLM to revise its boundaries to correspond directly with the State of Wyoming policy.	3035_1
1026	1026-24	Devon is opposed to BLM's proposal to acquire private lands within the Planning Area in order to protect sage-grouse habitat. Bighorn RMP/SDEIS, Record Nos. 4, 5, pg. 2-17. The BLM already owns and manages the vast majority of the surface and mineral estate within the Planning Area, owning 3.1 million acres of surface lands and 4.2 million acres of federal minerals estate out of the approximately 5.6 million acres within the Planning Area. Bighorn RMP/DEIS, pg. 1-1. It is inappropriate for the BLM to attempt to acquire any additional public lands within the Planning Area.	3016-2

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-23	The BLM should clarify its proposed management action regarding categorical exclusions within priority sage-grouse habitat. Bighorn RMP/SDEIS, Record No. 3, pg. 2-16.The BLM should specifically state that the agency is free to utilize categorical exclusions established by section 390 of the Energy Policy Act of 2005 without applying the extraordinary circumstances as provided for in the CEQ regulations (40 C.F.R. § 1508.4) and the BLM's NEPA regulations (43 C.F.R. § 46.205).	3027-1
1026	1026-22	Devon is additionally opposed to the BLM's proposal under Record No. 2 to require development of wildlife resource monitoring and mitigation plans to address mineral development. First, the BLM has not justified that such a wildlife monitoring plan is necessary for each and every development activity on federal lands. Such an assumption presumes that oil and gas development will always have a negative impact on wildlife and wildlife habitat. The BLM has failed to support the position that all mineral development negatively impacts wildlife. Second, Devon believes the BLM should create a threshold for when wildlife mitigation and monitoring plans may be necessary. For example, if a single infill well is proposed within an established oil and gas area, the development of an entirely separate wildlife mitigation and monitoring plan is likely not justified.	3023-2
1026	1026-21	For the same reasons, Devon is opposed to Record No. 2 in the Bighorn RMP /SDEIS that would require the incorporation of BLM Design Features into mineral development activities on federal minerals, regardless of surface ownership. Bighorn RMP /SDEIS, Record No. 2, pg. 2-16.	3023-2
1026	1026-20	Given its nature and purpose, the BLM should carefully consider what decisions need to be made in the Bighorn RMPs. The BLM should not attempt to make site-specific decisions, but should develop only broad management goals and objectives. Further, the BLM should not expend unnecessary resources attempting to analyze the potential impacts of oil and gas development on a site-specific basis more than necessary given the uncertainty associated with the location and extent of future development.	3023-3
1026	1026-19	Devon also objects to the BLM's attempt to impose site-specific mitigation measures in a RMP. Pursuant to FLPMA, the BLM is required to develop land use plans to guide the agency's management of federal lands under its administration.	3027-1
1026	1026-18	In the revised Bighorn RMPs and accompanying EIS, the BLM should also state clearly that oil and gas lease is a contract between the federal government and the lessee, and that the leesee has a certain rights there under	3023-2
1026	1026-17	Table 2-5 -Detailed Alternatives Devon is opposed to Record No. 1 and the imposition of the Required Design Features contained in Appendix L to the Bighorn RMP/SDEIS. Bighorn RMP/SDEIS, Record No. 1, pg. 2-16. The BLM must clarify the extent to which the so-called Required Design Features will be applied to operations on existing leases. The BLM must recognize that oil and gas leases are existing rights that cannot be modified.	3023-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-16	Further, the BLM has not analyzed or disclosed the potential impacts the restrictions on future leasing may have upon operations on existing leases. As the BLM acknowledges in Map SEIS 9 and Map SEIS 10, a significant portion of the Bighorn Planning Area is currently leased for oil and gas development. Some leases, however, are isolated making them virtually impossible and not economically feasible to develop in their current state. Any responsible oil and gas producer who decides to take the risk of exploring by drilling a wildcat area must do so only after assembling a large enough block of leasehold acreage so that, if the drilling is successful, it can obtain an adequate return on the high-risk dollars invested. The BLM has, in another context, recognized the need for control of a reasonable acreage block. See Prima Oil Et Gas Co., 148 IBLA 45, 51, (1999) (BLM policy to suspend leases when "a lessee is unable to explore, develop, and produce leases due to the proximity, or commingling of other adjacent Federal lands needed for logical exploration and development that are currently not available for leasing"). The BLM must recognize, study, and report the economic impact of its decision to close significant portions of the Planning Area to leasing, or to make significant portions of the Planning Area only available with major constraints will have upon future exploration and development in the area. It is not enough for the BLM to simply assert that existing lease rights will be protected, the BLM must analyze further how existing lease rights will be impacted by future limitations on leasing and development and what protection it will afford existing leases in the above-described scenario.	3036-1
1026	1026-15	The removal of vast areas of lands from future oil and gas development and potential restrictions on existing leases under Alternative E, and, to a lesser extent, Alternative F, would also significantly restrict regional earnings, jobs, and tax revenue. According to the information presented in the Bighorn RMP/SDEIS, the adoption of Alternative E would reduce regional earnings significantly and reduce local jobs by a staggering 46% over the current management. See Bighorn RMP /SDEIS, Table 4-21, pg. 4-134. In these difficult economic times, it is inappropriate for the BLM to significantly restrict economic development opportunities. The Obama Administration has repeatedly indicated that its first priority is to create jobs for the American people, yet the BLM is proposing alternatives, including Alternative E and Alternative F, that would actually reduce jobs in the Bighorn Planning Area Such alternatives are inappropriate and should be eliminated. The BLM must not adopt an alternative that would reduce economic development, decrease domestic energy supplies, and harm the local tax base.	3036-2
1026	1026-14	The adoption of Alternative E, and, to a lesser extent Alternative F, would significantly curtail domestic production compared to both the baseline scenario and any of the other alternatives analyzed by the BLM. Bighorn RMP/DEIS, pg. 4-22.	3023-3

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-13	The overall minerals management under Alternative E and Alternative F are inappropriate because they unreasonably limit oil and gas development. As noted above, the BLM is significantly limiting potential future oil and gas development in the Planning Area by making 2,296,279 acres under Alternative E and 291,294 acres under Alternative F unavailable for oil and gas leasing. The BLM is additionally making 1,320,277 acres and 261,282 acres available to oil and gas leasing only with major constraints under Alternatives E and F, respectively. Alternative E in particular eliminates almost the entire Planning Area for mineral development and must not be selected by the BLM.	3023-3
1026	1026-12	Under FLPMA, BLM is required to foster and develop mineral development, not stifle and prohibit such development. Alternative E and Alternative F do not comply with the BLM's multiple use mandate and must be eliminated.	3027-1
1026	1026-11	Overall, Alternative E and Alternative F are overly restrictive, unnecessarily limiting oil and gas development in the Bighorn Basin, and should be eliminated from further consideration. Oil and gas development is one of the primary employment and tax revenue sources in the Bighorn Basin, Bighorn RMP/DEIS, pgs. 3·214 -3·217; 4·456 -4-477; Bighorn RMP/DEIS, pgs. 4-135 -4-144. In these trying economic times, the BLM should take every action to promote and foster the employment and revenue opportunities in Wyoming, not limit economic development and job creation. The BLM's adoption of Alternative E or Alternative F would have devastating economic impacts upon the region, State of Wyoming, and even the nation. Bighorn RMP/SDEIS, pgs. 4-134 -4-144. Oil and gas development, even on existing leases, would be significantly hampered by the BLM's management actions under Alternative E or Alternative F. Although Devon understands the importance of having a wide range of alternatives to satisfy the requirements of NEPA, the BLM must not adopt Alternative E or Alternative F.	3023-3
1026	1026-10	Given the release of the Bighorn RMP/SDEIS, it is no longer entirely clear whether Alternative D from the Bighorn RMP/DEIS remains the Preferred Alternative. The BLM should clarify the extent to which Alternative D is still the Preferred Alternative so that the public and operators like Devon can provide more specific comments.	3027-1
1026	1026-9	Under Alternative E and Alternative F, the BLM would make over 100,000 acres of oil and gas leasing unavailable for a period of two years or more, yet BLM has not complied with the clear and unequivocal requirements of FLPMA. BLM must notify Congress of its intent to close significant areas to future oil and gas development prior to finalizing the Bighorn RMPs.	3027-1
1026	1026-8	To date, the Department of the Interior has not complied with the requirements set forth in section 204 of FLPMA. Prior to approving the Bighorn RMPs, the BLM must comply with these provisions and inform the public how it will be impacted.	3027-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-7	The BLM cannot escape the withdrawal requirements imposed by FLPMA by suggesting lands are not "closed" to development, but merely "administratively unavailable" to leasing for several reasons. First, the BLM's Land Use Planning Handbook does not recognize or authorize the BLM to make lands administratively unavailable. Rather, the Handbook only recognized closed or open with varying levels of constraint. BLM Land Use Planning Handbook H-1601, Appd. C.II.H., pgs. 23-24 (Rel. 1-1693 03/11 /05). Second, the BLM admits throughout the document that administratively unavailable areas are actually closed to leasing. Bighorn RMP/SDEIS, pgs. ES-6, 4-21, 4-22, 4-23, 4-57, 4-70, 4-79. There is simply no distinction between areas administratively available for leasing and those that are closed. Finally, regardless of whether the BLM terms the closure as "administratively unavailable," eliminating the land from oil and gas leasing for the life of the plan still meets the definition of a withdrawal~ because they make large areas of the public lands unavailable for a significant period of time making a conscious, deliberate choice not to allow leasing in these areas. It is not merely deferring a few parcels from a particular lease sale. Such a formal closure constitutes a withdrawal. 1702(j). The BLM must comply with the withdrawal requirements set forth in FLPMA.	3023-2
1026	1026-6	Under Alternative E and Alternative F, the BLM proposes to make large areas of land unavailable to oil and gas leasing. Closing an area to fluid mineral leasing constitutes a withdrawal under FLPMA. Unbelievably, under Alternative E, the BLM proposes to close almost 2,300,000 acres and render them unavailable for oil and gas leasing. Because closing areas to oil and gas leasing constitutes a withdrawal, the Department of the Interior will be required to comply with the procedural provisions of section 204 of FLPMA. 43 U.S.C. § 1714.	3023-2
1026	1026-5	For example, overly stringent restrictions or conditions of approval ("COAs"), such as requiring all directional drilling regardless of technical or economic considerations, may render development uneconomic and need not be analyzed. The restrictions included in both Alternative E and Alternative F are not appropriate, and, thus, are not reasonable alternatives.	3023-1
1026	1026-4	Given the drastic limitations both Alternative E and Alternative F would have upon oil and gas development, neither alternative is reasonable and must not be selected. Devon urges the BLM not to adopt either Alternative E or Alternative F because of the drastic adverse impacts they would have upon oil and gas development and, thus, on the economy of the Bighorn Planning Area.	3023-5

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1026	1026-2	Devon is strenuously opposed to the BLM's adoption of either Alternative E or Alternative F in the Big Horn RMP /SDEIS. It is Devon's assessment that both Alternative E and Alternative F will unreasonably limit if not preclude oil and gas development, even on existing leases. Devon is aware of the difficulties inherent in managing the public lands for multiple use, but believes that the proposed alternatives are not adequate. Devon is particularly concerned that both Alternative E and Alternative F will not honor existing lease rights in violation of federal law. As the BLM is aware, a significant portion of the Bighorn Planning Area has high potential for oil and gas development. See Reasonable Foreseeable Development Scenario for Oil and Gas for the Bighorn Basin Draft Report, May 6, 2009 ("RFD Report"), Figure 20. The BLM should not unreasonably restrict access to this important source of domestic energy. Devon opposes Alternative E and Alternative F because they place far too many onerous and unreasonable restrictions on future oil and gas development. In particular, Alternative E inappropriately and unreasonably proposes to close much of the Bighorn Basin to future oil and gas leasing and places overwhelming operational restrictions and timing stipulations on the remainder of the lands. Bighorn RMP/SDEIS, Record No. 71 , pg. 2-28, Map SEIS 7. Devon is also opposed to Alternative E and Alternative F because they do not comply with the Energy Policy Act of 2005, Energy Policy and Conservation Act of 2000 ("EPCA"), the National Energy Policy, and Executive Order Number 13212 (66 Fed. Reg. 28357 (May 18, 2001)) to reduce rather than increase impediments to federal oil and gas leasing. Devon strongly opposes the adoption of Alternative E or Alternative F, or any elements thereof.	3023-3
1027	1027-25	Tri-State requests that existing authorizations and pending access authorizations be excluded from the ACEC designation under Alternatives E and F. Utilities should be allowed under their existing and future authorizations to upgrade existing facilities and improve/construct access roads associated with their facilities under either alternative. Rights-of-way in some cases might need to be expanded anywhere from 50-150 feet to allow for upgrades to these facilities.	3033-1
1027	1027-24	Tri-State is concerned that the proposed Alternatives E and F have incorporated mitigation measures that are not based on peer-reviewed science and in some cases are not a feasible option for utilities to implement (burying, modifying, or removing existing transmission lines). Tri-State is also concerned that Alternatives E and F could place restrictions on our ability to safely operate and maintain our existing facilities in violation of other federal requirements	3033-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1027	1027-23	Routing and siting of new facilities is a complex process that involves consideration of meeting system planning requirements, numerous environmental resource concerns as well as land use, prope1iy rights, safety, cost, and engineering constraints. Tri-State recommends that the DEIS and supplemental FEIS documents acknowledge this complex process and work directly with local utilities owners, operators, and local governments and municipalities when evaluating future corridors designated for use. The outcome of this approach will be a better understanding of future energy demands and a balanced approach to conserving sage-grouse and their habitat and identifying corridors that will meet customer demands.	3033-2
1027	1027-22	Tri-State requests that the BLM consider an adaptive management approach whenever requiring seasonal buffers for sage-grouse. There is a lack of peer-reviewed data to show effective buffer distances for tall structures. There has been a push in the past year by APLIC, electric utilities, and agencies alike to conduct further research to understand what man-made and other environmental variables might play a role in how tall structures may or may not affect sage-grouse. Research is also evaluating lek proximity to existing power lines which may help inform discussions on appropriate and effective lek buffers. Designation of suitable No Surface Occupancy Buffers and seasonal buffers should take into consideration the existing environment (disturbance, topography, vegetation type, etc) and the latest peer-reviewed research available.	3033-2
1027	1027-21	Tri-State requests that the BLM FEIS and RMP consider other forms of mitigation in their conservation "tool box". Mitigation in the form of funding research studies would be beneficial to both the agencies and industry in helping both groups understand the issues as well as identifying effective mitigation measures that could minimize potential effects. All stakeholders agree there are a number of factors affecting sage-grouse across the westem U.S. from habitat loss to disease to predation. Connelly and Braun 1997 and Connely et. al 2000c, state "'the effect of predation on the fluctuations and viability of sage-grouse populations has never been investigated. The National Technical Team report states that raptor predation from power poles could be a significant factor in sage-grouse mortality, yet there is still no clear understanding of the extent of these impacts on overall sage-grouse populations. Additional research funds could be used to better understand natural mortality rates from predation and would enable us to better understand, to what extent raptor predation from increased perching on power poles may affect sage-grouse populations.	3027-3

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1027	1027-20	A second issue requiring additional research is the incidence of sage-grouse collisions with power lines. To date, grouse collision risk with fences has been established. Sage-grouse collisions with power lines have been few, isolated, and anecdotal. Information to date infers no population-level impacts to grouse, but this has not been thoroughly studied. Tri-State requests that the BLM engage with members of the utility industry to gain a better understanding of utility construction and operational constraints relative to the recommended conservation measures to ensure they are reasonable and feasible given other federal and state requirements as well as general operational requirements.	3033-1
1027	1027-19	Tri-State requests that the FEIS include a review of the results of these studies and incorporates adaptive management to identify appropriate and effective mitigation measures for potential impacts associated with tall structures. The BLM's National Technical Team states that tall structures "may" negatively impact grouse populations. The availability of the science to date does not provide sufficient information for land management agencies across the West to make educated decisions relative to sage-grouse and their responses to aboveground structures. This lack of data has resulted in and could continue to exacerbate agency decisions that are not only infeasible for the electric utility industry (e.g., burying power lines), but also are not structured to support grouse in the long term. Increased communication among all the stakeholders is encouraged in order to identify the process by which new research and data is obtained and shared between the agencies and utilities.	3033-1
1027	1027-17	Tri-State requests that the BLM address in the FEIS and RMP that there is a critical lack of information and research on the effects of tall structures on sage-grouse. There are very few peer-reviewed, experimental studies designed specifically to evaluate the landscape effects of tall structures on sage-grouse according to a review conducted by the Utah Wildlife in Need, a nonprofit foundation working in cooperation with Utah Department of Natural Resources and Rocky Mountain Power (2010). Although raptors prey on adult sage-grouse, chick and egg predation typically increase following power line construction (Stahlecker 1978, Knight and Kawashima 1993, Steenhof eta! 1993, Oles 2007), however, such changes have not yet been linked to population-level impacts on sage-grouse.	3033-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1027	1027-16	Despite their declining use by electric utilities to prevent avian electrocution, perch discouragers are now being required on transmission lines by resource agencies to be installed in sage-grouse habitats to dissuade raptors and corvids from perching or nesting on power poles in areas with sage-grouse or other special status species. Perch discourager research has shown limited effectiveness in preventing perching. Discouragers actually increase the potential for nesting on structures because they provide a firm foundation for nest material. Furthermore, use of discouragers to avoid perching on a structure may increase electrocution risk, particularly on lower voltage distribution lines by forcing raptors to perch in unsafe areas (the discourager reduces the separation required to prevent bird contact from phase to phase or phase to ground). In areas where raven predation on sage-grouse nests is a concern, perch discouragers may aid in the accumulation of nest material (APLIC 2006), and could potentially increase raven predation pressure due to nest construction on discouragers in sensitive areas. The negative impacts of perch discouragers must be weighed against the limited benefits, if any, they may provide, particularly if they are contributing to mortalities of protected birds and facilitating increases in predator nesting opportunities. Hunting techniques and strategies of avian predators of sage-grouse should also be considered, because they differ for different prey species. For example, golden eagle diet is largely mammalian (80-90%, Kochert et a!. 2002). Golden eagles prey on sage-grouse opportunistically, and typically hunt sage-grouse by stooping from a high soar (Watson 1997, Kochert et al. 2002). Consequently, power poles may not play an important role in eagle predation of sage-grouse. Golden eagles are vulnerable to electrocution mortality (APLIC 2006) and perch discouragers have been correlated with increased eagle electrocution risk (PacifiCorp, in prep.). Common ravens are known predators of sage-grouse nests, yet ravens are able to overcome perch discouragers, will perch on wires, and may experience higher nesting rates on poles with perch discouragers. Because of these concerns, Tri-State requests that the BLM consider other more effective alternatives to sage-grouse conservation, such as habitat conservation or enhancement efforts, which are compatible with conservation measures for other protected species (e.g. electrocution prevention measures for raptors and other migratory birds). Consideration must be given to other federally protected species and should not result in impacts to migratory birds, including eagles.	3033-1
1027	1027-15	These proposed mitigation measures would have a significant impact on utilities ability to provide reliable power at a reasonable rate. Existing data has not shown to date that overhead power lines and raptor predation from these lines has had a significant effect on sage-grouse populations. Proposed mitigation measures need to be based on the best available science and must be proven to effectively mitigate impacts to sage-grouse and their habitat.	3033-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1027	1027-14	These same issues apply to the suggestion to re-locate transmission lines outside of priority habitats for sage-grouse. Re-locating a multi-million dollar facility is cost-prohibitive and not a viable option for Tri-State and its members in almost all situations. Transmission lines are routed to avoid impacts to the natural and human environment to the greatest extent feasible. Relocating and removing existing power lines requires local, state, and federal permits; the acquisition of new easements on private lands; and complete environmental compliance under the National Environmental Policy Act, often for facilities that have been in operation for decades. Re-locating a transmission line can cost millions of dollars in permitting, engineering, and construction fees. All of these costs are passed along to the rate payers in the community. Potential line re-location also could result in cumulative impacts to Greater Sage-Grouse from increased habitat fragmentation across the landscape for power lines that cross federal and private lands and, therefore, could not be moved entirely out of a geographic area (due to engineering constraints or established electrical paths).	3033-2
1027	1027-13	Direct impacts to sagebrush habitats increase when burying a transmission line versus building an overhead line. The ROW required to construct and operate an underground transmission line is generally wider and would result in more direct impacts to sagebrush habitats, increasing habitat fragmentation for sage-grouse. Burying transmission lines can result in greater ground disturbance and more regular maintenance in seeding and weed prevention. It is important to consider the other resources (biological and cultural) and conservation objectives associated with burying a high voltage transmission line compared to the ground disturbance for an overhead line. Restoring sagebrush habitat and weed control in a wide linear corridor is inherently difficult and the BLM has acknowledged that sagebrush restoration can take decades to reach pre-construction results/conditions. Minimizing impacts to sagebrush habitats is identified in the Greater Sage-Grouse Interim Management Policies and Procedures (JM 2012-043), and the Conservation Objectives Team Final Report, but the recommendation to bury transmission lines contradicts this approach	3033-2
1027	1027-12	Other factors regarding the feasibility of building an underground transmission line include longevity, maintenance and operational issues, and increased habitat fragmentation effects. Underground transmission lines typically have half the life expectancy of an overhead transmission line and when an outage occurs on an underground line, it takes much longer to respond because it is difficult to pinpoint and reach the source of the outage. Repairs will take longer and require additional ground disturbance, potentially increasing disturbances to sensitive habitats.	3033-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1027	1027-11	Construction costs per mile for a new overhead I 15kV transmission line average between $270,000-$300,000 dollars per mile (based on two new lines constructed in the San Luis Valley and Telluride area). Increasing these costs by 6 -I0 times would create a significant economic impact to our member entities and individual rate payers. If the new lines were required to be constructed underground the costs would increase to an average range of $1,620,000 $3,000,000 dollars per mile. Tri-State recently completed the Nucla-Sunshine transmission line project that required 9 miles of line to be constructed underground. The cost for undergrounding the 9 miles of the Nucla-Sunshine line was $ I 9, 000,000 dollars or just over $ 2. I million dollars per mile. In another project, the cost for re-building 30-miles of existing transmission line (construction labor and material only) was $12.6 million dollars. Here, underground construction would increase those costs to between $2,520,000 and $4,200,000 dollars. For this reason it is imperative that mitigation for sensitive species is proven to be necessary and effective as our entire cooperative network shares these costs.	3033-2
1027	1027-10	The Supplemental EIS calls for co-locating power lines within existing ROWs. For operational and safety reasons, utilities frequently cannot co-locate facilities within existing ROWs. Utilities are required to maintain clearances identified in the National Electric Safety Code for the safe and reliable operation of our transmission system. The Final EIS should recognize requirements, policies and guidelines defined by the North American Electric Reliability Corporation (NERC) and the Federal Regulatory Energy Commission (FERC) for the safe and reliable operation of transmission systems. Tri-State requests the RMP is clarified to state that linear facilities should parallel existing ROWs (not co-located within) to the greatest extent feasible, in order to make this a viable management option and to comply with utilitiesÂ· other federally mandated operation standards and guidelines.	3033-2
1027	1027-9	Tri-State is unclear on how the BLM would implement management directive #8 in Table 2-5 under Alternative E: Managing sage-grouse Key Habitat Areas ACEC so that anthropogenic disturbance does not exceed one disturbance per 640 acres and cover less than 3% of total sage-grouse habitat regardless of ownership. The management directive also recommends prohibiting further disturbance in Key Areas ACEC where the 3% threshold is already exceeded until enough habitat has been restored to reduce impacts below the 3% disturbance threshold. How would these disturbance thresholds apply to both existing authorizations and for future transmission line authorizations that may occur in Core or Key Areas? If existing utility corridors are included in the ACEC designation regardless of alternative, Tri-State is concerned that if improving an existing access road within 4 miles of an active lek exceeds the 3% disturbance allowance for any given area, access could be restricted by the BLM. Tri-State currently builds access roads to the minimum standard required for operation and maintenance purposes and complies with seasonal restrictions in sensitive areas. Additional mitigation for existing access rights or prohibiting access improvements will affect our ability to safely maintain and operate existing facilities.	3035_4

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1027	1027-8	Tri-State's comments on travel management for Alternative F are similar to those discussed above for Alternative E. It is imperative that TriState is able to access its facilities and in some cases build new roads to access these facilities. Tri-State appreciates that Alternative F acknowledges the ongoing use of existing access roads. We request that roads that are currently being proposed for authorization for our Lovell-Big George transmission line are considered in this category. Tri-State has provided this data to the BLM for review.	3039-1
1027	1027-7	Tri-State regularly complies with seasonal restrictions to reduce impacts to sensitive species; however, we request that the BLM acknowledge that in an emergency situation (line outage), Tri-State is required by federal law to get the facility repaired immediately regardless of weather or season to ensure the safe, reliable transfer or power to our member systems.	3039-1
1027	1027-6	Road improvement and creation would be conducted to the minimum standard to reduce impacts to sage-grouse habitat. Alternative E would also not allow the upgrading of existing routes that would change route category. If a road has been authorized for administrative use only, Tri-State requests that maintenance and road improvements be approved (when necessary for maintenance activities) for the safe access and operation of our maintenance vehicles and equipment.	3039-1
1027	1027-5	Alternative E prohibits new road construction within 4 miles of an active lek site and requires the development of travel management plans that minimize impacts to sage-grouse habitat. In addition, Key Habitat areas would be managed under a seasonal closure restricting motorized use from February 1 through July 31. Tri-State is concerned that this alternative could prevent access to and therefore, maintenance of our existing facilities. Tri-State requests if this alternative is selected that existing permittees are allowed to improve and build new roads to access transmission structures when required.	3039-1
1027	1027-4	Table 2-5 of the DEIS recommends closing designated roads in sage-grouse priority habitats (which includes BLM Key Habitat Areas and State of Wyoming Core Areas) under both Alternatives E and F. The ability to safely maintain, operate, and access our existing electric delivery facilities is crucial to providing a reliable source of electricity to our customers. Tri-State requests that the BLM acknowledge in the final RMP supplement that access is a critical component to existing facility authorizations and that the BLM would not close designated or non-designated roads that may be critical to maintaining our existing electrical facilities in Core and Key Areas.	3039-1
1027	1027-3	As discussed above, Tri-State requests coordination with the BLM to incorporate existing facilities into planning efforts and into the Rights-of-Way and Corridor designation. We also request that if these existing transmission line corridors and substations occur in areas proposed as Areas of Critical Environmental Concern (ACEC) under Alternatives E and F; that the BLM consider these corridors and facilities excluded from this ACEC designation.	3033-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1027	1027-2	In reviewing the maps associated with the Supplemental EIS (Current Management Right-of-Way and Corridors), it appears that the lines listed above are not in the BLM's database and were not recognized as existing utility corridors during planning efforts (Figure 3). Tri-State requests that these transmission lines be included under the Current Right-of-Way and Corridors designation.	3033-2
1027	1027-1	In reviewing the maps associated with the Supplemental EIS (Current Management Right-of-Way and Corridors), it appears that the eastern portion of the Lovell-Big George transmission line is not in the BLM's database and was not recognized as an existing utility corridor during planning efforts. Figure 1 shows the remainder of the line as it travels towards the Lovell Substation. Tri-State requests that the entire line be included under the Current Right-of-Way and Corridors designation.	3033-2
1028	1028-52	Manier et al. (2013) provides a fairly comprehensive review of potential impacts of livestock grazing on sage grouse.64 Manier et al. (2013) point out that a reduction in livestock stocking rates can directly increase residual vegetation substantially, potentially assisting in meeting this target level for grasses. BLM should include residual grass requirements inside all sage-grouse habitats to be applied as automatic amendments to permit terms and conditions and Allotment Management Plans. Due to their reliance on sagebrush, sage-grouse are great indicators of the health of the sagebrush steppe ecosystem on which they depend. Literature previously cited indicates that sage-grouse need higher levels of sagebrush canopy cover than the RMP indicates and livestock reduce that cover.	3017-3
1028	1028-51	The chosen alternative for the RMP should also include specific direction and language authorizing the permanent retirement of voluntarily waived BLM grazing permits, regardless of the location within the planning area. The BLM Worland Field Office should utilize the process outlined by BLM IM No. 2013-184, released on September 9, 2013 and incorporate the Relinquishment Decision Tree as an Appendix in the plan, relieving the agency of the need for a subsequent plan amendment when site-specific relinquishments are offered. The Final EIS/RMP should also include suggested language for permit retirement authorizations as follows: Grazing privileges for allotments that are wholly or partially located within the Cody and Worland Field Offices planning area that are lost, relinquished, canceled, or have base property sold without transfer shall have attached AUMs held for watershed protection and wildlife habitat.	3017-1
1028	1028-49	The DRMP meets requirements of this IM because the conservation alternative considers meaningful reduction in lands available for grazing or forage amounts. Alternatives B and E contemplate closing I,988,927 acres to livestock grazing, leaving about 1.2 million acres still available for grazing.88 The other alternatives do not consider meaningful reductions in lands available for grazing.89 Of the proposed alternatives, Alternatives B and E present the most meaningful protection of sage-grouse and sage-grouse. While the consideration of reduction in Alternatives B and E may meet the requirements of the IM, the other alternatives do not provide sufficient protection of sage-grouse and sage-grouse habitat.	3017-2

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1028	1028-47	The EIS and RMP must also address the fact that livestock sizes, and thus forage consumption, have increased dramatically since the AUM was defined. Failure to address this critical issue will lead to legal vulnerability under NEPA, Administrative Procedure Act and the False Claims Act.	3017-2
1028	1028-46	Meaningful alternatives must define specific measurable terms and conditions for livestock grazing. BLM must develop alternatives and adopt that alternative that charts a rapid, site-specific path forward to ensure protection of remaining native vegetation communities through passive restoration. BLM must prioritize areas based on habitat recovery needs, connectivity (reducing habitat fragmentation) and population viability needs, and other vital information necessary to maximize sagebrush ecosystem protections and efficiency of recovery and protection.	3035_1
1028	1028-45	BLM must fully analyze environmental effects of the No Grazing Alternative in depth. This includes conducting a full and fair capability and suitability analysis, where lands with significant conflicts with grazing are removed and retired from grazing disturbance impacts. This analysis is essential to set a solid comparative effects baseline and fully understand the significant ecological toll of any continued grazing use.	3017-2
1028	1028-44	Furthermore, meeting the requirements of the Wyoming Standards for Healthy Rangelands does not equate to protecting sage-grouse and sage-grouse habitat, as these standards were not written to protect sage-grouse habitat. A hard look must be taken at whether the Standards for Rangeland Health are even sufficient measures of sage-grouse habitat value; a recent ruling in the Office of Hearings and Appeals (Department of Interior) suggests that BLM's qualitative and inconsistent monitoring methods do not assure habitat protection and cannot be the full measure of grazing impacts to this species.	3035_6
1028	1028-43	The BLM must at least analyze the no grazing alternative to determine whether it is a viable alternative. Considering the scientific evidence demonstrating that the elimination of grazing is the only way to protect and restore many areas, the BLM should provide analysis of that important option.	3017-2
1028	1028-42	The Purpose and Need of the DEIS states an intent "to thoroughly consider the conservation measures identified in the Greater Sage-grouse National Technical Team (NTT) Report on National Greater Sage-Grouse Conservation Measures (Sage-grouse NTT 2011), as referenced in BLM IM 2012-044."85 However, the DEIS fails to considers a reasonable range of alternatives. The most likely alternatives considered propose no meaningful, enforceable, regulatory changes to livestock grazing practices in the planning area, despite the numerous and severe impacts of livestock grazing on sage-grouse habitat and other values.	3035_1
1028	1028-40	In accordance with its multiple use mission, the BLM must consider land uses other than grazing in its calculation of the economic and social values of each alternative, including administrative costs and environmental impacts to water, wildlife, plants, recreation, potential species loss, intrinsic land value, and beauty. WWP asks that the social and economic calculations presented in the RMP address these important issues.	3036-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1028	1028-39	The Supplemental DRMP states that under Alternative E livestock grazing would contribute 134 jobs, and under Alternative F livestock grazing would contribute 186 jobs. 84 However, this comparison, like the comparison of annual earnings and output of each alternative, fails to account for agency administrative costs, increased recreational income due to improved environmental conditions from decreased grazing, and other factors that WWP urges that BLM consider in its analysis.	3036-1
1028	1028-38	Furthermore, there is great potential for administrative cost savings for BLM from reduced grazing. Decreased grazing would save the BLM costs associated with environmental analysis, litigation, grazing permit administration, predator control, weed spraying, and costly efforts to preserve species harmed by grazing. The GAO found that it cost the federal agencies approximately $23.50 per AUM to administer the livestock grazing program yet only .67 cents of the grazing fee goes towards covering those expenses.77 Disappointingly, RMPs tend to calculate economic and social values based almost exclusively on potential profits or lost profits of buying and selling cattle. The Bighorn Basin RMP should consider these important factors.	3036-1
1028	1028-37	The current grazing utilization level (what is it? I think they dumped the old RMP utilization limits) is unsustainable, and restoration of the land will require costly action by the BLM._A thorough economic calculation must consider the value lost from negative environmental impacts to: water quality and quantity, wildlife habitat quality and quantity, and native vegetation. The costs of further exotic species and weed expansions, diminished recreational opportunities, potential species loss, intrinsic land value, and beauty must also be calculated.	3036-1
1028	1028-36	The economic and social value of public lands livestock grazing often receives disproportionate weight in BLM RMPs. The importance of public lands grazing to the economy is often grossly overestimated. In the Final RMP, the comparison of social and economic values of the proposed alternatives should demonstrate a clear understanding and consideration of the conflicts between continued grazing and other uses of the public lands.	3036-1
1028	1028-35	Furthermore, the DEIS analysis includes no discussion of the other ways that cattle contribute to climate change, such as impacts to the carbon sequestration or storage of the lands themselves, and the effect of allowing livestock to utilize an unspecified percentage of the vegetation each year. The Final RMP/EIS must address the issue of climate change.	3002
1028	1028-34	The Supplemental DRMP acknowledges the issue of methane emissions from cattle, stating that "Animal Unit Month (AUM) projections under alternatives A, C, D, and F are similar, and therefore would result in similar CH4 [methane] emissions. Alternatives B and E would reduce AUMs by about 50 percent, resulting in a proportional reduction in CH4 emissions from enteric fermentation." Only the selection of Alternative B or E would address the climate change impacts of livestock grazing.	3002

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1028	1028-33	The document provides appendix L on Best Management Practices but fails to provide information regarding how these will be implemented and whether they are required components of any alternative(s). Furthermore, this section completely ignores any requirements related to the primary impact across the Bighorn basin which is livestock production.	3035_3-1
1028	1028-32	The document fails to provide the monitoring requirements stating that the BLM is "currently in the process of finalizing a monitoring framework". The result is that this critical component is not available for public review. This does not comply with NEPA.	3035-7
1028	1028-31	Unfortunately, the document fails to address the issue of livestock grazing as a contributor to the spread of West Nile virus among sage-grouse. Water developments installed on public lands for livestock serve as breeding grounds for mosquitoes and can thus increase the spread of West Nile virus, and "[e]liminating mosquito breeding habitat from anthropogenic water sources is crucial for reducing impacts.54	3035_6
1028	1028-29	Despite admissions of the negative impacts of livestock grazing, the DEIS, particularly the preferred alternative, fails to address livestock grazing in a way that would protect sage-grouse and sage-grouse habitat. In the Supplemental DRMP, BLM appropriately recognizes: There are many sources of habitat alteration, all of which may affect the greater sage-grouse... Livestock grazing, fuels treatments, and weed infestations are factors that may cause habitat degradation depending upon severity, intensity, and design. 51 Despite this acknowledgement of the impact of livestock grazing on sage-grouse habitat, DRMP's preferred alternative would continue grazing at high levels and allow vegetation treatments to the detriment of sage-grouse. Furthermore, the Affected Environment section later acknowledges threats to special status species and vegetation, but fails to mention livestock grazing.	3017-3
1028	1028-28	The EIS states that "alternative F manages grazing lands consistent with alternative D, except in greater sage grouse core habitat areas ACEC where the BLM prioritizes the consideration of sage grouse habitat objectives and management considerations over livestock grazing objectives through the imposition of restrictions on livestock grazing location and timing, and range improvement projects."45 However this critical issue, prioritizing sage grouse habitat objectives over livestock grazing, has not been declared within the proposed RMP.	3035_6
1028	1028-27	In our reading of the supplemental EIS, we could find no evidence that the BLM has shifted its preferred alternative from alternative D to one of the two alternatives that attempt to deal with this sage grouse issue, so it appears that the BLM is using this only as an exercise and does not plan to even implement the week measures in the two new alternatives.	3027-1
1028	1028-26	The DEIS states "despite the long-term declines in populations, implementation of the Wyoming governor's executive orders for sage grouse may help alleviate these declines,"44 but this statement is not supported by evidence.	3035_2

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1028	1028-25	The DEIS does not sufficiently address the issue of species recovery. The DRMP states that "the highest level objective ... [is] reversing negative population trends." 3 However, Record # 115 discusses adaptive management and sage grouse populations. Here the BLM attaches itself to State of Wyoming population objectives, which it says are "to maintain at least 67% of the 2005 to 2008 sage grouse core area population within the state of Wyoming". So the BLM here is admitting that the actions proposed are meant to achieve a one third reduction in the populations that the US Fish and Wildlife Service had determined made the species warranted for listing under the ESA. Further, the BLM's population objectives are only within core areas and do not even apply to areas excluded from core areas.	3035_2
1028	1028-24	Record # 101 fails to implement any trigger to "analyze" existing water developments and as such it will never happen and therefore from a sage grouse recovery perspective the direction provided is worthless. The same applies to #103 and #106.	3035_6
1028	1028-23	Record #97 provides that in those few riparian areas that do meet the minimal level of PFC the BLM well "strive" to attain further improvements. Such direction to "strive" is meaningless.	3034
1028	1028-22	Record #95 proposes to manage "riparian areas and wet meadows for proper functioning condition". This objective has been BLM policy since the mid-1990s and has rarely been achieved. In addition, PFC as defined in the technical reference, is merely the minimum physical functioning to withstand a 20 year flood event and is well below the condition necessary to provide fisheries or wildlife habitat needs.	3034
1028	1028-21	The DEIS suffers from flaws in its logic regarding impact analyses in riparian areas. As an example in the executive summary the document states that "alternative E would result in the greatest beneficial impacts to riparian-wetland resources through restrictions on surface disturbing activities". 2 These are not beneficial impacts, but reduced negative impacts. Furthermore, because the BLM has arbitrarily defined surface disturbing activities to exclude livestock grazing, the primary impact within riparian-wetland areas, livestock grazing, is ignored.	3017-3
1028	1028-20	The BLM must modify its preferred alternative that protect and restore sage-grouse habitat, native plants, particularly in riparian areas. This should be done, not with fencing that poses other problems for sage-grouse and other wildlife, but through reduction and removal of livestock grazing in pastures that include riparian areas. The Final RMP should include stipulations prioritizing riparian habitat protection for sage-grouse and other species.	3035_6
1028	1028-19	The DRMP states: "livestock grazing in greater sage grouse habitat can have both adverse and beneficial impacts".39 No references are provided to support the statement that livestock grazing has beneficial effects on sage grouse habitat. As described and referenced in this document, livestock grazing in sage grouse habitat increases fragmentation, causes fence strike mortality, causes direct disturbance to nesting habitat, reduces residual cover, causes long-term plant community changes which degrade sage grouse habitat and other impacts. We could find no support whatsoever in the literature that livestock grazing improves sage grouse habitat.	3035_6

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1028	1028-18	Stunningly, the document contains no data whatsoever regarding current sage grouse habitat conditions or population data nor how these compare to the objectives laid out in the proposed RMP. There is no information regarding the discrepancy between these two nor any examination of the effectiveness of the proposed actions. This clearly does not comply with the "hard look" requirement of NEPA .	3035_2
1028	1028-17	The Supplemental DRMP virtually ignores the threat of livestock grazing to sage-grouse habitat, stating that "the primary threats to this portion of the population are energy development and transfer including both renewable and nonrenewable resources, long-term drought and sagebrush eradication programs."32 However, this completely ignores the fact that energy development occurs on a small percentage of the sagebrush habitat, while livestock grazing occurs on many more acres. The primary long-term threat is the widespread conversion of mid-stature cool season bunchgrasses, that did not evolve with significant herbivory, to short stature, grazing tolerant species. This conversion has occurred throughout much of the Bighorn basin already and is the primary source of habitat degradation across the planning area.	3035_6
1028	1028-16	This information should be integrated into the "No Grazing" or "Reduced Grazing" alternatives and, given these findings, the BLM should analyze the impacts of long-term authorized grazing and its impacts on sagebrush communities and obligates compared to the impacts of removing livestock and allowing these communities to recover naturally.	3017-2
1028	1028-15	The DRMP/DEIS fails to fully consider the impact of livestock grazing on the full suite of resources in the project area.	3017-3
1028	1028-14	The BLM is responsible for "Ensuring that BLM activities affecting Bureau sensitive species are carried out in a way that is consistent with its objectives for managing those species and their habitats at the appropriate spatial scale."23 This is true for every Sensitive Species in the field office, not just sage-grouse, and the DRMP/DEIS does not place enough emphasis on minimizing and eliminating threats from livestock grazing.	3017-3
1028	1028-13	WWP is concerned that no alternative will uphold BLM's obligation to manage Sensitive Species to "minimize or eliminate threats," and not "contribute" to the need for listing, either within or outside of sage-grouse Core Area habitats. As detailed elsewhere in these comments, mitigation measures applied under the proposed alternatives will inevitably lead to serious impacts to sage grouse populations within Core Areas and elsewhere and, for the most part are unenforceable, and therefore not "adequate regulatory mechanisms". This result represents an unnecessary and undue degradation of key sage grouse habitats.	3035_9

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1028	1028-12	The U.S Fish and Wildlife Service will consider the Policy for Evaluating Conservation Efforts ("PECE Policy") as the yardstick to determine the adequacy of existing regulatory mechanisms when considering whether listing is warranted. Implementation must be certain and the proposed plan in question must be known to be effective. According to the PECE policy, "We will make this evaluation based on the certainty of implementing the conservation effort and the certainty that the effort will be effective."8 The BLM must incorporate this certainty into the current planning effort. The current supplement fails to provide any information regarding these two key factors.	3035_2
1028	1028-11	The BLM National Sage-grouse Habitat Conservation Strategy is entitled "Guidance for the Management of Sagebrush Plant Communities for Sage-Grouse Conservation," and hence is directly applicable to the Bighorn Basin planning area. The Strategy includes a host of enforceable limitations and requirements on livestock grazing to protect sagebrush habitats, and to maintain, enhance or restore sagebrush habitat, including: Avoid constructing livestock management facilities (i.e., corrals, tanks, troughs, pipelines, fences, etc.) next to leks; Design and locate the placement of fences for livestock .. . so as not to disturb important sage-grouse habitat areas; Consider seasonal closures to protect priority sage-grouse habitat if other alternatives will not achieve desired objectives; Use grazing practices that promote the growth and persistence of native shrubs, grasses and forbs needed by sage-grouse for seasonal food and concealment. . . Vegetation structure (height) should be managed so as to provide adequate cover for sage-grouse during the nesting period; Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young sage-grouse; Maintain sagebrush and understory diversity ... adjacent to crucial season sage-grouse habitat unless removal is necessary to achieve sage-grouse habitat management objectives; Where other grazing management options are not achieving, or cannot achieve, the desired objectives, a short-term option may be livestock exclusion These measures must be directly incorporated in the current plan.	3035_6
1028	1028-10	According to BLM IM 2012-44, "The conservation measures developed by the NIT and contained in Attachment 1 must be considered and analyzed, as appropriate, through the land use planning process by all BLM State and Field Offices that contain occupied Greater Sage-Grouse habitat." This must be done fully in the Bighorn Basin RMP EIS. IM 2012-44 does not provide an option not to analyze these measures in at least one alternative unless a clear finding is provided that the measure is not appropriate, and BLM has provided no such findings in the context of the RMP.	3035_1
1028	1028-8	The BLM is required to meet the water quality standards of every state in which it administers public lands. Livestock grazing in and near streams results in increased E. coli and fecal coliform bacteria. The Final EIS and RMP must explain how the plan complies with Wyoming surface water quality standards for E. coli and fecal coliform bacteria.	3044

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1028	1028-7	The National Environmental Policy Act ("NEPA") requires that the BLM consider a reasonable range of alternatives. See 42 U .S.C. § 4332(2)(C)(iii). Considering the presence of endangered, special status, and sensitive species in the planning area, a no grazing alternative and 50% reduction from actual use, in permitted grazing should be included within the reasonable range of alternatives for the Bighorn Basin DRMP.	3035_1
1028	1028-6	The EIS/DRMP fails to explicitly state that the desired outcome of the RMP is to recover sage grouse and its habitat to insure that the species is no longer warranted for listing under the ESA. As such the "allowable uses and actions" do not directly address the desired outcome.	3035_1
1028	1028-5	The DRMP fails to provide specific measurable terms and conditions related to livestock management sufficient to meet the requirements of FLPMA's unnecessary or undue degradation and multiple uses provisions. Western Watersheds Project urges the BLM to add specific measurable objectives for livestock grazing specific to riparian areas, uplands, and impacts on sensitive species habitat in order to comply with FLPMA, beginning with the terms and conditions mentioned above.	3017-2
1028	1028-4	The preferred alternative does not meet the requirements of FLPMA. FLPMA requires the BLM "take action necessary to prevent unnecessary or undue degradation of the lands[.]" 43 U.S.C. § 1732 (b). FLMPA also requires that the BLM manage lands for multiple uses, "without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output." 43 U .S.C. § 1702(c). Permitting ongoing livestock grazing cannot be justified under these parameters.	3017-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1028	1028-3	In regard to livestock grazing, Western Watersheds Project urges the BLM to add the following to the Final EIS and RMP: (I) Specific measurable terms and conditions for livestock grazing in riparian areas, uplands, and wildlife and fisheries habitat. The 20I0 US Fish and Wildlife Service "warranted but precluded" decision stated that sufficient management terms and conditions were not in place to protect the sage-grouse. Because NEPA analysis is rarely performed on grazing allotments, due to the BLM's addiction to the 2005 Appropriations Rider, the terms and conditions must be immediately incorporated into any existing use authorizations in order to meet adequate regulatory mechanisms of ESA. These terms and conditions must be specific to sage-grouse habitat, and include: (i) A minimum of 7" stubble height remaining on hydric soils riparian greenlines after livestock grazing; (ii) A 10% maximum annual bank or wetland alteration from all sources for streams and wetland hydric and mesic soil areas of upland seeps, springs, wet meadows and aspen clones; (iii) A maximum annual woody browse utilization by all browsing ungulates of 15% on cottonwood, aspen, woody shrubs, and willows; (iv) A maximum annual grazing utilization of perennial grass species on upland landscapes by all grazers of25%; (v) A minimum 9" residual perennial native grass cover for ground-nesting birds; (2) Additional alternatives that represent a range of grazing levels; and (3) Authority for the permanent retirement of voluntarily waived grazing permits in every alternative of the Final EIS. (4) Standards and Guidelines assessments must be completed on all allotments within sage grouse habitat within 5 years of signing the Record of Decision ("ROD"). These assessments in addition to the standard procedures, must gather habitat condition data to be used in the decision-making process. Allotments within sage grouse habitat that are not in HCPC or >75% Similarity Index must have significant reductions in AUMs in order to allow recovery cool season grasses in order to provide sage grouse habitat. Much of the Bighorn Basin has been converted from grazing intolerant cool season brunch grasses to short stature increasers. Management changes that immediately address this issue must be implemented in order to provide for sage grouse habitat recovery. (5) Given the importance of changes in livestock management, the RMP must require full processing of all permits within sage grouse habitat or else all the actions proposed will never be implemented due to the BLM's addiction to the Appropriations Rider. Without this requirement in the RMP none of the livestock related actions could be considered "adequate regulatory mechanisms".	3035_6

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1028	1028-2	Responsible land management requires the use of ecologically sound, science-based analysis in the determination of appropriate livestock grazing levels. Unfortunately, the Bighorn Basin DRMP fails to sufficiently address the environmental impacts of livestock grazing. From the NEPA prospective, the BLM has failed to sufficiently discuss the effectiveness of its proposed actions or provide sufficient information regarding their effect on sage grouse populations and their habitat. The DRMP document falls short of providing the depth of analysis and consideration of grazing alternatives warranted by a land use plan that will govern lands managed by the Worland and Cody BLM Field Offices. A reader of the document is provided almost no information regarding the outcome for sage grouse of the various alternatives nor is there any population viability analyses provide added as references. This does not fulfill the "hard look" requirement of NEPA.	3035_6
1028	1028-1	Unfortunately, the DRMP fails to meet this purpose and need. The proposed DRMP fails to significantly address the "present and threatened destruction, modification, or curtailment ofthe habitat or range of the greater sage-grouse." In addition, RMP fails to implement the "regulatory mechanisms" that would be necessary for the recovery of the species. Regulatory mechanisms under the ESA must be mandatory and enforceable. The vast majority of the supposed actions proposed do not fit either of these requirements.	3035_1
1029	1029-18	Phased development and phased leasing are two important means for limiting environmental impacts. Phased development can "leave areas of habitat undisturbed by ongoing construction and drilling activity while other areas are developed" and developed areas "would be required to undergo interim reclamation before drilling could move on to the next area." Manual Phased leasing "could provide the opportunity to lease a limited and less sensitive for development in order to determine the area's production potential." /d. at V-6. This should be part of an adaptive management approach "so that if oil and gas were successfully discovered and produced there would then be the opportunity to analyze the impact of additional leasing." Id.	3023-3
1029	1029-14	We believe the DEIS and the Supplement define resource condition objectives that should be applied and sought in the A-B Front, Fifteen Mile Basin, and Bighorn Front MLPs. For example, under alternative E, which we think is appropriate for application to these three areas, anthropogenic disturbance will not exceed 640 acres and it will cover less than 3 percent of total sage-grouse habitat	3023-6

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1029	1029-13	These disturbance level specifications and habitat structural specifications establish resource condition objectives for these three MLP areas. Notably, they would help ensure greater sage-grouse conservation, among the many other resource values that would benefit from development of MLPs. Importantly, these Resource Condition Objectives must be based on the "vision" for the Master Leasing Plans. If the vision in these MLPs prioritizes (and it should prioritize) the avoidance of potential impacts on lands with wilderness characteristics, crucial big game winter habitat, wildlife migration corridors, greater sage-grouse core areas, recreational opportunities, scenic viewsheds, and more, the resource Condition Objectives should provide clear standards (numeric or otherwise) and measures for implementing that vision. A Resource Condition Objective must be developed for each of the values recognized in the MLP area: thus, a Resource Condition Objective for Lands with Wilderness Characteristics should be developed and prioritized with the conditions for the other recognized issues, in accordance with the MLP vision.	3023-6
1029	1029-7	In both the DEIS and SEIS, the BLM has examined a variety of management decisions to recognize and/or protect these resource values. As shown on maps in both the DEIS and the Supplement, there are, or will be, a large number of special recreation areas and ACECs in the MLP areas. These special designations demand special management of oil and gas leasing and development in these areas. There are large areas of inventoried lands with wilderness characteristics (LWC) in these MLP areas. DEIS Map 63. The Wyoming Outdoor Council advocates that all LWC be managed to protect their wilderness characteristics in the Master Leasing Plans. The Absaroka-Beartooth Front and the Bighorn Front border Forest Service lands, some of which are wilderness areas or roadless areas; cross-jurisdictional consistency of resource values and associated management are key in these two landscapes. Cultural resources are equally important as ecological values; the Nez Perce National Historic Trail traverses the northern part of the Absaroka-Beartooth Front and must be considered in the "A-B Front" MLP. DEIS Map 73. The extraordinary fisheries and wildlife values of these MLP areas are undeniable. DEIS Maps 30, 32, 34, and 35. Supplement Maps -14 and -15. The Bighorn Basin is obviously a sage-grouse stronghold where many potential conflicts are presented between conservation of this species and oil and gas development. The visual qualities of the MLP areas are also undeniable. DEIS Maps 39 and 41. Supplement Maps SEIS-16 and -17. And as to soils, at a minimum the extensive badlands and "hoodoos" in the Fifteen Mile Basin certainly present potential resource conflicts. All of these resource values should be recognized as BLM develops MLPs for these areas.	3023-6
1029	1029-3	The vision statement for these three Master Leasing Plans should also acknowledge the need to address conflicts not only with future leasing, but with future development, including developments on existing leases. The Supplement provides for a range of alternatives regarding resource protection measures that can be incorporated into these MLPs for existing leases. For example, Alternative E considers adding no surface occupancy (NSO) stipulations to APDs for the Greater Sage-Grouse Key Habitat Area of Critical Environmental Concern.	3023-6

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1030	1030-11	Additional peer-reviewed, scientific literature on sage-grouse is constantly developing addressing new behavioral patterns, habitat requirements, management implications, and population statistics. It would be appropriate for the BLM to provide itself with decision space in the Bighorn Basin RMP that allows for increased management stipulations and disturbance restrictions if research shows current approaches to be inadequate to protect sage-grouse populations from energy development. The greater flexibility inherent in such a system should allow for improved decision-making regarding the appropriate scale and extent of energy development in priority (core) sage-grouse areas.	3035_9
1030	1030-10	In order for Adaptive Management to be best utilized, adequate monitoring and data collection must be implemented. We recommend a tiered approach to monitoring, starting locally and working up to a national level. The local level would encompass geographically related habitats (for example, the Bighorn Basin) and data collection by Wyoming Game and Fish Department (WGFD) in collaboration with local working groups, BLM, U.S. Forest Service (USFS), and private land owners would monitor population trends and habitat integrity on a local level. The next level of management would be at the state level, under the Executive Order and in collaboration with WGFD, to monitor state-wide trends in population. Third would be trends on a regional scale recognizing the cross-state boundaries of Management Zones set by the USFWS Conservation Objectives Team (USFWS 2013), and finally at the national level as trends are monitored between states and management zones. The only way that Adaptive Management will function as a regulatory mechanism will be if trigger actions and trigger points for population trends and sagebrush ecosystem health are pre-determined, data are faithfully collected, analyzed, and compared to both trigger points and target population numbers, and management actions are strictly and effectively monitored and implemented properly. We strongly recommend that Adaptive Management be included in the final RMP and not as part of an alternate document.	3035-7
1030	1030-9	Adaptive Management is critical when addressing future threats to sage-grouse, primarily when considering declining population numbers. We recommend setting trigger points for identifying management action if and when population numbers reach a certain level of decline. When the trigger point is reached, additional management actions that provide further protections-such as treating non core area leks as core area leks, establishing core areas as Administratively Unavailable for oil and leasing within 4 miles of active and undetermined leks, etc.-should be implemented. The Wyoming Outdoor Council strongly advocates the inclusion of Adaptive Management in the Big Horn Basin RMP to allow for the best management decisions to continually be made as emerging research provide information over the life of the plan.	3035-7

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1030	1030-8	We advocate the BLM incorporate Alternative E's decisions regarding rights-of-way into the preferred alternative and FEIS-regardless of whether the ACEC designation is forwarded to the FEIS. Managing the priority habitats of the proposed Greater Sage-Grouse Key Habitat Area ACEC as exclusion areas for rights-of-way, see Supplement Map 22, provides the necessary protection for this species from aboveground transmission line impacts (predation, avoidance, and habitat fragmentation) and from construction-related impacts from below-ground pipelines (habitat fragmentation and loss). At the same time, there are ample opportunities for north-south or east-west rights-of-way to traverse the planning area but not impact these priority habitat areas; these provide adequate continuity with right-of-way decisions for public lands surrounding this planning area. We recognize the importance of the route identified for Energy Corridor 79-216; this is the only right-of-way that crosses the sage-grouse key habitats for which we could support avoidance/mitigation rather than exclusion.	3033-1
1030	1030-7	Enhanced BLM protections are likely required if ESA listings of the sage-grouse, or other sagebrush obligates, are to be avoided in the long-term. As recognized in the scientific literature, "[t]he simplest and most cost effective first step in conservation is to halt the largescale actions that further reduce or eliminate the largest populations in the best remaining landscape~ (Doherty eta!. 20I0). Therefore, we advocate that the Field Offices included in the Bighorn Basin RMP and Supplement should err on the side of conservation when making management decisions in regard to oil and gas development. To accomplish this, provisions from Alternatives E and F should be incorporated into Alternative D, the preferred alternative, even if the corresponding ACECs are not destgnated.	3035_1
1030	1030-6	To slow population declines of sage-grouse, more effective conservation efforts must be considered if listing under the Endangered Species Act is to be avoided. The BLM should consider five specific actions to avoid impacts from oil and gas development. These include: I) increase buffer zones surrounding both active and undetermined leks in areas designated Core Area by EO 2011-5 from 0.6 miles to a minimum of 2 miles; 2) apply an Administratively Unavailable determination or NSO stipulation in place of a TLS stipulation surrounding leks (Holloran 2005; Aldridge & Boyce 2007; Doherty et al. 2008); 3) reduce the maximum disturbance allowed within Core Areas from 5% disturbance per 640 acres to 3% per 640 acres with further disturbance prohibited in sections where disturbance has exceeded 3% (Knick et a12013); 4) implement similar restrictions outside Core Areas, particularly where habitat is still mostly intact and unfragmented to maintain both habitat and population connectivity within the Bighorn Basin and between populations in Wyoming and Montana; and 5) implement a surface disturbance cap in non-core areas. Further protections to sagebrush ecosystems and wildlife habitats and protection from increased surface disturbance are essential to maintaining habitat and landscape integrity as more and more acres are fragmented and lost throughout the state and across the region.	3035_9

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1030	1030-5	The proposed plans to monitor habitat health lack standardized data collection and analysis of critical sagebrush habitats. This is a shortcoming that can and should be corrected. Fixing this flaw will also help the BLM to better plan for its multiple use objectives. Additional research has shown that percent cover in sagebrush habitats as determined by BLM is 2.6 times greater than sagebrush cover from research applications (Wambolt 2007 and references therein). Considering the additional proposed disturbances in sagebrush habitats, accurate information regarding current sagebrush cover and distribution is needed for BLM to make responsible management decisions. Implementation and enforcement of data sampling and analysis, utilizing Ecological Site Descriptions, will provide accurate data necessary to address sagebrush ecosystem health, and will benefit all wildlife and plant species reliant on sagebrush ecosystem	3042
1030	1030-4	Utilization of Ecological Site Descriptions also discourages subjective application associated with applying numerical percentages to classification ratings. According to this rating system, the classifications represent percent similarity to the Historic Climax Plant Community (poor= 0-25%, fair= 26-50%, good= 51-75%, and excellent= 76-1 00%). By using this ranking system, BLM is striving for 65% of HCPC in alternatives D and F, and 75% of HCPC in alternative B. The RMP and Supplement propose to "[m]anage to achieve or make progress toward achieving [65% or 75%] or more of Historical Climax Plant Community" (BLM 2011, p. 2-65, Record# 4031). This is flawed, in our opinion, because it gives no incentive to strive for better habitat, perpetuating the sentiment that "good is good enough." Ecological Site Descriptions reflect new understandings about ways in which vegetation changes over time. Instead of describing vegetation change as a gradual linear process, the state-and-transition models included in Ecological Site Descriptions reflect the sudden and unpredictable changes that sometimes occur on landscapes, providing resource managers with better information about ecological changes resulting from specific disturbances, response following disturbance, and how landscapes change over time.	3042
1030	1030-3	We are also concerned with the basic premise behind the Timing Limitation Stipulation (TLS) presented in alternative D. The TLS offers only the minimum to reduce direct disturbance to sage-grouse during critical times of year, primarily focusing on bird behavior, but does nothing to protect habitat. Since habitat degradation and fragmentation are considered primary threats to continued sage-grouse population resilience and survival, we object to the use of a TLS on principle. Habitat disturbance may occur at all other times of year not included in the TLS. Imagine spending the winter in Florida, only to return home to Wyoming to find that half of your house is missing. The loss of shelter and food is significant, even if the disturbance happened while you were not there. It is for these reasons that TLS is an 'inappropriate' management tool in this context. In its place, we urge the BLM to utilize unavailability determinations or No Surface Occupancy (NSO) stipulations. These administrative tools will better provide the protections needed to ensure the greater sage-grouse continues to be precluded from Endangered Species Act protections.	3035_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1030	1030-2	Providing a buffer in non-core areas that peer-reviewed scientific research has shown will neither ensure lek persistence nor maintain grouse populations, runs counter to Wyoming Executive Order 2011-5, which states: "[d]evelopment scenarios should be designed and managed to maintain populations, habitats and essential migration routes ..." We believe the Bighorn RMP should avoid taking undue risks with non-core populations and should provide alternatives that would adopt scientifically validated stipulations that afford sage-grouse inside and outside core areas with levels of protection that would satisfy core area conservation strategy objectives.	3035_1
1031	1031-6	Record # 50--It is unrealistic to assert that an entire allotment should be shut off from grazing if the burned area can't be fenced. This is completely unnecessary and extreme. It reflects an absence of on the ground reality. These allotments can be huge, burned areas can be huge and fencing unrealistic. It again reflects the obvious agenda against livestock grazing under the guise of caring about restoration.	3011
1031	1031-5	Record #49 " Alternative F: It is counterproductive for sage grouse to exclude livestock from grazing in burned areas until wood and herbaceous plants achieve sage-grouse habitat objectives. Woody shrubs in this ecology could take as long as 60 years to re-establish and in the meantime grasses could compete with them. Livestock grazing should be permitted during this time. If in fact sage grouse stewardship is on the radar screen.	3011
1031	1031-4	Chapter 4.3 Fire and Fuels Management: Proactive Management section- Marginalizing and restricting the use of fire within areas of environmental concern will only worsen the invasive weed problem already ahead of land managers. We need all tools to help control invasive weeds and not worsen the problem by slowing management. Proactive fire management must not move slowly, it must continue at a rapid and consistent pace to improve habitat.	3011
1031	1031-3	Chapter 2, Table 2.3: Alternatives E & F: Not necessary to put 1,857,485 acres or 1, 786.241 acres under the restrictions of Areas of Environmental Concern. While sage-grouse may be present, it does not mean that they will be negatively impacted or the area degraded if left open to the public. These alternatives seek to manage for one species only, the sage-grouse to the detriment of all other resources. Alternative E adds 9 additional Areas of Critical Environmental Concern (ACECs) to the restricted use picture: The nine proposed ACECs are Chapman Bench, Clarks Fork Basin/Polecat Bench West Paleontological Area, Clarks Fork Canyon, Foster Gulch Paleontological Area, McCullough Peaks South Paleontological Area, Rainbow Canyon, Rattlesnake Mountain, Sheep Mountain, and Greater Sage-Grouse Key Habitat Areas. Where is the demonstrated justification for this closeout?	3001
1031	1031-2	Chapter 2, Table 2.2: There are no lands open for Desert Land Entry. No justification for this, as any such entries would take into account the sage-grouse life cycle, if they were present. These entries, while underutilized should remain an option to the American public.	3016-1

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1032	1032-1	No Lands open for desert land entry" In Chapter 2, Table 2.2, although the entries may be under utilized, stopping entry is not justified because if sage grouse were present, any such entries would take into account their life cycles.	3016-1
1035	1035-1	Economic Fall out: Chapter 2, Table 2.2 proposes the closure of almost 2 million acres of livestock grazing. This alternative is not supported scientifically, nor does it take into account the economic fallout to local communities, communities who are sustained by the livestock industry throughout the Big Horn Basin.	3036-2
1036	1036-1	#1" If for some reason you choose alternative E. "Fire-Fuels" got my attention and its effect on grazing. If it (BLM land) has to recover fully to pre-fire condition, that could take up to 50 years for sagebrush to come back. Therefore our grazing would be cut up to 1/2 meaning we would also have to reconsider how we manage our private lands. One option is we would either cut way back on stocking rate & use more of our own resources for cattle, graze more intense leaving less habitat for the Prairie Chickens and other wildlife elk, deer, moose, antelope, etc. One other option is to subdivide or lease private land out, therefore cutting off habitat again. As far as the "science" that go into these decisions, it seems to change as the political and emotional winds shift.	3011
1037	1037-51	Alternative B/E provides the most appropriate protections for raptors, with improvements. Record #4124 states, "To protect nesting raptors, apply a TLS to prohibit surface-disturbing and disruptive activities within: 1 mile of active raptor nests (543,945 acres) during specific species nesting period, or until young birds have fledged … 2 miles of active ferruginous hawk nests (47,365 acres) from March 1 to July 31, or until young birds have fledged." [DRMP at 170].Audubon encourages that the definition of "active nests" be clarified to include being those that have been active within the past 7 years as raptors may abandon a nest but either return themselves in following years or have the nest taken over by another pair. These temporarily inactive nests identify areas containing quality combinations of nesting and foraging habitats that should be protected for use by future nesting raptors. Audubon also requests for the inclusion of winter roost sites.	3038
1037	1037-48	Despite being a BLM sensitive species and referenced as being within the Planning Area, Golden Eagles were woefully addressed within the RMP. The Final RMP should include analyses on Golden Eagle populations and use within the planning area and improve the protective buffers. Especially in light of USFWS currently authorizing take permits only under "no net loss" requirements, surface-disturbing activities should be prohibited within 1 mile of Golden Eagle nests, as is recommended by Alternative B.	3038
1037	1037-44	The Bighorn Basin Draft RMP and SRMP fails to reference the Avian Power Line Interaction Committee. Audubon was one of the original members of this committee and has participated in recent training workshops. Please note that a newer APLIC guideline manual was released in 2012 and should be referenced. Suggest contacting Rick Loughery (rloughery@eei.org) as this committee has developed resources that should be incorporated in the FEIS.	3027-3

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1037	1037-42	For non-core/general habitat, protections should still be provided regarding powerlines.The Lander RMP FEIS Record #4102 (Alternative B): Prohibit new, permanent, high-profile structures (higher than 12 feet) within 1 mile of occupied greater sage-grouse nesting habitat (Map 64). FEIS at 130. Similarly in the Miles City Daft RMP, while high voltage power lines are allowed within General Habitat, they should avoid areas within 1 mile of a lek to minimize grouse avoidance behavior and increased predation pressure. Research indicates approximately one-third of juvenile sage-grouse mortality is directly attributed to collisions with power lines (Beck, Reese, Connelly, and Lucia 200617; Flake, Connelly, Kirschenmann, and Lindbloom 201018). Miles City DEIS at 4-133. In addition, a study in Idaho found that power line collisions resulted in 33 percent of juvenile sage-grouse deaths in the study area (Beck et al. 2006; Flake et al. 2010). Miles City DEIS at 4-158. We support this provision as a means to prevent area avoidance by sage-grouse. These powerline provisions should all be incorporated into BLM's final decision.	3035_8
1037	1037-41	High voltage powerlines should be avoided within high priority habitats, such as ACECs, as proposed in the SRMP. While they are allowed within general habitat, they should prohibited within 1 mile of a lek to minimize grouse avoidance behavior and increased predation pressure. The SRMP also endorses burying powerlines. While eliminating perching opportunities for avian predators, burying power lines may well be more detrimental in regards to volume of surface disturbance occurring in such proximity to leks. Audubon requests additional analyses compare the impacts to sage-grouse from burying versus vertical structures. Audubon remains concerned at the amount of habitat lost or fragmented, resulted in direct and indirect impacts, resulting from a uniform stipulation of burying powerlines within 1 mile of leks.	3033-1
1037	1037-39	We recommend deterrent devices on H-frame structures because recent research indicates they are effective tools in reducing perch use of such structures (Lammers and Collopy 200715, Slater and Smith 201016). Record #17, which applies to both Alternative E and F, in the SRMP specifies that "Any existing towers must undergo review for adverse effects. Review will include minimizing wires and other collision hazards for sage grouse and migratory birds, as well as adverse impacts of night lights." [SRMP at 2-19]. While this is an important step forward, Audubon is cognizant that resources are limited and towers should be prioritized by distance from leks.	3033-2
1037	1037-38	Anti-perching devices should be required for on all new overhead powerlines in Greater Sage-grouse habitats to reduce predation from raptors. In addition, the BLM should work ROW holders to identify conflict areas and get anti-perching devices installed on existing overhead powerlines in these same habitats. These two minimizing techniques are noted in the Lander RMP (DEIS at 882). Because approximately 74-80% of sage-grouse females nest within 4 miles of leks (Moynahan 200413, Holloran and Anderson 200514), this measure will help to reduce predatory pressures on nesting and foraging grouse.	3033-1

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1037	1037-35	The USFWS recommends that all existing guy wires be marked with recommended bird deterrent devices.11 Although the use of bird deterrent devices has been particularly important in raptor and waterfowl concentration areas, such devices also are useful in preventing songbird and perhaps even sage-grouse collisions with guy wires. Sage-grouse probably are far more likely to strike met tower guy wires than wind turbines (efforts currently are underway to mark rangeland fencing, which accounted for 18% of sage-grouse deaths in a Utah study,12 to prevent grouse collisions with wires). Due to the impacts to raptor populations, we encourage strict exclusion language for raptor concentration areas.	3032
1037	1037-34	BLM should avoid siting new temporary meteorological (met) towers near leks and other important sage-grouse habitat. Where wind turbines or met towers are considered appropriate and properly sited, guy wires should be marked with recommended bird deterrent devices and other state-of-the-art best practices applied to minimize impacts. Guyed meteorological (met) towers have been known to cause more bird fatalities than associated wind turbines in a number of instances. For example, at Foote Creek Rim in Wyoming, researchers found an estimated 8.1 bird fatalities per met tower per year, whereas they found an estimated 1.5 bird fatalities per wind turbine per year.10 Given these findings and the U.S. Fish and Wildlife Service (USFWS)'s recommendations for using bird diverters to prevent avian collisions and remain in compliance with the Migratory Bird Treaty Act (16 U.S.C. 703-712), bird diverters should be more commonly used met towers.	3032
1037	1037-33	In 2004, the USFWS used several scientific studies to develop recommendations about impacts of wind energy development on grouse species. Due to various structural factors, including height, the USFWS recommended avoiding placement of wind turbines within 5 miles of greater sage-grouse and Columbian sharp-tailed grouse leks. See, e.g., Comments of USFWS on Antelope Ridge Wind Project, May 17, 2010, at 3 (noting that the "5-mile protective zone for wind project features helps buffer sage-grouse against increased mortality (both human-caused and natural), habitat degradation and fragmentation, and disturbance"); Audubon supports these recommendations for placement of turbines within non-core/general habitat.	3032

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1037	1037-30	Audubon supports a proactive approach to systematically inventory and close unnecessary roads and trails, and prescribe rehabilitation/reclamation for them to benefit wildlife habitat. However, simply closing an eroding road without alleviating soil compaction and reseeding can be successful in some cases and very unsuccessful in others, leading to more adverse impacts from INNS invasion. Lander RMP FEIS at 810. We also recognize the BLM's staff and resource limitations. A combination of protection (no new infrastructure), especially in relatively undeveloped areas, and rehabilitation will best achieve habitat goals. The HiLine RMP noted for the Grassland Bird/Greater Sage-Grouse ACEC and Greater Sage-grouse ACEC, that "Where leases or rights-of-way have some level of development (e.g., road, fence, well, etc.) that are no longer in use, the site would be reclaimed by removing the features and restoring the habitat. Upon project completion or right-of-way expiration, roads built and maintained for commercial use across BLM land would be reclaimed, unless based on site-specific analysis, the route provides specific benefits to the public and the continued public use does not contribute to resource conflicts." DEIS at 156.	3039-1
1037	1037-29	Furthermore, BLM should specifically require that priority stretches of existing fences, especially those in proximity to leks, will be identified for use of sage-grouse fence diverters/markers to prevent collisions. BLM should adopt the provision which avoids construction of new infrastructure (such as fencing) and instead focuses on livestock grazing management throughout seasons of use and lower forage utilization. Lander RMP FEIS at 43.	3035_8
1037	1037-28	The BLM should also increase the visibility of existing fences to reduce hazards to flying greater sage-grouse and require the installation of fence markers on new wire fences constructed in greater sage-grouse habitat to increase fence visibility and reduce collision potential. When fences are authorized, the BLM should require a design that has the fewest adverse impacts to greater sage-grouse including features to reduce greater sage-grouse strikes and mortality. Audubon is very supportive of these requirements, all of which are in the Lander RMP FEIS (Record #4039, Record#4083, and Record #4101).	3035_8
1037	1037-27	In addition, fence surveys in the Lander and Rock Springs Wyoming BLM Field Office areas have shown that Greater Sage-grouse can be injured or killed as a result of flying into fence wires. Lander RMP FEIS at 969. To address this, the Bighorn Basin SRMP should include the option to remove identified wildlife hazard fences that are adversely affecting wildlife, such as sage-grouse where opportunities exist.This option was provided in the Miles City RMP, "Fences in high-risk areas (based on proximity to leks, lek size, and topography) would be removed, modified, or marked to reduce outright sage-grouse strikes and mortality." DEIS at 2-49.	3035_8

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1037	1037-25	In addition, protective stipulations should be extended to maintenance and operations actions. Lander RMP FEIS notes that "wildlife seasonal protections from surface-disturbing and disruptive activities apply to maintenance and operations actions when the activity is determined to be detrimental to wildlife." FEIS at 117. This is an important timing due to the longer period of time associated with maintenance and operations actions, beyond the usual development-specific stipulations. BLM supports this, "Beyond initial exploration (including geophysical activities), land clearing, and aboveground facility construction, continued human disturbance to special status wildlife could occur from activities such as equipment maintenance and site operations, which are especially disruptive during sensitive times (wintering, breeding, and nesting)." FEIS at 931. Furthermore, BLM notes that "it would not preclude development or limit the number of wells and would result in no more adverse impacts than management under Alternative A, which does not have timing limitations on O&M." FEIS at 707. The Miles City Draft RMP noted that in areas where development occurred, "there would be no restrictions to operation and maintenance activities, which would potentially result in the reduction or extirpation of populations." DEIS at 4-134 (emphasis added).	3035_9
1037	1037-24	Given the plethora of scientific research which has documented the negative impacts of energy development on sage-grouse, Audubon is strongly opposed to the delineation of Oil and Gas Management Areas. The pursuit of full development of resources in existing fields while exempting these areas from seasonal development and other restrictions flies in the face of the BLM's sage-grouse conservation objectives.	3035_9
1037	1037-23	Pump stations and other permanent structures should be placed a minimum of 2 miles (3.2 km) from the nearest lek, with a preferred distance of greater than 4 miles (6.4 km) from active leks, based upon the best-available data from Naugle et al. (2011)9.	3035_9
1037	1037-22	The use of 0.6 mile buffer around leks and 0.25 mile NSO for leks in occupied habitat is inadequate to maintain lek activity, as has been repeatedly shown by science (Holloran 20056, Walker et al. 2007)7.The Lander RMP DEIS and FEIS both recognized this as did the Miles City RMP.	3035_9
1037	1037-21	Audubon commends the BLM's approach for special status species management in Alternative E - which manages disturbances (e.g., roads, oil and gas wells, pipelines, etc.) in the Greater Sage-Grouse Key Habitat Areas ACEC to not exceed one disturbance per 640 acres and cover less than 3 percent of the total sage-grouse habitat [SRMP 2-13], thus protecting priority sage-grouse habitats from anthropogenic disturbances that will reduce distribution or abundance of sage-grouse. Recently released research by Knick et al. 20135, while they did not examine Wyoming, did further emphasize the intolerance of grouse to human disturbance and development. Specifically, the researchers reported that ninety-nine percent of active leks in the species' western range were in landscapes with < 3% disturbance.	3001

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1037	1037-19	While Audubon commends the BLM for the recognition of the three new important sources of data4 that became available since the release of the draft RMP, in comparison to other recently released draft RMPS there is a startling lack of scientific background presented on the known development impacts to sage-grouse, despite the references made (as noted above) within the document as to the severity of the impacts. For example, oil and gas development has been identified as a cause of declining greater sage-grouse populations (Doherty et al. 2006, Walker et al. 2007, Naugle et al. 2009, Harju et al. 2009). Impacts to leks from energy development were most severe near the lek, remained discernible out to distances >6 km (Holloran 2005, Walker et al. 2007), and have resulted in the extirpation of leks within gas fields (Holloran 2005, Walker et al. 2007). Surface disturbance is anticipated to have adverse impacts to sagebrush habitats including temporary and permanent loss of habitats across all alternatives. Fragmentation and degradation of habitat for greater sage-grouse also is anticipated from surface-disturbing activities and associated development. Therefore, protective stipulations within the planning area deserve careful attention.	3035_2
1037	1037-18	The designation of Restoration Habitat should be considered, as was proposed for the HiLine RMP. Audubon is extremely supporting of application of management actions within these areas that would emphasize restoration for the purpose of establishing or restoring sustainable sage-grouse populations.	3035_8
1037	1037-15	Audubon respectfully notes that specific records related to riparian/wetland resources appears to be missing from Table 2-5 in the SRMP, thus it is unclear the details of the protections being proposed. Given this missing information, Audubon presents the following protections proposed in other draft RMPs (many of which would be appropriate outside the ACEC): . Oil and gas leasing would be offered with a CSU stipulation within 300 feet of riparian and wetland areas. Miles City DEIS at 2-23 and 2-24. . Surface disturbing activities should be prohibited within 1,329 feet (0.25 mile) of playas and 100-year floodplains where mapped. The Lander BLM noted that a set-back of 1,329 feet would not result in any substantial adverse impact because most drilling operations would be able to accommodate the setback distance and still adequately recover the oil and gas resources. Lander RMP FEIS at 706. New livestock water developments (troughs or tanks) would be located at least 0.25 miles from riparian and wetland areas, waterbodies, and streams. Miles City DEIS 2-24 and 2-25. This should be expanded to include no new range improvement projects within ½ mile of water and riparian-wetland areas, so as to avoid providing perching locations for raptors, while hens and their broods are foraging. Avoidance of introducing or expanding invasive nonnative species through disturbances/degraded habitat is another important land management consideration.	3034

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1037	1037-12	Because of the importance of this habitat to grouse, Audubon Rockies suggests protections for these areas based on what has been presented in the Lander RMP (Record # 3006): "In identified greater sage-grouse winter range, vegetation treatments should emphasize strategically reducing wildfire risk around or in the winter range and maintaining winter range habitat quality;" FEIS at 101;	3035_8
1037	1037-11	In addition to assessing the spatial distribution/acreage of current winter habitat and concentration areas for sage grouse, the BLM should also consider the current quality of this habitat as this will likely drive selection of appropriate protective measures and prioritize restoration activities. The Governor-appointed Wyoming Sage-grouse Implementation Team recently commissioned the Wyoming Chapter of the Wildlife Society, a non-profit organization of wildlife biologists, to review current protocol for identifying and mapping sage-grouse winter concentration areas. This report would be helpful for consideration in the Bighorn Basin's planning efforts going forward3.	3035_2
1037	1037-10	Upon designation of special status species, the species's distribution, key habitat areas, and special management needs should be identified prior to developing resource management plans. While winter concentration areas were referenced in the document (Table 2-2, SRMP 2-4), maps displaying the location of these were not provided which seriously limited reviewers's understanding and ability to provide substantive comments.	3035_2
1037	1037-8	In June 2013, the BLM issued a new interim policy on regional mitigation, effective immediately (http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2013.Par.57631.File.dat/IM2013-142_att1.pdf). The new manual covers regional mitigation strategies, planning, and implementation. In the planning portion, the goal is to incorporate sites and measures and mitigation strategies into land use plans, including a regional baseline, mitigation objectives, land use allocations or "areas for landscape-level conservation and management actions." Relevant to the HiLine RMP, ACECs and sage-grouse priority habitat are used as examples of these. In the implementation portion, this is described as part of approving specific land uses, which may be "within (onsite) or outside of the area of impact." The manual emphasizes that on-site mitigation is always the first choice (including a "mitigation priority order", then discusses off-site mitigation comprising replacing or providing similar or substitute resources or values through "restoration, enhancement, creation, or preservation." As the RMP process proceeds in the Bighorn Basin Planning Area, Audubon respectfully requests clarification on how this new interim regional policy on mitigation will be incorporated.	3035-7

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1037	1037-7	Given the number of times "mitigation" is referenced in DRMP/SRMP and the misconception that mitigation is limited to compensatory, the RMP should provide a clear description of the Mitigation Hierarchy (Council on Environmental Quality 2000). This has been done in other RMPs and is important to note in the Bighorn Basin RMP as well, that before impacts can be restored or off-set, good faith efforts must be made to avoid or minimize impacts. Environmentally responsible development will limit environmental impacts by guiding projects away from the most environmentally sensitive sites and species. Where avoidance is impossible or impracticable, mitigation measures should generally lead to increasing or stable populations in the project area, as well as at the regional/planning level. Mitigation, which should be monitored to determine effectiveness, should enhance long-term health and viability of the impacted populations through permanent protections and through other protections that last at least throughout he life of a proposed project.	3035-7
1037	1037-6	We are encouraged that the BLM and USFS are currently in the process of finalizing a Monitoring Framework, which will ultimately provide clarity on how the BLM and USFS will monitor and track implementation and effectiveness of planning decisions (e.g., tracking of waivers, modifications, site level actions) to meet conservation objectives. While it is in the process of being finalized, with a goal of being included in the FEIs, we stress that it must be meaningful and have specific measures/thresholds. It is imperative that the BLM require and enforce the implementation of a science-based adaptive management program. The purpose of an adaptive management program is to reduce uncertainty about the effects of specific development projects on wildlife and wildlife habitat.	3035-7
1037	1037-5	In addition, clarification is needed on how mitigation documents being currently developed by the BLM (this may be the Monitoring Framework) and USFWS, in regards to Greater Sage-grouse, will be applied to this proposed RMP.	3035-7

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1037	1037-4	With the cooperation of key experts (including staff from Wyoming Game and Fish Department and WY BLM), the following Important Bird Areas were identified within the planning area. Several are described in greater detail due to overlap with GRSG Core Areas, thus further emphasizing their ecological importance. Chapman Bench IBA. This IBA overlaps GRSG Core Area. Land ownership is all federal. The area contains sagebrush habitat that supports at least 12 sensitive species, including three BLM sensitive species GRSG, long-billed curlew, and mountain plover. This area provides nesting habitat for one of the highest concentrations of sagebrush-obligate species in the Bighorn Basin. The area has limited development. This is a proposed ACEC and Audubon strongly supports its nomination for the retention, enhancement, and success of GRSG and mountain plover. Heart Mountain IBA. This IBA overlaps GRSG Core Area. Land ownership is a mix of federal, state, and private. Due to the wide elevational range, Heart Mountain is able to support abundant wildlife populations despite the presence of relatively little water. The Nature Conservancy maintains ranching operations on these lands. Ornithological species of note and BLM sensitive species in the area include GRSG, long-billed curlew (breeding), golden eagle (breeding), swainson's hawk, ferruginous hawk, prairie falcon, sage thrasher, and Brewer's sparrow. Loch Katrine Wetland IBA. This IBA overlaps GRSG Core Area. Land ownership is all federal. Prairie grassland and shrub communities surround the lake and the adjacent rock hills and cliffs provide raptor-nesting habitat. Because the site exists in a high desert ecosystem, Loch Katrine is the most productive lacustrine complex in Wyoming's Big Horn Basin and supports a diverse community of migratory and nesting waterfowl and shorebirds. The area produces an estimated 100-150 broods of waterfowl and 50-100 broods of shorebirds on a "normal year" and is considered to have an above average reproductive success rate. Breteche Creek IBA. Land ownership is a mix of federal and private. This IBA is noted for containing GRSG. Ornithological species of note and BLM sensitive species in the area include GRSG, Brewer's sparrow, golden eagle (breeding), and bald eagle. Beck Lake/Alkali Lake IBA. TenSleep Preserve IBA. Yellowtail Wildlife Habitat Management Area IBA.	3049
1037	1037-3	While two Important Bird Areas (IBAs) are briefly referenced in the DRMP and SRMP, others are missing. IBAs have been incorporated in other RMPs and BLM planning documents, and are increasingly being included in landscape scale planning efforts. This program, which reflect critical avian habitat, should be incorporated in BLM decisions going forward for the Bighorn Basin Planning Area.	3049

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1039	1039-7	The Conservancy supports implementation of the Best Management Practices in the adopted Alternative, as specified in Appendix L and expressed in Alternatives E and F as required design features for all projects (Table 2-5, Record#1-2) to reduce disturbance and manage landscapes to benefit sage-grouse population health. We suggest, however, that these BMPs be updated and modified as needed to reflect the most recent sage-grouse science as reflected in the COT report and recent publications such as Baruch-Mordo et al. (2013), Knick et al. (2013), Manier et al. (2013), and Taylor et al. (2013). We also encourage BLM to be as specific as possible when implementing these BMPs (e.g., by providing quantitative guidelines and timeframes) in projects.	3035_3-1
1039	1039-6	In order to measure success at conserving sage-grouse, the Conservancy believes that the BLM Field Offices in each state and associated RMPs must demonstrate specific actions taken or implemented to reduce key threats to sage-grouse, as outlined in the COT report, to USFWS. Many specific measures are proposed in Alternatives E & F (Table 2-5) that could address threats to Greater Sage-Grouse (e.g., fire, invasive species) and that support the COT goal of "the long-term conservation of sage-grouse and healthy sagebrush shrub and native perennial grass and forb communities by maintaining viable, connected, and well-distributed populations and habitats across their range, through threat amelioration, conservation of key habitats, and restoration activities. (COT Report, Section 4.2)" While the Conservancy is not currently able to comment on or endorse the specific measures identified in Alternatives E & F relative to these threats, we acknowledge their importance and fundamental role in the mitigation hierarchy of avoid, minimize, restore and offset and strongly encourage the BLM to choose an alternative that tangibly supports goals outlined in the COT report and addresses these threats. More specifically, the Conservancy supports those measures proposed within Table 2-5 for Alternative F that recommend management of the ACEC to mitigate impacts on BLM land, including records 10, 18, 58, 79, and 115, and offers elements of a compensatory mitigation program, attached as Appendix A, for implementation in the adopted Alternative.	3035-7
1039	1039-4	The Conservancy also supports the recommendation detailed in Table 2-5, Record 7, under Alternative F to "Consolidate anthropogenic features from development and transmission on the landscape, regardless of land ownership patterns or whether proposed actions occur in the [...] ACEC" and recommends that this instruction be included in whichever Alternative is finally adopted. However, we believe that no exceptions for high-profile structures should be granted in the Core/Key Habitat ACEC under any circumstances, due to the well-documented tendency of sage-grouse to avoid such structures and their ability to provide predator perches.	3033-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1039	1039-3	In the calculation of the number and extent of disturbances in sage-grouse habitat to determine compliance with the cap, the Conservancy encourages the BLM to develop a methodology that, while maintaining the proposed restrictions on anthropogenic disturbance, allows measurement of other disturbances that render habitat unusable by sage-grouse. Particularly important in this regard are acres burned by wildfire; BLM should refine its calculations of the disturbance cap to include these other forms of disturbance in a way consistent with the Wyoming Core Area Strategy.	3035_4
1039	1039-2	The Conservancy recommends BLM follow the COT Report's recommendation and implement an avoidance first strategy in Priority Areas for Conservation (PACs) (COT Report, pg. 14).Since PAC boundaries correspond with boundaries from Version 3 of the Wyoming Governor's Executive Order (Greater Sage-grouse Core Area of Protection; WY EO 2010-4) and therefore the Greater Sage-Grouse Core Area ACEC and in general Key Habitat Areas (SEIS, pg. 89, Section 3-3; pg. 216, Section 4.7.1) proposed in Alternatives E and F, the Conservancy recommends limiting density of disturbance within the Greater Sage-Grouse Core/Key Habitat Areas ACEC in accordance with the Wyoming Core Area Strategy, to one disturbance per 640 acres and capping all disturbance at 3% or less of total sage-grouse habitat in accordance with recent scientific findings on sage-grouse sensitivity to human disturbance above 3% (Knick et al. 2013) (Table 2-5; Record #7). In our opinion, actions to reduce disturbance within sage-grouse core areas consistent with the Wyoming Core Area Strategy (Executive Orders 2010-4 and 2011-5) will be essential toward any effort to convince the USFWS that listing the sage-grouse is unwarranted.	3035_4
1042	1042-2	Lastly, Alternatives E and F are not only counterproductive to the resource, but would have a significant impact on local business. Our small rural communities are struggling. The loss of land use would greatly hinder the livelihood of those who exist in the communities adjacent to those resources.	3036-2
1042	1042-1	I also question most of the fire management in relation to grazing. While I do believe some rest after a fire might be needed, I think it is short-sighted and unwise to limit management tools across the board. Every sight is unique and should be managed as such by the people on the ground. These kinds of policies seem to give a no confidence vote to those in the local federal offices tasked with actually managing the resource. It is generally difficult to get the most qualified personel to work under such conditions. I have little doubt that upon initiating policies such as these will bring an emmediate and lengthy downward trend in the same areas you wish to improve.	3011
1043	1043-8	Page 2-32, Record #87 Alternative E "Close the Greater Sage-Grouse Key Habitat Areas ACEC to livestock Grazing." This is an unacceptable alternative because it goes against the BLM multiple use mandate. Also, there seems to be conflicting studies as to what affect grazing has on Greater Sage-Grouse populations.	3017-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1043	1043-7	Page 2-24, Record #49 Alternative F "Livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve sage-grouse habitat objectives." In some cases in the Big Horn Basin woody plants can take decades to grow. In these cases livestock grazing will be eliminated entirely. This is an unacceptable alternative	3011
1043	1043-6	Page 2-24, Record #49 Alternative E Same as above. "Page 2-24, Record #48 Alternative F "Post fire recovery must include establishing adequately sized exclosures (free of livestock grazing) that can be used to asses recovery." Will these exclosures prevent grazing from wildlife as well? Grazing is a part of the system, and therefore, should not be excluded while assessing recovery"	3011
1043	1043-5	Page 2-24, Record #48 Alternative F "Post fire recovery must include establishing adequately sized exclosures (free of livestock grazing) that can be used to asses recovery." Will these exclosures prevent grazing from wildlife as well? Grazing is a part of the system, and therefore, should not be excluded while assessing recovery	3011
1043	1043-4	Page 2-24, Record #48 Alternative E "Close the Greater Sage-Grouse Key Habitat Areas ACEC to livestock grazing" This goes against the BLM's multiple-use mandate.	3017-3
1043	1043-3	Page 2-23, Record #40 Alternative F "Manage to achieve or make progress towards achieving 65 percent or more of Historical Climax Plant Community." Will it be determined if reaching Historical Climax Plant Community is even possible? For example, if cheatgrass is present Historical Climax Plant Community is probably no longer an option. What happens if this percentage is not reached or no progress is being made?	3011
1043	1043-2	Page 2-23, Record #40 Alternative E "Lands will be managed to be in good or better ecological condition to help minimize adverse impacts of fire." How is this assessment done? Is this even reasonable?	3011
1043	1043-1	Page 2-23, continuation of Record #39 Alternative F "Limit the use of fire to treat sagebrush in areas receiving less than 12 inches annual precipitation". Is this an average, if so over how many years? This is not stated. Fire is one of the most cost effective management tools for sagebrush treatment. All of the allotments Hoodoo Ranch uses have an annual "average" precipitation of less than 12". It would be a shame to throw a useful tool like fire out of the toolbox.	3011
1044	1044-2	Utilizing sage grouse, which may be present, ha, "also which may not be present", is a way of indoctrinating opinions rather than facts. Entries to public and desert lands already underutilized should be open to public and agricultural people as asset to living, working, and surviving within the state as a Wyoming Resident. No one single animal or bird should be constituted as necessity for closure to public land.	3016-1

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1045	1045-1	am strongly opposed to the possible negative effects of the two alternatives E and F in the final resource document. Closing off lands to multiple use, such as grazing and general public use of Public Land is unnecessary and unwarranted. Livestock, humans, horses and other users have co-existed for years. There is no substantial and credible scientific evidence that this type of multiple use cannot continue without harm to the sage grouse or the environment. If the grazing is an issue, then the Wild Horses will need to be removed because I have witnessed the horses of the McCullough Peak area chasing and harassing sage grouse. There is no need to over react and try to fabricate information to keep the best use of the PUBLIC LANDS viable and for the benefit of the people.	3017-3
1046	1046-14	Recommendations (In addition to management under the current IMP) · WWA Preferred Management Prescriptions—WSA lands containing Sage Grouse Core Area (See Map 1, Appendix A) are closed to motorized and mechanized vehicle use (Alternative B).· WWA Minimum Management Prescriptions—Motorized and mechanized vehicle use on WSA lands containing Sage Grouse Core Area is limited to existing roads and trails with seasonal closures from February 1st-July 31st (Alternative E).	3035_10
1046	1046-13	Given the focus on sage grouse conservation policy options, we have identified five WSA's that contain portions of sage grouse core areas stipulated by Version 3 of Wyoming Executive Order (WY EO) 2011-5 Greater Sage-grouse Core Area of Protection (See Map 1, Appendix A). In the interest of achieving the best management plan in light of the BLM's multiple use mandate, we recommend that these particular Sage Grouse Core Areas, which fall within WSA boundaries, have additional resource use restrictions placed upon them. The five Sage Grouse Core Areas contained within WSA boundaries are identified below, and detailed recommendations applicable to all five areas follow the descriptions of these areas	3035_10
1046	1046-12	There are nine designated Areas of Critical Environmental Concern (ACEC's) in the planning area. Of these, we have identified five that contain Sage Grouse Core Areas (proposed ACEC's under Alternatives E and F), one of which merits additional special management (See Map 4, Appendix D). We suggest that the following stipulation be incorporated into the preferred alternative in order to address both the needs of sage grouse and the unique features of the existing ACEC for which "special management attention is required:"□ Brown/Howe Dinosaur ACEC . Sage Grouse Core Areas within the Brown/Howe Dinosaur Area ACEC are administratively unavailable for mineral leasing and closed to mineral materials disposal.	3001

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1046	1046-11	In addition to providing comprehensive sage grouse preservation, implementing WWA's preferred stipulations on sage grouse core areas that fall within CWP boundaries would preserve wilderness qualities, including naturalness and excellent opportunities for solitude and primitive recreation. These delicate and easily disturbed values are especially apparent within Citizens' Proposed Wilderness boundaries, which stand out to Wyoming Wilderness Association and our constituency as exceptional among BLM wild lands. In fact, we contend that these areas possess all of the necessary qualities for a wilderness designation. However, current management is not sufficient to keep these values intact, so future wilderness designation may be in jeopardy. WWA's preferred stipulations, if incorporated into the agency preferred alternative, would help preserve CWP areas' eligibility for a wilderness designation while significantly benefitting sage grouse vitality.	3046
1046	1046-10	Our recommendations for sage grouse core areas located within CWP's emphasize the same points as our recommendations for core areas in LWC's, namely mitigation or elimination of motorized and mechanized vehicle use, mineral leasing, exploration, and disposal, and oil and gas leasing. As previous analysis has demonstrated, these land use activities pose a legitimate threat to sage grouse populations, notably during breeding and nesting seasons. Therefore, we recommend that policies implemented in our areas of interest within the planning area eliminate or mitigate these resource uses, thereby ensuring sage grouse vitality and complying with the multiple use mandate.	3046
1046	1046-9	We recommend that the Agency Preferred Alternative be modified to instate special management of Sage Grouse Core Areas that fall within Citizen's Proposed Wilderness areas. Specifically, we advise that these lands within the planning area be managed with the following stipulations. Suggested at minimum stipulations. Motorized and mechanized vehicle use in the Sage Grouse Core Areas within these CWP Boundaries is limited to existing roads and trails with seasonal closures from February 1st -July 31st (Alternative E) . Sage Grouse Core Areas within CWP's are managed as VRM Class II. . Sage Grouse Core Areas within CWP's are unavailable for oil and gas leasing. . Sage Grouse Core Areas within CWP's are closed to mineral leasing, but horizontal drilling that originates outside these boundaries and has no impact to surface may be allowed.. Sage Grouse Core Areas within CWP's are managed as ROW mitigation/avoidance zones. WWA preferred stipulations. Sage Grouse Core Areas within CWP Boundaries are closed to motorized and mechanized vehicle use. . Sage Grouse Core Areas within CWP's are managed as VRM Class I. . Sage Grouse Core Areas within CWP's are administratively unavailable for locatable, salable, and leasable mineral leasing. . Sage Grouse Core Areas within the CWP Boundaries are closed to mineral materials disposal and geophysical exploration (Alternative E). . Sage Grouse Core Areas within the CWP Boundaries are managed as ROW and Renewable Energy exclusion zones (Alternative E).	3046

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1046	1046-8	Given the focus on sage grouse conservation policy options, we have identified six CWP's, five of which abut existing WSA's that contain portions of Version 3 of WY EO 2011-5 Greater Sage-grouse Core Area of Protection (See Map 2, Appendix B). In the interest of achieving the best management plan in light of the BLM's multiple use mandate, we recommend that these particular Sage Grouse Core Areas, which fall within CWP boundaries, have additional resource use restrictions placed upon them. The Sage Grouse Core Areas contained within CWP boundaries are identified below, and detailed recommendations applicable to all six areas follow. Alkali Creek CWP Abuts Alkali Creek WSA to the West. The BLM already recognizes most of the Alkali Creek CWP as part of the Alkali Creek NW CP LWC as of a 2011 inventory. According to Table 3.46 in the Draft RMP/EIS, oil and gas development potential within this LWC is low, and there are no valid existing rights (BLM, 2011). Bobcat Draw CWP Abuts Bobcat Draw WSA, primarily to the South. The BLM already recognizes nearly all of the Bobcat Draw CWP as part of the Bobcat Draw West CP and Bobcat Draw South II CP, 508 AK LWC's as of a 2011 inventory. According to Table 3.46 in the Draft RMP/EIS, oil and gas development potential within both of these LWC's is low and there is no locatable mineral development potential (BLM, 2011). Buffalo Creek CWP Buffalo Creek is a classic example of the wide open plains unique to and characteristic of Wyoming. The big game species inhabiting the area make it an excellent location for hunting, and 32 outfitters have permits for day use. Honeycombs CWP Surrounds Honeycombs WSA. The BLM already recognizes most of the Honeycombs CWP and nearly the entirety of the CWP portion we address in these comments as Lands with Wilderness Characteristics as of a 2011 inventory. The LWC Honeycombs South CP in particular overlaps a very substantial portion of the area we address in these comments. Moreover, according to Draft RMP/EIS Table 3.46, there is no locatable mineral development potential within any of the LWC's in the Honeycombs CWP region (BLM, 2011). Medicine Lodge CWP Abuts Medicine Lodge WSA to the North and South. According to a 2011 BLM inventory, most of the Medicine Lodge CWP is contained within the Medicine Lodge North CP LWC. This LWC has no valid existing rights or locatable mineral development potential and has low oil and gas development potential (BLM, 2011). McCullough Peaks CWP Abuts McCullough Peaks WSA, primarily to the Southwest. The McCullough Peaks WSA consists of pink badlands at the foot of cascading solitary peaks. The citizens's western addition includes striking breaks and additional winding drainages, which create beautiful patterns of erosion. Mule deer and white tail deer find winter habitat in the area, which also provides habitat for mountain lions, pronghorn antelope, jackrabbits, coyotes, a variety of raptors, and sage grouse. The National Park Service has identified this area as a potential National Natural Landmark. The BLM already recognizes most of the McCullough Peaks CWP as part of the Rough Gulch LWC, including the entire portion of the CWP addressed in these comments. According to Table 3.46 in the Draft RMP/EIS, oil and gas development potential is low within the Rough Gulch LWC, and no locatable mineral development potential exists (BLM, 2011).	3046

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1046	1046-7	Figure 1. Decreasing nest site probability with increased gas field development (Holloran, 2005). Implementing WWA preferred stipulations on sage grouse core areas that fall within LWC's would provide the most comprehensive protection for sage grouse populations. Eliminating disruptions to breeding and nesting imposed by anthropogenic noise and infrastructure as well as related increases in predation is the only way to ensure lasting vitality of sage grouse populations in core areas. This, in turn, will help prevent listing of the sage grouse as an endangered species under the Endangered Species Act. Similarly, our recommended preferred management stipulations would preserve existing naturalness and excellent opportunities for solitude and primitive recreation.	3046
1046	1046-6	Our recommendations for sage grouse core areas located within LWC's focus on motorized and mechanized vehicle use, mineral leasing, exploration, and disposal, and oil and gas leasing, because limitation or elimination of these land uses within our recommended portions of the planning area would serve the dual purpose of preserving wilderness qualities and protecting sage grouse. In addition to suggesting that roads and traffic volume disturb sage grouse breeding and nesting, studies also show that the number of displaying males correspondingly decreases with decreased distance from gas field infrastructure (Holloran, 2005). Moreover, nest initiation rates for sage grouse hens at leks at least three kilometers (1.86 miles) from gas development sites are approximately 25% higher than initiation rates for hens at leks within three kilometers of gas development (Anderson & Lyon, 2003). Mineral extraction is similarly disruptive, and Holloran predicts that leks located near extractive mineral sites will eventually become unoccupied. Consequently, we recommend that policy implementations aim to reduce anthropogenic development and noise disturbances, especially oil and gas infrastructure, mineral extraction, and traffic volume within sage grouse core areas in LWC's.	3046
1046	1046-5	We recommend that the Agency Preferred Alternative be modified to instate special management of Sage Grouse Core Areas that fall within Lands with Wilderness Characteristics. Specifically, we advise that these lands within the planning area be managed with the following stipulations. Suggested at minimum stipulations. Motorized and mechanized vehicle use is limited to existing roads and trails with seasonal closures from February 1st-July 31st (Alternative E). . Sage Grouse Core Areas within LWC's are managed as VRM Class II. . Sage Grouse Core Areas within LWC's are designated No Surface Occupancy. WWA Preferred stipulations. Sage Grouse Core Areas within LWC's are closed to motorized and mechanized vehicle use. . Sage Grouse Core Areas within LWC's are managed as VRM Class I. . Sage Grouse Core Areas within LWC's are administratively unavailable to locatable, salable, and leasable mineral leasing. Sage Grouse Core Areas within LWC's are closed to mineral materials disposal and geophysical exploration (Alternative E). . Sage Grouse Core Areas within LWC's are managed as ROW and Renewable Energy exclusion zones (Alternative E).	3046

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1046	1046-4	Given the focus on sage grouse conservation policy options, we have identified 22 LWC's -Trout Creek; Rough Gulch; Whistle Creek; N. Yu Bench; Cedar Ridge; 639 AK; 652 Lower, Upper AK; 676 AK PR; Bobcat Draw West CP; Bobcat Draw South II CP, 508 AK; Bobcat Draw South CP, 626 AK; 665 CW; 0048 PR; Honeycombs South CP; 0008 DH; 130 JW; 069 JW; Honeycombs 164 CP; 005 PR; Medicine Lodge North CP; Alkali Creek NW CP - that contain portions of sage grouse core areas stipulated by Version 3 of WY EO Greater Sage-grouse Core Area of Protection (See Map 3, Appendix C). In the interest of achieving the best management plan in light of the BLM's multiple use mandate, we recommend that these particular Sage Grouse Core Areas, which fall within LWC boundaries, have additional resource use restrictions placed upon them.	3046
1046	1046-3	The best management directive, which we recommend be incorporated into the agency preferred alternative, is closure of the areas identified to motorized and mechanized vehicle use. However, at a minimum, motorized and mechanized vehicle use in these areas should be limited to existing roads and trails with seasonal closures during breeding and nesting seasons.	3035_10
1047	1047-9	Public Record #50" It is unrealistic and extreme to assert that an entire allotment/pasture should be shut off from grazing if the burned area can't be fenced. This is completely unnecessary and extreme. It reflects an absence of knowledge of on-the-ground realities. These allotments can be huge, burned areas can be huge and fencing unrealistic. It again reflects the obvious agenda against livestock grazing under the guise of caring about restoration. Neither the rangelands nor the livestock component deserve this clear bias.	3011
1047	1047-8	Public Record #49" Alternative F: It is counterproductive for sage grouse to exclude livestock from grazing in burned areas until woody and herbaceous plants achieve sage-grouse habitat objectives. Woody shrubs in this ecology could take as long as 60 years to reestablish and in the meantime grasses would compete with them. Having livestock graze these areas during the grow-back would be helpful to habitat not harmful appropriate grazing would lessen the competition for woody component to re-establish!	3011
1047	1047-7	Chapter 4.3 Fire and Fuels Management: Proactive Management section: Marginalizing and restricting the use of fire within areas of environmental concern will only exacerbate the invasive weed problem already ahead of land managers. We need all tools to help control invasive weeds and not worsen the weed problem by slowing management. Proactive fire management must not move slowly, it must continue at a rapid and consistent pace to improve habitat. Fire should be used and post fire conditions should be well managed, and that would include good livestock grazing to encourage range health and vigor.	3011

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1047	1047-6	Appendix L, Best Management Practices, Vegetation Treatments/Fire and Fuels Management, #24,-25, p L-7: The reference to ˜annual grasslands" under Best Management Practices seems inappropriate. Annual grasslands in this context are an ecosystem that exists in California and not in Wyoming. GOR suggests that you use wording more along the line of "areas infested with undesirable annual grasses". This change should help to minimize possible confusion.	3042
1047	1047-5	4.4.2 Vegetation Grassland and Shrubland Communities. 4.4.2.3 Detailed Analysis of Alternatives, Alternative F, Resource Uses, p. 4-46: This wording serves to require that the BLM ensure that standards and guidelines be met for wildlife including greater sage-grouse habitat. This is inappropriate. The agency already is required to make certain that allotments do meet standards and guidelines for healthy rangelands. To try and expand this for wildlife, including greater sage-grouse is not appropriate and should be removed. Again it seems to be another action with is fully intended to discriminate again livestock grazing under the guise of greater sage-grouse conservation	3042
1047	1047-4	Table 2.5. Detailed Alternatives, 7000 Special Designations (SD) “ACECs“ Proposed Greater Sage-Grouse Priority Habitat Area (ACECs, Record #110, p 2-35. Alternative F “ Again proposing action such as retirement of grazing allotments reflects clear bias and negative discriminatory actions toward livestock grazing as a valid management tool for sage-grouse conservation. This push to ˜retire" and identify allotments for retirement should not be part of the RMP. Such inclusion into the document seeks to include all allotments and to use the platform of an RMP as the place to proceed with such actions. This is inappropriate and insulting.	3017-1
1047	1047-3	Table 2.5. Detailed Alternatives, 7000 Special Designations (SD) "ACECs" Proposed Greater Sage Grouse Priority Habitat Area ACECs, Record #31, p. 2-21. Alternative E “The clear bias against all things livestock are alive and well in this. The wording clearly indicates that getting rid of livestock will solve any trampling damage to soils, mitigate spread of weeds and reduce the creation of thatch in an allotment; and this strongly infers that all are attributable to livestock grazing. Any credible environmental document should propose looking at more than one method of managing these factors. This bias against livestock grazing is appalling and should not be carried forward as an action item.	3042

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1047	1047-2	We request the BLM incorporate language into the final document that is consistent with EO 2013-3, Greater Sage-Grouse Core Area Grazing Adjustments, which supplements EO-2011-5. We support the suggested language of the Wyoming Department of Agriculture: "The BLM will collaborate with appropriate Federal agencies, and the State of Wyoming as contemplated under Governor Executive Order 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where Greater Sage-rouse conservation objectives are now being achieved on federal land, to determine if a significant causal relationship exist between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework." We strongly recommend the BLM add the above language as a standalone management action in the preferred alternative.	3017-1
1047	1047-1	We strongly oppose the designation of the Greater Sage-Grouse Key Habitat Areas ACEC (Alternative E), the Greater Sage-Grouse Core Habitat Areas ACEC (Alternative F) and their associated restrictions on livestock grazing and associated range improvements. These alternatives (E&F) are replete with actions that connote only negative impacts on sage-grouse associated with livestock grazing. This is patently unfair and incorrect. Where is the balance of good science and pragmatic assessment relative to livestock grazing and sage-grouse.	3017-3
1048	1048-36	Chapter I of the SEIS states "BLM will utilize the COT Report (USFWS 20 13), the Western Association of Fish and Wildlife Agencies (WAFWA) Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et al. 2004), and any other appropriate resources, to identify greater sage-grouse habitat requirements and best management practices." It seems that the "other resources" and their inclusion in the document are limited at best. Page 3-2 clearly demonstrates this lack of consideration of additional data, as it reads "primary threats to this portion of the population are energy development and transfer. .. " A significant amount of research clearly indicates this is not the case, but was not included in the document. For example, Ramey et al (20 II) and Taylor et al (2007) provide valuable data that was not included.	3035_2
1048	1048-35	Any additional restrictions to oil and gas development will have adverse effects on the Bighorn Basin communities. Alternatives E and F would impose additional constraints that seem to have no scientific basis and are instead based on the poor information contained in the NIT report. BLM should consider the severity of the economic impacts these new restrictions, especially the implementation of a new ACEC, would have on the communities in the Bighorn Basin.	3036-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1048	1048-34	Fidelity agrees with PLA's statements regarding monitoring, which read "the SEIS states that GSG would be monitored via site visits to leks on an annual basis to determine the number of males and females (emphasis added) as well as whether a lek is occupied/unoccupied. This data would be used to make a determination of whether there is a declining trend in the number of males and females. The document states that Wyoming Game and Fish is responsible for data collection. However, the Buffalo Draft RMP/EIS in Table B.I (Special Status Species, Wldf-6) states that GSG would be monitored via site visits and aerial and field inspections to leks on an annual basis to count the number of males and make a determination of whether there is a declining trend in the number of males. The document also states that Wyoming Game and Fish is responsible for data collection." We question why one document will track only males and the other both males and females, and why monitoring techniques will be different, especially since Wyoming Game and Fish will be collecting the data for both documents. There should be a single set of data used to detect changes in resource conditions.	3035-7
1048	1048-33	P. 2-31, Record 86, Alternative E, proposes to "Close the Greater Sage-Grouse Key Habitat ACEC to geophysical exploration." Fidelity questions why geophysical exploration would be prohibited in this vast area. There is no real explanation why this new restriction is necessary, and BLM does not acknowledge that there is virtually no surface disturbance associated with geophysical activities. Additionally, closing this area off could violate valid existing rights. Alternative F states it will "Allow geophysical exploration in the Greater Sage-Grouse Core Habitat Areas ACEC to obtain exploration information for areas outside of and adjacent to priority sage-grouse habitat areas." This is confusing, as it implies the prohibition of the use and interpretation of geophysical information for areas within core areas, which could violate valid existing lease rights. Alternative F would "Allow geophysical operations only by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply." BLM must recognize this could be unfeasible and cost prohibitive. These operations may also cause more disturbance (i.e., noise) to habitat than other equally effective methods. The term "other restrictions" needs to be clearly explained, as it is unclear what would constitute these restrictions.	3023-4

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1048	1048-32	As mentioned above, BLM does not demonstrate any compelling reasons to designate the sage-grouse Core Habitat Areas an ACEC. We concur with PLA's statement that "According to BLM Manual 1613-ACEC, such designations are used to highlight areas where special management attention is needed to protect and prevent irreparable damage to important values or processes. The description cited in the SEIS is inadequate. The ACEC included in the SE!S needs to be discussed and justified in more detail, including recognition of the wide scope of mitigation measures BLM has at its disposal to lessen the impacts on the GSG in areas where it is believed they pose a threat." According to the BLM's Land Use Planning Manual and Land Use Planning Handbook, II.A.7, pg. 22 (Rei. 1-1693 03/11/05), BLM must identify how the Preferred Alternative best meets the multiple use and sustained yield requirements of FLPMA and creating this ACEC clearly conflicts with this mandate, as mineral leasing would be virtually eliminated. Fidelity also doubts the ability of BLM to manage the nearly 2 million acres of this proposed ACEC. The Core Habitat strategy in the EO provides a much more sensible framework for management. BLM should be consistent with the EO and eliminate this proposed ACEC.	3001
1048	1048-31	P. L-6, 7, Best Management Practices, "Power-washing all vehicles and equipment involved in vegetation treatment and firefighting activities prior to entering the area to minimize the introduction of undesirable and/or invasive plant species." There are many questions as to how this would function. What would operators need to do with the fluids used to wash vehicles? Would they need to dispose of it in a certain way or get a permit for the facility and/or disposal? How would the infrastructure for such a site look and how will an operator obtain the fluids needed for the wash station? Surely recreational vehicles, animals grazing, and local traffic will also bring invasive plant species in, so how will they be effected? How would one determine if they should wash the vehicle? Would it be within a certain radius or a certain number of travel miles? This entire statement seems unclear and unfeasible and should be removed.	3023-1
1048	1048-30	P. L-3, Best Management Practices, 22-"Use only close-loop systems for drilling operations, with no reserve pits." Closed-loop systems are appropriate in many situations, however not all rigs are equipped for closed-loop systems and require a reserve pit. A pit is necessary for cuttings even for closed-loop systems. BLM should allow for flexibility when a closed-loop system is not possible. BLM must review the document to make sure all of their proposed design features and mitigation are technically feasible.	3023-1
1048	1048-29	P. 2-31, record 84 -"Where the federal government owns the mineral estate and the surface is in non-federal ownership, apply the conservation measures applied on public lands." Fidelity is very disturbed by the concepts addressed in this record. The identified conservation measures clearly show intentions to limit future oil and gas activities in the planning area while all other multiple-uses may proceed as the surface owner chooses. As already discussed in these comments, this is based upon the incorrect assumptions contained in the NTT report. This concept should be omitted from the final document.	3023-2

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1048	1048-28	P. 2-31, Record 81 -"Include conditions that require relinquishment of leases/authorizations if doing so will mitigate the impact of a proposed development or mitigate the unanticipated impacts of an approved development." BLM does not have the authority to require relinquishment of leases/authorizations. Additionally, the term "unanticipated impacts" is very broad and open for interpretation. As noted above, the implication is that BLM will make a decision based on what they feel is in the best interest for the parties involved, which is inappropriate. This should be removed in the final document.	3027-1
1048	1048-27	P. 2-31, Record 80-"Consider offers to amend, cancel or buy out leases." This statement seems to indicate a "takings" or eminent domain, which is very concerning. The implication is that BLM will make a decision of what they feel is in the best interest of the parties involved. The lessee is currently the one who makes the decision to approve such offers. This could have serious implications and Fidelity asks BLM clarify its role in such decisions.	3023-2
1048	1048-26	P. 2-30, Record 78-"Complete Master Development Plans in lieu of APD-by-APD processing for all but wildcat wells." Fidelity strongly supports PLA 's statement that "this provision is inappropriate for use in the Bighorn Basin. While master development plans (MDP) may be acceptable and beneficial in areas where drilling takes place year round or where there is long term development planned, BLM has failed to consider the greater likelihood of periodic drilling or drilling within existing Federal Units on a well-by-well basis within the Bighorn Basin. Currently, the operator of a federal unit is required to submit a Plan of Development and a Review of Operations on a yearly basis. BLM needs to recognize that most Bighorn Basin operators drill only on occasion, rather than continuously. Very few, if any, are solely exploration companies. Therefore, we recommend BLM eliminate the requirement for an MDP within the Bighorn Basin."	3023-6
1048	1048-25	P. 2-29, Record 73 -"Require a full reclamation bond specific to the site in accordance with 43 CFR 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM or USFS will perform the work." This seems totally unnecessary, as current bonding requirements already address reclamation.	3027-1

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1048	1048-22	P. 2-29, Record 72 -"Require unitization when deemed necessary' for proper development and operation of an area or to facilitate more orderly (e.g., phased and/or clustered) development as a means of minimizing adverse impacts to resources, including greater sage-grouse, so long as the unitization plan adequately protects the rights of all parties including the United States, according to the Federal Lease Form, 3100-11, Sections 4 and 6." Unitization generally takes place when, due to economics and reservoir engineering, all mineral owners will benefit. What are the benefits of unitizing, per the proposed Alternative E? Will other stipulations be relaxed if unitization occurs? BLM needs to discuss why this is beneficial, who would decide when this would occur, and how it will be applied. Fidelity also agrees with PLA's comments that "The State of Wyoming BLM Office knows that it cannot tell or require multiple owners to bond together under one (I) unit. How is this reflected in Record 72? This Record not only implies that the right to decide what is in the owner's best interest in fact will be dictated by the BLM, but it also implies that the BLM will require state and/or fee lands to additionally unitize. How does this protect the rights of all parties if the BLM determines what is in the owner's best interests?" and "Furthermore, the State of Wyoming has primacy over all well spacing. If a well comes in as non-producing in a unit and the BLM removes it from the unit, then the area goes back to spacing-then what? For example, will the unit dissolve immediately or contract in the middle of a unit? How are wells drilled still to pay for the unit?	3023-3
1048	1048-21	P. 2-28, Record 71 -"Apply an NSO stipulation within 0.6 mile of occupied or undetermined sage-grouse leks (Map SEIS-15). Apply a minimum lease size of 640 contiguous acres of federal mineral estate within sage-grouse Core Habitat Areas. Lease smaller parcels only when 640 contiguous acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations, and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. Apply a TLS to restrict disruptive activity within 0.6 mile of occupied or undetermined sage-grouse leks from March 15 to June 30." BLM proposes the use of both an NSO and a timing stipulation within 0.6 miles of a lek. The TLS already provides an appropriate amount of protection, thus we are confused why BLM would need a TLS if surface activities are already precluded through the imposition of an NSO stipulation?	3035_3-2
1048	1048-19	P. 2-20, Record 23 -"Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, nonnative seeds may be used as long as they support sage-grouse habitat objectives." We are pleased that BLM has recognized seeding is not a one-size-fits-all process and appreciate the flexibility to use different types of seed as is appropriate. We request that BLM provide a list or description of acceptable seed mixes for planning purposes.	3035-7

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1048	1048-18	P. 2-19, Record 17 -"Any existing towers must undergo review for adverse effects. Review will include minimizing wires and other collision hazards for sage-grouse and migratory birds, as well as adverse impacts of night lights (FAA requirement)." Fidelity questions the need for these reviews, as there is no data provided demonstrating high mortality rates for towers. This statement is also overly broad, and does not indicate what types of towers will need to undergo review. Additionally, BLM does not provide the height and/or size a tower would meet to warrant review.	3033-1
1048	1039-9	The Conservancy supports implementation of a compensatory mitigation program to offset impacts to sage-grouse habitat identified in Alternatives E and F (Table 2-5; Record #4-5) As stated previously, the Conservancy recommends BLM seek to avoid, to the greatest extent possible, impacts to high value ecological resources, fragmentation of intact habitats and conflicts with other uses, designations and legal mandates, while facilitating land uses including energy and mineral development. Where impacts to greater sage-grouse habitat are unavoidable, the Conservancy strongly recommends that BLM implement a compensatory mitigation program and, as a result, supports the recommendation in Alternative F of the SEIS where BLM will manage an extensive amount of the planning area as mitigation areas. The Conservancy believes such a program to be a critical part of successful sage-grouse conservation planning and recommends BLM consider implementing the attached elements of a compensatory mitigation program, attached as Appendix A. We also note that implementation of such a mitigation program could allow, and serve as an incentive for, resource developers to restore or reclaim habitat in areas that are presently over a disturbance cap so that such areas come under the cap and might therefore be developable at some future time. Please note; the attached recommendations (Appendix A) are made from Conservancy staff with expertise in mitigation policy and practice. However, the Conservancy recognizes that many of the following recommendations are consistent with BLM's interim Regional Mitigation Manual, which we support as a partial alternative to the recommendations we offer below. Additionally, we are aware that BLM's interim Manual has been, at least partially, incorporated into the Northwest Colorado Greater Sage-Grouse Draft Resource Management Amendment and EIS, and we believe this inclusion supports incorporation of a compensatory mitigation program in the Bighorn Basin RMP [or participation of the Bighorn Basin in a regional mitigation program involving other adjacent Field Offices].	3035-7
1048	1048-17	P. 2-17, Record 4 -In the Greater Sage-Grouse Core Habitat Areas ACEC, the density goal includes either: Maintain or reduce the existing level of density of energy production and/or transmission structures on the landscape in sagebrush communities, or Manage the existing level of density of disturbance on the landscape so that anthropogenic disturbances do not exceed one disturbance per 640 acres within the Density and Disturbance Calculation Tool (DDCT) analysis (or best available tool) and cover less than 3 percent of sagebrush habitat." How does BLM propose to honor valid existing lease rights while reducing the existing level of density? This is also inconsistent with the EO and should be removed.	3001

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1048	1048-16	P. 2-17, Record 4-"Designate greater sage-grouse priority habitat within Core Habitat Area as the Greater Sage-Grouse Core Habitat Areas ACEC (Map SEIS-31 and Appendix F of the Draft RMP and Draft EIS; I,161 ,234 acres)." This ACEC is unreasonable, does not promote multiple-use, and is inconsistent with the EO.	3001
1048	1048-15	P. 2-17, Record 4-"Where suitable conservation actions cannot be achieved in priority habitat, seek to acquire state and private lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore sage -grouse habitat." There is already a lack of adequate BLM funding and Fidelity finds it difficult to believe the funds BLM already receives will be adequate to acquire state and private lands. BLM should instead focus on acknowledging valid existing lease rights and working with private landowners to find appropriate programs.	3016-2
1048	1048-14	P. 2-16, Record 3- "Examine applicability of categorical exclusions in priority habitat." Categorical exclusions (CX) are provided by law and are intended to benefit the operator as well as BLM during the permitting process. The decision to exclude the use of a CX must be made based upon site-specific conditions on a case-by-case basis and the proposed project. The use of CX's should therefore always be included in a general guidance document.	3027-1
1048	1048-13	There is no justification for the expansion of habitat under Alternative E. This would increase habitat by 72,000 acres with no scientific justification. An ACEC [Area of Critical Environmental Concern] designation with a 3% disturbance cap would essentially prohibit new oil and gas exploration and development. The final document should follow the plan outlined in the EO.	3035_1
1048	1048-12	Livestock grazing on federal land, for example, has been shown to have beneficial impacts on the surface as acknowledged by BLM. This should, therefore, not be considered as contributing to the surface disturbance cap. Since the surface disturbance cap is focused on limiting surface impacts from oil and gas operations, the only surface disturbance that should be included in the disturbance cap calculation is that caused by oil and gas development.	3017-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1048	1048-11	Page 2-30, Record 79, Alternatives E and F offer an exception to the surface disturbance caps "if additional mitigation is demonstrated to onset the resulting loss of sage-grouse habitat." There is no discussion as to what activities will constitute this additional mitigation, if it will apply to both on- and off-site mitigation, or if it will be a requirement in specific habitats. There is no description of how credit will be calculated for operators. BLM must also address reclamation credits for interim reclamation efforts toward the total disturbance cap allowance. In the EO, reclamation credit is to be given for completion of habitat enhancements on bond release or minimally functional habitat. Per the EO, these habitat enhancements may be used as credit for reclamation that is slow to establish in order to maintain the disturbance cap or to improve nearby sage-grouse habitat. It makes sense from a biological perspective to remove reclaimed and/or mitigated acres from the surface disturbance calculation because these acres are no longer disturbed BLM should also include reclamation as an exception to the surface disturbance caps. Fidelity requests BLM provide more detail regarding these processes. There is no discussion of what types of activities will be included in the surface disturbance calculation.	3035_4
1048	1048-10	As noted previously, BLM 's proposed 0.6 mile condition of approval (COA) directly conflicts with the 0.25 mile buffer provided for by the State for occupied leks, which would allow much needed flexibility in the application of this stipulation and potential land use. We urge BLM to remove "surface disturbance" and "disruptive activity" from these stipulations to achieve consistency with the State.	3035_1
1048	1048-9	BLM should clearly explain the significant difference between the requirement of 1.9 miles for a primary and secondary road and the 0.6 mile for a tertiary road and provide background as to where these numbers came from. If BLM chooses to include such stipulations, detailed information needs to be provided as to why scientific evidence shows a need for such restrictive management.	3039-1

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1048	1048-8	We are concerned that proposed management outside of Key Habitat Areas under Alternatives B and E greatly exceeds and is inconsistent with what is provided for under the EO. The 0.6 mile NSO around occupied sage-grouse leks, controlled surface use (CSU) for discretionary actions, Right-of-Way (ROW) exclusion areas around leks, and Timing-Limit Stipulations (TLS) in nesting and early brood rearing habitat within a 3-mile lek buffer were not included in the EO. These limitations contradict the core area concept to to protect important habitat while promoting and incentivizing development in less desirable habitat outside of these areas. The restrictions in Alternatives B and E clearly conflict with this principal. We urge BLM to adopt the Core Area Strategy contained in the EO. The restrictions proposed under Alternatives E and Fare very excessive and, as stated above, do not reflect those outlined in the EO. Alternative E proposes a 4-mile NSO around a lek, which is hardly reasonable. This 4-mile protective buffer around leks is more than twice the 1.9 mile buffer provided under the EO. The 0.6 mile NSO around the perimeter of occupied sage-grouse leks within key habitat areas provided under EO provides adequate protection. Increasing the size of a lek buffer by almost 700% is excessive, unjustified, and would prevent development on thousands of acres. New road construction within 4 miles of active sage-grouse leks and new road construction in occupied GSG habitat is also prohibited under Alternative E. No documentation is provided as to why this additional stipulation would be necessary, and this is entirely unreasonable.	3035_1
1048	1048-7	Fidelity is particularly concerned with the suggested 3% disturbance cap threshold, not exceeding one disturbance per 640 acres using the Density Disturbance Calculation Tool (DDCT) regardless of the use. The EO has a disturbance cap threshold of 5% per 640 acres using the DDCT and it does not limit such disturbance to one occurrence. This is very worrisome, as it will essentially shut off the Bighorn Basin to future oil and gas activities and other multiple uses. Alternatives D and F apply a surface disturbance cap, 5% and 3% respectively, to "sage brush habitat," while Alternative E applies a 3% cap to "total greater sage-grouse habitat." The EO applies a 5% surface disturbance cap to "suitable greater sage-grouse habitat." Alternatives D, E and F should all be modified to be consistent with the EO. Not all sage brush habitat is greater sage-grouse habitat and not all sage-grouse habitat is considered suitable sage-grouse habitat. In order to provide ample protection, the surface disturbance cap should only apply to suitable sage-grouse habitat.	3035_4
1048	1048-6	Many of the stipulations in DEIS/RMP are much more restrictive than the IM and EO, which leads Fidelity to wonder why BLM feels additional stipulations are necessary. Many sage-grouse management plans are currently being drafted and the State of Wyoming has become an example of what a good, comprehensive plan looks like; yet BLM seems to believe more stipulations are necessary, and do not provide reasons as to why this is so. Fidelity strongly recommends these unnecessary, inconsistent restrictions be removed and management instead follows the stipulations in the IM and EO.	3035_1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1048	1048-5	Fidelity is concerned about BLM's reliance on data from the National Technical Team (NIT) report. A variety of peer-reviewed, scientific information should be included in the DEIS in order to produce the best planning effort. Instead, it seems BLM relies almost solely on information from the NIT report. The Northwest Mining Association (NWMA) recently published a report which questions the validity of the NIT report, as the USFWS' "warranted but precluded" determination was based on the conservation measures already in place in BLM manual 6840 - Special Status Species Management. Ramey et al (20II)1 report that the implication in the NTT report stating "impacts are universally negative and typically severe" clearly demonstrates a bias against the oil and gas industry. An overview of the Cooper Ornithological Society's Monograph: Studies in Avian Biology, the primary source of information relied upon by the NTT, was conducted by the Center for Environmental Science, Accuracy and Reliability (CESAR) in February 2012 and entitled "Science or Advocacy?". This found significant mischaracterization of previous research, errors and omissions, lack of independent authorship and peer review, methodological bias, invalid assumptions and analysis is and inadequate data. Separate reviews conducted by scientists commissioned by the State of Colorado found the same defects.	3027-1
1048	1048-4	Fidelity would like to remind BLM that new stipulations cannot be imposed on valid existing leases simply because a plan amendment has been prepared, as is implied in several statements in the document (please see the examples below). BLM must acknowledge that when a lease is issued, it constitutes a valid existing right which cannot be unilaterally changed, including surface and timing restrictions beyond those identified in 43 CFR 3101.0.	3027-1
1048	1048-3	Fidelity would also like to remind BLM that, Per the Energy Policy Act, the least restrictive stipulations necessary to protect resource values should be implemented. This was clearly not the case in the Supplement when it came to oil and gas resources. The Federal Land Policy and Management Act (FLPMA) identifies mineral exploration and development as a principal or major use of the public lands, thus BLM must consider mineral exploration in the plan. As written, the RMP seems to consider this development a problem, not a potential asset, in the planning area.	3027-1
1048	1048-2	We are also confused as to why BLM did not select a new preferred alternative, in light of Alternative E and F being proposed in the Supplement. By failing to identity a preferred alternative in the DEIS, BLM has caused a disservice to operators and the public. Without a known preferred alternative, it is difficult to properly comment on future development options within the project area. This leaves the public with only a 30 day window to review BLM's preferred alternative during the protest period, which is not a substantial amount of time for proper review. A preferred alternative should be selected to indicate the perceived appropriate balance of development and environmental protection and the public relies on BLM's expertise in such matters. Fidelity is very disappointed in BLM's decision to omit a new preferred alternative from the Supplement.	3027-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1048	1048-1	We therefore request BLM give an explanation of why they felt additional time and resources were necessary to supplement the previous draft.	3027-1
1049	1049-4	Finally, WSGA is concerned that the socioeconomic analysis of Alternative F fails to properly address the impacts of the ACEC designation on the ranching industry and, by extension, communities within the Big Horn Basin. While Table 4-17 indicates minimal loss of AUM's under Alternative F, the true long-term impacts of the proposed limitations on range improvements, including water development and fencing, and the management constraints resulting from travel restrictions will inevitably be a significant reduction in livestock grazing.	3036-1
1049	1049-3	The Supplement fails to acknowledge the Wyoming Governor's 2013 Executive Order (EO 2013-3) developed in close collaboration with Wyoming BLM. The EO states: I. It is Wyoming's primary premise that grazing activities are compatible with Greater Sage-Grouse conservation and may improve habitat for Greater Sage-Grouse. Grazing is considered a de minimus practice (Executive Order 2011-5, Attachment C). Grazing management practices maintain or enhance Wyoming rangelands. Properly managed rangelands are capable of sustaining viable Greater Sage-Grouse populations and a diversity of plant species appropriate to suitable Greater Sage-Grouse habitat. 2. The State of Wyoming will collaborate with appropriate Federal agencies in defining a framework for evaluating situations to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives where conservation objectives are not being achieved on federal land. The State of Wyoming will also collaborate with appropriate federal agencies on appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework. Monitoring data will at minimum reflect 5 years of information, include rangeland health assessments and require conclusion or action to be based on 3 out of 5 years of data. WSGA requests that BLM incorporate the language of EO 2013-3 into Alternative F as the management prescription for livestock grazing within the Greater Sage Grouse Core Habitat Area.	3017-1
1049	1049-2	WSGA strongly opposes the designation of this entire area as an Area of Critical Environmental Concern. The flexibility and adaptation embodied in the Executive Order is lost through the ACEC designation. Specifically to the interest of our members, the proposed ACEC designation will inevitably lead to further restrictions on livestock grazing as recognized in Table 4-20. This is in direct contradiction to the recognition by the EO that grazing has a de minimus impact on sage grouse habitat.	3001
1050	1050-77	NWMA maintains that BLM's failure to include consideration and detailed analysis of conservation measures other than those in the NTT Report represents a pre-determined decision by BLM to implement the NTT conservation measures without giving proper and detailed analysis to alternative conservation measures – including those developed by USFWS and USGS, which may produce equal or better results for sage-grouse conservation, while complying with FLPMA.	3035_2

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1050	1050-76	In addition, throughout the DRMP and DSEIS, BLM seems to describe acreage subject to special designations and withdrawals in a way that is unclear or inconsistent with the total mineral acreage, which would be affected by the special designations or withdrawals. For example, the ACECs have overlapping boundaries, and under Alternatives B and E all ACECs are proposed for withdrawal; however it is unclear how much mineral acreage is actually subject to the withdrawal due to the overlapping boundaries. An example of this is where Alternative E carries over all management actions, outside the Sage Grouse Key Habitat ACEC, from Alternative B. Alternative B proposes 325,102 acres subject to withdrawal. The sage-grouse ACEC under Alternative E totals 1,231,383 surface acres and 1,519,859 mineral acres. If the sage-grouse ACEC mineral acres are added to the proposed withdrawals from Alternative B the proposed withdrawal would be 1,844,961; instead BLM reports that 1,764,621 acres are proposed for withdrawal under Alternative E (DSEIS Ch.4 at 4-101). One assumes this discrepancy is a result of overlapping boundaries; however this must be made clear in order for the reader to analyze the impact to hardrock mining due to land withdrawals.	3001
1050	1050-75	NWMA also contends that the NTT Report contains data that is not directly applicable to the planning area, and assumes that habitat and species conditions are consistent throughout the range, which may not be the case. For example, the NTT Report does not take into account that sage-grouse populations may be stable or even increasing in portions of the range in the Big Horn Basin resource area. In situations where this is the case, the conservation measures in the NTT Report are not warranted, regardless of whether they represent the "Best Available Science," as required under 40 C.F.R §1502.24. Therefore additional baseline data, which includes population trends of sage-grouse, and alternative conservation measures should be analyzed specific to the planning area. BLM must explain why the NTT Report conservation measures are warranted, since reportedly, Wyoming contains the largest population of sage-grouse across its range and are at low risk for decline (See DSEIS Ch.3).	3035_2
1050	1050-73	The EIS Must Evaluate Ways to Minimize Adversely Affecting Private Property Rights-The land use restrictions, prohibitions, and withdrawals proposed pursuant IM 2012-044 and the NTT Report have significant potential to diminish landowners' rights to develop their private property if their lands have key/core sage-grouse habitat or are located near key/core sage-grouse habitat. The EIS must evaluate ways to minimize interfering with private property rights, including the rights associated with owning patented mining claims and fee mineral estates located in, adjacent to or near key/core sage-grouse habitat.	3020
1050	1050-72	For each alternative, the EIS documents must re-evaluate the socioeconomic benefit or harm each alternative will have and disclose and quantify any adverse effects to job creation and local economies in light of BLM's own assertion that implementation of Alternatives B, E, and F will have significant adverse impacts to locatable mineral development	3036-1

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1050	1050-71	The EIS documents for the Planning Area do not consider the adverse impact on small businesses of requiring validity exams in withdrawn or segregated lands, and are devoid of any analysis or discussion of the impact of sweeping and cumulative land withdrawals in key/core sage-grouse on small entities. This is a significant omission that must be addressed in the socioeconomic analysis in the final EIS documents, especially because the proposed land withdrawals are co-located in areas with moderate to high mineral potential. As BLM discovered in Northwest Mining Association v. Babbitt, 5 F.Supp.2d 9 (D.D.C. 1998), failure to comply with the RFA and SBREFA will invalidate a rulemaking. Therefore the Final EIS/RMP risks being invalidated if this issue is not addressed	3036-1
1050	1050-70	In addition, NWMA contends that the socioeconomics analysis related to locatable minerals is completely inadequate, especially with respect to small entities, and does not comply with the CEQ regulations as cited in BLM's NEPA Handbook	3036-2
1050	1050-69	The DSEIS also states: it is not possible to quantify effects from locatable and salable minerals management changes among the alternatives, for lack of reliable production forecasts (DSEIS Ch. 4 at 4-142). The above statement is not adequate and does not eliminate the requirement to include locatable minerals in the socioeconomic impact analysis, especially considering that BLM's own Mineral Report clearly establishes that bentonite production is expected to remain steady or increase based on demand trends (See Mineral Report Ch. 3). BLM's above claim shows a complete lack of due diligence; BLM could have obtained the necessary information to conduct a trend analysis from Wyoming's Department of Revenue, or the published USGS mineral reports, which would have provided a reasonable alternative to the "lack of reliable forecasts." It seems clear that Alternatives B, E, and, F will have an extremely adverse impact on the locatable mineral industry due to land withdrawals and surface use restrictions, which will in turn adversely affect the economic stability of the counties which rely on mining.	3027-1
1050	1050-68	the DSEIS and DRMP fail to include locatable minerals in the socioeconomic analysis, which is particularly perplexing in light of the above statements, and when locatable mineral mining contributes to 11% of the jobs and 22% of the earnings in Big Horn County. To that end, the Bighorn Basin EIS documents fail to adequately address the economic impact it will have on the counties in the Planning Area, especially Big Horn, Washakie and Hot Springs Counties, where the locatable mineral industry would be crippled if Alternatives B, E, or F, were implemented. In addition, BLM must explain its rationale for concluding that "no high impacts" were identified in the socioeconomic impact analysis especially when Alternative E proposes to withdrawal at least 43% of the mineral estate in the Planning Area, and subject existing mining claims to validity exams.	3020

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-67	Analyze, Disclose, and Provide Convincing Rationale of the Impacts to Mineral Development Under Each Alternative-BLM failed to identify or provide useful explanation of impacts to locatable minerals required by 40 CFR §§1502.16(a)(b),1508.7 (See DSEIS Ch. 4; DRMP/DEIS Ch. 4). While NWMA agrees that land withdrawals and restrictions will have an adverse direct impact on locatable mineral development, NWMA contends that the cumulative impacts related to mineral withdrawals, and surface use restrictions in sage-grouse habitat across the range were not adequately considered, analyzed and disclosed. In Kettle Range Conservation Group v. U.S. Forest Service, 148 F. Supp.2d (D.C. Cir. 2001) the court held that agencies must locate, describe, and consider other projects (or in this case RMPs, and other special designations like Wilderness Study Areas) that could have cumulative impacts when combined with the project under consideration. In Muckleshoot Indian Tribe v. U.S. Forest Service, 177 F.3d 800, (9th Cir. 1999) the court discusses in dicta "the problem is compounded by the very general and one-sided analysis of the cumulative impact information…these sections merely provide very broad and general statements devoid of specific, reasoned conclusions." The court then held that the 12 cumulative impact statements contained in the EIS were "too general and one-sided to meet NEPA requirements." NWMA maintains that the cumulative impact to locatable minerals from the combined land withdrawals, segregations, and de facto withdrawals currently in place, as well as the future land withdrawals proposed in dozens of RMP revisions will have an inadequately defined and significant adverse effect on the hardrock mining industry, and this must be given thorough analysis in the DSEIS; otherwise it represents a significant flaw that will render the final NEPA documents incomplete. NWMA further contends that the direct, indirect, and cumulative impact analysis is inadequate and lacks convincing data as well as rationale, as described above.	3020
1050	1050-66	Alternatives E and F propose surface use restrictions that are not proposed under Alternatives B and D, and which would debilitate mineral development that is co-located within special designation areas and key/core sage-grouse habitat. Simply referring the reader to the DRMP for the impacts of management actions proposed in the does not provide the detailed analysis required under NEPA, and thus is a fatal flaw that must be addressed before the final NEPA documents are released. The Final EIS must provide detailed analysis in order to withstand legal scrutiny,	3020

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1050	1050-65	the impact analysis lacks any useful discussion regarding locatable mineral development, surface use restrictions, and land withdrawals within key/core sage-grouse habitat, and instead uses overly simplistic and comparative terms like - adverse impacts to locatable mineral development would be substantially greater under Alternative E(DSEIS Ch. 4 at 4-19), and then describes impacts to minerals outside the proposed sage-grouse ACECs would be the same as those under Alternatives B and D (DSEIS Ch. 4 at 4-18, 4-19). The impact analyses under B and D are insufficient as well, as they describe the impacts to locatable minerals as "similar to Alternative A." BLM needs to explain the rationale for concluding that the impacts of withdrawing approximately 174,000 acres from mineral entry (Alternative A) and nearly two million acres (Alternative E) are similar. In addition, there is no meaningful discussion of how the proposed land withdrawals, prohibitions, and surface use restrictions will affect individuals attempting to assert their pre-discovery rights, as discussed above.	3020
1050	1050-64	BLM must evaluate the substantially adverse consequences of making it impossible to explore and develop pre-discovery unpatented mining claims and lands that are currently open to location on which there are no unpatented mining claims that would be withdrawn from mineral entry and location of mining claims. BLM must recognize the rights granted in Section 22 of the Mining Law and the Section 22 VERs associated with access to and use and occupancy of pre-discovery claims.	3027-1
1050	1050-63	The Bighorn Basin EIS documents should discuss how the conservation measures proposed in the NTT Report, and included in the DSEIS, as well as the proposed land withdrawals, validity exams, and surface use restrictions detailed in Alternatives B, E, and F are in compliance with rights under the General Mining Law to allow access to public lands for prospecting, mining and processing and uses reasonably incident thereto	3027-1
1050	1050-61	Furthermore, BLM provides no baseline data to provide context to these arbitrary thresholds. Do these thresholds apply to occupied habitat or potential habitat? At what scale are these thresholds applied -planning area wide, state-wide, range-wide, MZ-wide, key/core habitat only? How can the public possibly be expected to gauge the potential impacts as a result of these conservation measures, if there is insufficient baseline data? NWMA contends that the habitat thresholds (3% surface disturbance and 15% sagebrush canopy cover) are derived from flawed studies, and in some cases are completely arbitrary.28 BLM must provide how and where these thresholds were determined, and re-evaluate the impacts they will have on other resources in the planning area as well as the socioeconomic impact they will have on the planning area, or else the Final EIS documents will not likely withstand legal or scientific scrutiny.	3035_2
1050	1050-60	In addition, NWMA believes that the 3% disturbance threshold proposed in key/core sage-grouse habitat, and 1 disturbance per 640 acres, (DSEIS Ch.2 at 2-13) puts an overly restrictive and unrealistic burden on mining operators exercising their rights under the General Mining Law, and creates a de facto withdrawal which is outside BLM's authority and contrary to law.	3035_4

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-59	BLM recommends the following substantial acreages be withdrawn from locatable mineral entry or subject to surface use and disturbance restrictions, and prohibitions primarily for the purpose of sage-grouse conservation (See Table 2. 6): . Alternative B: 325,102 acres (8%) of mineral estate (DRMP Ch. 4 at 4-48); . Alternative E:26 1,764,621 acres (42%) of mineral estate (DSEIS Ch.4 at 418); . Alternative F: 271,529,955 mineral acres (36% BLM mineral acres). BLM identifies locatable minerals as a principle industry or use in the decision area, especially in Big Horn County (DRMP/DEIS Ch. 3 at 3-2), yet BLM fails to identify compliance with the General Mining Law and the Mining and Minerals Policy Act as a way of addressing issues through policy or administrative action. NWMA contends that BLM has a legal obligation to comply with the General Mining Law, Mining and Minerals Policy Act, and FLPMA to recognize the Nation's need for domestic sources of minerals and the right to explore. It is at best careless and at worst remarkably disingenuous to identify locatable minerals as a "principle use"? and then fail to identify the applicable laws for managing them and then propose management actions that are contrary to the General Mining Law and outside BLM's discretion as described above.	3020
1050	1050-58	NWMA contends recommendations contained in the Bighorn Basin EIS documents are not consistent with rights under the General Mining Law which allow citizens of the United States the opportunity to enter, use and occupy public lands open to location to explore for, discover, and develop certain valuable mineral deposits	3027-1
1050	1050-57	Furthermore, FLPMA expressly provides that none of its other provisions "shall in any way amend the Mining Law of 1872 or impair the rights of any locators or claims under that Act, including, but not limited to, rights of ingress and egress" (43 U.S.C. § 1732(b)). Therefore, the Bighorn Basin EIS documents proposed land withdrawals, prohibitions, and restrictions are contrary to provisions under FLPMA and Section 22 of the General Mining Law (discussed below) and must be revised.1. NWMA Recommendation No. 5: Demonstrate Compliance with FLPMA. The DRMP/DEIS/DSEIS should discuss how the proposed land withdrawals and surface disturbing restrictions in sage-grouse key/core and general habitat areas contained in Alternatives B, E, and F comply with the FLPMA mandate to balance a wide range of resource values and uses of public lands including the directive in the Mining and Minerals Policy Act at 43 U.S.C. §1701(a)(12) and 30 U.S.C. §21(a) to recognize the Nation's need for domestic sources of minerals. In addition, as previously discussed, BLM states that environmentally responsible mineral development is a primary goal and a key objective of the RMP; however, Alternatives B, E, and F severely limit the possibility of hardrock mineral development by way of land withdrawals, validity exams, and surface use restrictions in order to protect and conserve sage-grouse, which is inconsistent with the stated goals and objectives of the RMP. The Final EIS must eliminate this inconsistency.	3019

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1050	1050-56	BLM must recognize that the need for mineral development to reduce the Nation's reliance on foreign sources of the minerals, to maintain our way of life and defend the country, may in fact be greater than the need to conserve millions of acres of sage-grouse habitat. As such BLM must demonstrate its compliance with the mandate under the Mining and Minerals Policy Act	3019
1050	1050-55	Moreover, the proposed restrictions and withdrawals from mineral entry in the DSEIS directly conflict with FLPMA's requirement that the Secretary must manage public lands to respond to the Nation's needs for minerals. Instead, the proposed restrictions and withdrawals place more importance on aesthetics and conservation of resources over other uses, like mineral development. Again, BLM must acknowledge that it is required to fully consider the need for mineral development along side with the need for conservation of other resources.	3019
1050	1050-54	NWMA recognizes that BLM appropriately identified mineral development as a key issue in the DRMP/DEIS (Ch. 1 at 1-10). However, BLM fails to provide for environmentally responsible mineral exploration and development, or recognize the Nation's need for domestic mineral sources, under Alternatives, B, E, and F. BLM must acknowledge that it is required to fully consider the need for future mineral development along side with the need for conservation of resources.	3019
1050	1050-53	NWMA contends that applying an emphasis on one resource, sage-grouse, across an entire planning area is not consistent with FLPMA, and BLM must resolve this issue before the Final EIS is published. The EIS must evaluate how the land use restrictions, prohibitions, and withdrawals recommended in the DSEIS pursuant to IM 2012 -044 and the NTT Report achieve the required balance in managing the public lands.	3027-1
1050	1050-51	Based on these findings reported by BLM as the current status of sage-grouse within the Planning Area, and USFWS's findings in the biological assessment, the conservation measures to protect sage-grouse proposed under Alternatives B, E and F go beyond what is necessary or reasonable to protect sage-grouse within the Planning Area; and calls into question the appropriateness of the NTT conservation measures pursuant to IM 2012-044. BLM must provide convincing data to support the proposed land withdrawals, surface use restrictions, and explain its rationale for inappropriately targeting mineral development in the DSEIS, when it is not identified as a primary or secondary threat to sage-grouse in the Planning Area (DSEIS Ch.4 at 4-152), and where habitat fragmentation has not rendered habitat unsuitable.	3035_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-50	Alternatives B, E, and F, severely limit the possibility of hardrock mineral development by way of land withdrawals, validity exams, and surface use restrictions in order to protect and conserve sage-grouse, despite the USFWS's conclusion that locatable mineral development with mitigation would not lead to a listing under the ESA. In addition, these proposed restrictions do nothing to address the primary threats to sage-grouse. The application of conservation measures or restrictions (to protect sage-grouse) placed upon locatable mineral development should be proportionate to the threat -if any-that responsible resource development with proper mitigation measures that include re-vegetation with appropriate species and monitoring plans to identify and eradicate invasive species in the reclaimed areas poses to sage-grouse. BLM's proposed prohibition against mineral development in key/core sage-grouse habitat areas is disproportional to the amount of land used for mineral development and the impacts associated with mineral exploration and development, especially considering that the projected long term surface disturbing activities related to locatable mineral development are small in the context of the habitat area.	3020
1050	1050-49	Policy Issues that Must be Evaluated in the EIS BLM policies regarding sage-grouse conservation measures must be consistent with the agency's statutory authorities and the regulations and policies that implement those authorities. As described below, NWMA is concerned that the land use restrictions and prohibitions incorporated into the DSEIS pursuant to IM 2012-044 and in the NTT Report exceed BLM's authority under FLPMA, or conflict with the multiple use mandate under FLPMA, rights under the General Mining Law, and BLM Manual 6840.	3027-1
1050	1050-47	The Alternatives Described in Detail Should Consider Other Conservation Measures Besides those in the NTT Report-NWMA recognizes that BLM reports that it will analyze all applicable conservation measures submitted to BLM and USFS by state governments and citizens during the public scoping process (DSEIS Ch.1 at 12); however NWMA contends that this is wholly inadequate given the emergence of new data - BLM's stated "Need" for the DSEIS--as well as newly implemented conservation measures by local working groups and private citizens. All current and applicable conservation measures must be considered, not just those presented during the scoping process which took place four years ago. 24 At least one additional alternative should be included that analyzes conservation measures and regulatory mechanisms that are not described in the NTT Report, and which have been updated and/or implemented since the original scoping process and release of the 2011 DRMP. Analysis of existing regulatory authorities including but not limited to BLM's Surface Management Regulations for locatable minerals at 43 CFR 3809 that allows for hardrock mineral development with mitigation to prevent unnecessary or undue degradation needs to be included. In addition, IM 2012044 itself even recognizes that the NTT Report conservation measures may not be appropriate in all situations:	3035_1

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1050	1050-46	The Council on Environmental Quality regulations require agencies to use the best available science when preparing EIS documents 40 C.F.R §1502.24.19 NWMA has learned a peer review of the NTT Report suggests that the NTT Report20 does not in fact represent the "Best Available Science" but rather relies on studies that have been criticized for: significant mischaracterization of previous research; . substantial errors and omissions; . lack of independent authorship and peer review; . methodological bias; . a lack of reproducibility; . invalid assumptions and analysis; and . inadequate data.21 NWMA is concerned that the Alternatives described in the DSEIS rely entirely on the NTT Report conservation measures.	3035_2
1050	1050-45	In addition, BLM must demonstrate compliance with Manual 6840. The proposed fire management actions under Alternatives B, E, and F are likely to harm sage-grouse in the short-term and probably the long-term, as discussed above, which is contrary to BLM's obligations under Manual 6840 and the ESA.	3011
1050	1050-44	NWMA believes Manual 6840 goes beyond what the ESA requires for candidate species, like the sage-grouse, and is a significant formalized conservation effort if implemented properly. Therefore proper implementation of Manual 6840 must be included in the detailed Alternatives and Environmental Consequences analyses of the EIS documents as well as in the proposed alternatives suggested herein.	3035_1
1050	1050-43	b. NWMA Recommendation No. 3: The DRMP/DEIS Must Include a Manual 6840 Alternative (Better Implementation of Manual 6840) - Consideration of specific provisions pursuant to Manual 6840 must be referenced in the Alternatives and Environmental Consequences chapters, and described in detail in an appendix, so that the public can objectively evaluate the potential effectiveness of the sage-grouse conservation measures in Manual 6840. BLM should not ignore or replace the existing regulatory tools it already has without demonstrating why the existing regulations are not functioning properly or are inadequate. Important aspects of Manual 6840 that apply to sage-grouse and should be discussed include the following: [See bullet list in letter pg. 19]	3035_1
1050	1050-42	none of the alternatives give proper analysis to the existing conservation measures or authorities the BLM already has to protect sage-grouse and its habitat. BLM must not ignore Manual 6840. NWMA recognizes that BLM generally describes Manual 6840 (DRMP/DEIS Ch. 3 at 3-103), but then fails to provide a discussion within the context of impacts of how any of the specific provisions of Manual 6840 meet or fail to meet the objectives and goals set for the planning area. The DRMP/DEIS and DSEIS documents should evaluate the numerous directives in BLM Manual 6840 in the context of each Alternative Considered in Detail, and include an additional alternative that analyzes full and consistent implementation of Manual 6840, existing BMPs, 2004 Strategy, and Fundamentals for Standards for Rangeland Health	3027-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-40	The Final EIS documents should not be published without a full and detailed analysis of an additional alternative, that incorporates and analyzes a full range of conservation measures, including existing strategies, and will provide future monitoring data that will satisfy USFWS's requirements. NWMA contends that this additional alternative would fit the Purpose, Need, and Objectives of the DRMP/DEIS and would be consistent with FLPMA, the Mining Law of 1872, the Mining, Minerals and Policy Act, and BLM's sage-grouse conservation goals and objectives.	3027-1
1050	1050-39	Contrary to the WBP finding which indicates that fire suppression activities can benefit sage-grouse, Alternatives B and E do not focus on fire suppression; rather they propose passive management which is expected to have adverse impacts to sage-grouse in the short-term. BLM must explain how subjecting sagebrush ecosystems/sage-grouse habitats to increased fire potential in the short-term will benefit sage-grouse in the long-term; especially if sage-grouse are incapable of persisting in fragmented habitat, devoid of sagebrush cover, which is what the NTT Report contends. Under this assumption, most if not all the sage-grouse would die; therefore there would not be sage-grouse in the long-term.	3011
1050	1050-37	NWMA agrees that the USFWS identified conservation measures in RMPs as BLM's primary mechanism for protecting sage-grouse; however, BLM continues to mischaracterize the USFWS's WBP determination by saying that USFWS's determination concluded that BLM lacks adequate regulatory tools to conserve sage-grouse, and therefore new regulatory mechanisms must be developed (See DSEIS Ch. 1 at 1-2; Ch.3-2). Using this as a premise, BLM maintains the NTT Report conservation measures are required to respond to the WBP determination. The NTT Report does not use Manual 6840 or ESA as a foundation upon which to build. In fact, the NTT Report never references Manual 6840, nor does it explain the need for an entirely new regulatory approach. As such, it inappropriately discards an existing agency policy without ever justifying the radical change advanced in the NTT Report, and is thus arbitrary and capricious. Throughout the Warranted but Precluded (WBP) determination, specific to BLM regulatory mechanisms, USFWS repeats over and over its inability to assess the regulatory mechanisms because of how information was being reported to them.	3035_1
1050	1050-35	The alternatives analysis in the DRMP/DEIS and DSEIS does not satisfy requirements under NEPA to analyze all reasonable and viable alternatives, BLM's own requirements for analyzing alternatives as set forth in its NEPA Handbook, H-1790-1, or the above-noted Purpose of the document because it fails to recognize the Nation's need for domestic sources of minerals, violates FLPMA, does not balance BLM's goals and objectives, and fails to incorporate appropriate management actions by opting for a one-size fits-all approach to conservation. The Final EIS documents must include a revised and expanded alternatives analysis.	3027-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-34	This language is clear that mineral development is to be pursued and that exploration and development be conducted in an environmentally sound manner in compliance with the FLPMA mandate at 43 U.S.C. 1732(b) to prevent unnecessary or undue degradation of the lands. However, precluding mineral development by way of, surface use restrictions, validity exams and land withdrawals (See DSEIS Ch. 2at 2-12; 2-19) does not accomplish the DRMP/DEIS' stated goal, or provide consistency with the mandate under FLPMA or the Mining and Mineral Policy Act to recognize the Nation's need for domestic mineral sources or balance resources. NWMA contends that full implementation of existing regulatory tools "including required conservation and mitigation measures" are adequate to ensure environmentally sound mineral development that is compatible with sage-grouse conservation. To that end, only alternatives that will incorporate appropriate and implementable management actions that will conserve sage-grouse and its habitat, and at the same time recognize the nation's needs for domestic sources of minerals, among other management goals described in the DRMP/DEIS can be considered in the DSEIS. The DSEIS should carefully evaluate a reasonable range of alternatives, which are consistent with the stated purpose of the RMP revision, and consider conservation measures that are within the boundaries of the law. Conservation measures that are inconsistent with the law are not implementable. They cannot be part of BLM's Preferred Alternative, must be rejected out of hand, and therefore must be eliminated from detailed analysis.	3019
1050	1050-33	NWMA contends that in order for the alternatives to be considered a "reasonable range" of alternatives, then the alternatives must provide a reasonable range of area-specific conservation measures appropriate for the Bighorn Basin Planning Area and not rely almost entirely on the conservation measures recommended in the NTT Report. Moreover the alternatives must consist of management actions that are supported by the "Best Available Science." NWMA contends that the NTT Report does not constitute the Best Available Science.	3035_1
1050	1050-32	In addition, BLM prepared the DSEIS to consider the conservation measures identified in the NTT Report pursuant BLM Instruction Memorandum No. 2012044 (DSEIS at ES-1). IM-2012-044 requires BLM to consider all applicable conservation measures when revising or amending its RMPs in sage-grouse habitat. The conservation measures developed by the NTT must be considered and analyzed, as appropriate, and a reasonable range of conservation measures must be considered in the land use planning alternatives.	3035_1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-31	The "alternatives" portion of an EIS is considered the "heart" of the NEPA process and requires an agency to rigorously explore and objectively evaluate all reasonable alternatives so that decision-makers and the public are fully informed (40 C.F.R.§1502.14(a)).14 Substantial case law exists regarding the range of alternatives that need to be included in an EIS. For instance in Natural Resource Defense Council v. Morton, 458 F. 2d 827 (D.C. Cir. 1972) the court found that an agency must look at reasonable alternatives sufficient to allow for a reasoned decision; it is not appropriate to disregard an alternative merely because it does not offer a complete solution to a broad problem, like sage-grouse conservation. In Dubois v. USDA, 102 F. 3d 1273 (1st Cir. 1997) the court held that the Forest Service acted arbitrarily and capriciously when its Final EIS did not sufficiently explore all reasonable alternatives, and that an "agency has duty to study all alternatives that appear reasonable and appropriate for study… as well as significant alternatives suggested by other agencies or the public during the comment period." 15 Further, in Resources Ltd. v. Robertson, 35 F.3d 1300, 1307 (9th Cir. 1993) the court held "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate."16 To that end, BLM must examine the viable alternatives suggested herein, otherwise it will not likely withstand legal scrutiny pursuant to NEPA case law.	3027-1
1050	1050-30	Thoroughly Evaluate the No Action Alternative -The EIS documents must include a detailed discussion of the habitat conservation improvements currently being achieved under the existing policies, the socioeconomic benefits that would result from continued private-sector authorized uses of public lands with sage-grouse habitat, and the possibility that in light of the numerous habitat conservation measures already in place, the USFWS will determine in 2015 that the sage-grouse should not be listed as a threatened or endangered species. The No Action Alternative must discuss, in detail, specific conservation measures like those in Manual 6840 (see discussion infra at 17-20) and explain and quantify the deficiencies (if any) associated with these conservation measures/BMPs and/or the way in which they are being implemented and documented. Without this analysis, it is impossible for the public to gauge and understand the need (if any) for land use management changes in BLM's Preferred Alternative. The EIS documents must also include detailed discussion of the mitigation measures currently in place pursuant to FLPMA's "unnecessary or undue degradation"[illegible] provisions (43. U.S.C. §1732(b)) within the context of the No Action Alternative. BLM must not propose new or different regulatory mechanisms if any of the apparent shortcomings or gaps in the existing regulations are due mainly to uneven or incomplete implementation of existing policies.	3035_1
1050	1050-29	However BLM fails to include other management actions or conservation measures currently in effect in the planning area that would have a positive effect on wildlife, such as habitat conservation improvements and the various conservation measures required under the Wyoming Sage-grouse Strategy.	3035_1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-28	The No Action Alternative analysis in the DRMP/DEIS should quantify the impacts associated with ongoing implementation of the many existing local, state, and federal conservation measures and the existing BLM policies to protect sage-grouse habitat.	3035_1
1050	1050-26	The continuation of existing management and conservation measures and existing regulatory policies including the directives in BLM Manual 6840 define the No Action Alternative and provide a baseline upon which useful analysis may take place. It seems apparent that BLM has prematurely concluded that these existing regulatory policies are inadequate. However, BLM provides no discussion based upon on-the-ground data that this is the case. BLM should not presume (as it currently has) that using the existing tools or better implementation of the existing regulatory tools would not provide adequate sage-grouse and sagebrush habitat conservation.	3035_1
1050	1050-25	BLM fails to fully explain or analyze adequately how existing regulatory mechanisms are either adequate to conserve sage-grouse or inadequate to conserve sage-grouse, and therefore provides no useful baseline against which each of the proposed alternatives can be compared.	3035_1
1050	1050-24	As the DRMP/DEIS currently stands, insufficient explanation and discussion of current regulatory mechanisms or conservation strategies are described with respect to sage-grouse, which makes it impossible to compare the effects of the management actions proposed in the DSEIS.	3027-1
1050	1050-23	NWMA contends that Alternatives B, E, and F are inconsistent with the language contained in the DRMP/DEIS relating to BLM policy on land withdrawals, fails to recognize the Nation's need for domestic mineral sources, and fails to comply with FLPMA, the General Mining Law, Mining and Minerals Policy Act, BLM's own policy pursuant Manual 6840, IM 2012-044, DOI 603 Departmental Manual 1, withdrawal regulations at 43 Code of Federal Regulations (CFR) Part 2300, and NEPA. Moreover, the alternatives contained in the DSEIS and Alternative B of the DRMP/DEIS do not satisfy the Purpose and Need for the RMP revision, and should therefore, be revised to demonstrate that they are legal and fit the Purpose and Need before the Final EIS documents are published	3027-1
1050	1050-22	Alternatives considered in detail address management actions that include closure or prohibition of various resource uses over portions of the Planning Area (Id. at 2-8, emphasis added). Following the same line of reasoning, BLM should have eliminated Alternatives B, E and F from detailed analysis rather than evaluate them as alternatives that could be selected.	3027-1
1050	1050-21	NWMA agrees with BLM that alternatives that pursue sweeping land withdrawals within the Planning Area are overly restrictive, unreasonable and contrary to law and BLM policy; which calls into question the validity of Alternatives B, E, and F, which propose sweeping land withdrawals, or de facto withdrawals due to special designations, or unreasonable surface use restrictions. As such, Alternatives B, E, and F are inconsistent with FLPMA, and the Property Clause of the United States Constitution,13 which gives Congress sole power to regulate the public lands.	3027-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-19	BLM has failed to demonstrate how any of the Alternatives best satisfy statutory requirements; balance BLM goals, objectives, and polices; and which alternative represents the best way to satisfy the Purpose and Need, addresses key issues, and considers cooperating agencies recommendations (DRMP/DEIS Ch. 2 at 2-2, 2-3). NWMA believes Alternatives B, E and F, do not satisfy statutory requirements, do not balance BLM goals, objectives and policies, and are not the best fit for the Purpose and Need. The lack of meaningful analysis contained in the DSEIS as well as the DRMP/DEIS constitutes a serious shortcoming that must be addressed. Consequently, the DSEIS and DRMP/DEIS are "inadequate as to preclude meaningful analysis" (40 CFR §1502.9(a)); and therefore the BLM must prepare and reissue a revised draft which provides the analysis necessary to support each of the management alternatives, including identifying the Preferred Alternative.	3027-1
1050	1050-18	BLM has failed to indicate whether Alternative D, the agency's Preferred Alternative in the DRMP/DEIS, remains the agency's Preferred Alternative in the DSEIS, or whether there is no longer a Preferred Alternative. Instead BLM states in the DRMP/DEIS "The Agency Preferred Alternative or new alternative may be a combination of existing alternatives or an alternative within the range of alternatives already analyzed" (DRMP/DEIS Ch. 2 at 2-3, emphasis added). NWMA recognizes that BLM is only required to identify a Preferred Alternative at the time the final EIS documents are published (40 CFR § 1502.14(e)); however NWMA contends that a "Preferred Alternative or new alternative" which is introduced at the time the final NEPA documents are published precludes public involvement and the detailed analysis/disclosure required under NEPA, and as a result does not satisfy the agency's procedural obligations under NEPA. BLM must provide detailed analysis that supports why the Preferred Alternative is in the best interest of the agency as well as the public.	3027-1
1050	1050-17	Additionally, the CEQ regulation at 40 CFR § 1502.16(c) requires BLM to include discussion of "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies, and controls for the area concerned." NWMA contends that the surface use restrictions and land withdrawals proposed within sage-grouse habitat under Alternatives B, E and F described in the DSEIS conflict with BLM's own policy in Manual 6840, the General Mining Law, and its multiple use mandate under FLPMA (discussed in detail below), and represents a fatal flaw which renders the DRMP/DEIS and DSEIS both inadequate and inconsistent with existing laws and policies. The conflict between sage-grouse conservation and the prohibition through administrative fiat against mineral, oil and gas and other commodity development in the planning area must not be ignored. Unfortunately, the DSEIS fails to recognize and disclose this conflict. Detailed discussion of the impacts to each of the resources with respect to the proposed mitigation measures for sage-grouse found throughout the DSEIS must be thoroughly developed and analyzed before the Final EIS is published.	3027-1

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1050	1050-16	Alternatives E and F, which are based on recommendations in the NTT Report, lead to an absurd outcome that makes long-term restoration of sagebrush habitat (which will take a couple of decades to achieve) BLM's primary objective - rather than protecting sage-grouse populations now and in the next decade or so. NWMA vehemently opposes this misguided objective and urges BLM to recognize that conservation measures to minimize habitat loss are the only logical path forward - as well as the best opportunity to minimize the likelihood of the USFWS determining it is necessary to list the Greater sage-grouse as a threatened or endangered species. The likelihood that USFWS will determine it is necessary to list the Greater sage-grouse increases significantly if BLM fails to develop appropriate conservation measures to address the fire and invasive species cycle - one of the main threats to sage-grouse habitat range wide. Unfortunately, the conservation measures in the NTT Report do not mainly address habitat threats due the wildfire - invasive species cycle and focus inappropriately on restrictions and prohibitions on land uses and the regulated community. NWMA is also concerned that the assumptions used in the Special Status Species analysis are flawed, partly due to the way in which the NTT Report mischaracterizes other studies in order to support arbitrary habitat and disturbance thresholds. The analysis also contains broad generalization that the level of disturbance directly correlates to the level of adverse impact to species generally (DSEIS Ch. 4 at 4-70), but does not provide data to support that assertion. Based on the above mentioned flaws, the DSEIS and DRMP/DEIS are "inadequate as to preclude meaningful analysis" (40 CFR §1502.9(a)); and therefore the BLM must prepare and re-issue a revised draft which provides the analysis necessary	3035_1
1050	1050-15	Surprisingly, the flawed impact analysis is not one-sided. The impacts to sage-grouse due to the passive management of invasive species proposed under Alternatives B, E, and F which severely limit fire suppression methods, is expected to adversely affect sage-grouse in the short term, but provide long-term beneficial impacts to sage-grouse habitat due to restoration of a natural fire regime. However, no rationale or evidence is provided. (DSEIS Ch. 4 at 4-78). BLM must explain its rationale for concluding that sage-grouse will benefit in the long term "but certainly not in the short term" because fire suppression restrictions are likely to increase the potential for catastrophic fire; which in turn would increase the potential for the spread of invasive species, which would then take decades to restore sagebrush ecosystems after wildfires.12 The impact analysis is fatally flawed and must be revised before the final EIS documents are published.	3011

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-14	Furthermore, the DSEIS omits any discussion or analysis of impacts the proposed withdrawals, segregations, and restrictions will have on sage-grouse except to say they will be beneficial, but provides no quantitative analysis, data, convincing rationale or evidence of this assertion. There is no attempt to quantify the impacts whether beneficial or adverse, instead broad generalizations are used. NWMA opposes any impact analysis that does not quantify the cumulative impacts the proposed management decisions will have on all uses of public lands, including locatable minerals exploration and development. Detailed discussion of the impacts to locatable mineral operations and development, as well as to other land uses, must be thoroughly analyzed and developed, otherwise the Final EIS documents will be vulnerable to legal challenges.	3020
1050	1050-13	BLM may have presented impacts (i.e. environmental consequences) by resource and alternative in the DSEIS, however the DSEIS completely fails to include any detailed or meaningful analysis of the impacts to resources under Alternatives E and F, especially the socioeconomic impacts of withdrawing millions of acres to locatable mineral development (See DSEIS Chapter 4), which is discussed in detail below.	3020
1050	1050-12	Regrettably, DOI decision-makers did not heed warnings like this from DOI staff and peer reviewers and proceeded with publishing the NTT Report knowing that there were significant internal concerns about the report. If the legal, scientific and procedural flaws are not addressed and cured, the Final EIS and RMP will not stand up to legal challenges.	3035_2
1050	1050-9	Additionally, the failure to provide a detailed evaluation of Manual 6840 and other BLM policies pertaining to sage-grouse conservation is inconsistent with the guidance in Section 6.6 of BLM's NEPA Handbook(H-1790-1): The range of alternatives explores alternative means of meeting the purpose and need for the action…The broader the purpose and need statement, the broader the range of alternatives that must be analyzed. You must analyze those alternatives necessary to permit a reasoned choice (40 C.F.R 1502.14…In determining the alternative to be considered, the emphasis is on what is "reasonable"… Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense… (BLM Handbook H-1790-1 at 49 – 50). NWMA believes the entire DRMP/DEIS/DSEIS process is fraught with substantial procedural, legal and scientific flaws, which again, were recognized by DOI employees and discussed in internal emails questioning the legality of some of the conservation measures recommended in the NTT Report: But, does the NTT really want to recommend something that is blatantly illegal(?)…9	3027-1

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1050	1050-8	The NEPA process requires an agency to rigorously explore and objectively evaluate all reasonable alternatives so that decision-makers and the public are fully informed. NEPA documents are intended to be used as a tool during the planning and decision-making process (40 C.F.R. §§1502.14(a), 1502.14(b),(d)). Substantial case law exists regarding the range of alternatives that need to be included in an Environmental Impact Statement (EIS), and "[t]he existence of a viable but unexamined alternative renders an environmental impact statement inadequate" (Resources Ltd. v. Robertson, 35 F.3d 1300, 1307 (9th Cir. 1993)). To that end, failing to analyze full and consistent implementation of existing policies and conservation measures, like those contained in Manual 6840, IM2005-024: National Sage-Grouse Habitat Conservation Strategy (2004 Strategy), Fundamentals for Standards for Rangeland Health (43 C.F.R §4180.1), and existing Best Management Practices (BMPs) as an alternative (a "Manual 6840 Alternative"), and an alternative which complies with USFWS's "Warranted but Precluded"€ finding for sage-grouse in the EIS documents is arbitrary and capricious and does not comply with NEPA requirements (discussed infra, Section II). Consequently, the Final EIS documents should not be published for public review until a detailed analysis of the above alternatives are included.	3027-1
1050	1050-7	We also believe that IM 2012-044 and the NTT Report inappropriately jettison BLM's existing policies to protect candidate species, including the policies contained in BLM Manual 6840, "Special Status Species Management" (Manual 6840). Instead, the DSEIS arbitrarily imposes a completely new regulatory framework without providing a reasonable explanation for doing so, and is therefore arbitrary and capricious.	3027-1
1050	1050-6	In addition to being inconsistent with FLPMA and the General Mining Law Alternatives E and F propose surface-disturbing restrictions that are not scientifically supported as required by the regulations that implement the National Environmental Policy Act (NEPA)	3027-1
1050	1050-5	As described below, NWMA does not support any of the Alternatives as they are drafted. Specifically, Alternative B, Alternative E, and Alternative F do not recognize rights provided to individuals under the Mining Law of 1872 (General Mining Law, 43 U.S.C. 21a et seq), and are not consistent with provisions under the Federal Land Policy and Management Act of 1976 (FLPMA, 43 U.S.C 1701 et seq).	3027-1
1050	1050-4	However, Alternative B is reported as having the least potential for long-term beneficial impacts from restoration of historic fire regimes due to the threat of invasive species out-competing native species in fire disturbed areas,7 which seems odd because all the Alternatives are subject to the same post-fire stabilization and rehabilitation requirements. The above statement assumes post-fire stabilization will thus be more effective under Alternative E, without providing any support.	3011

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1050	1050-3	In addition, NWMA believes that in light of the May 16, 2013 letter the Western Association of Fish and Wildlife Agencies (WAFWA) sent to Department of the Interior Secretary, Sally Jewell, expressing concern with relying solely on the conservation measures recommended in the NTT Report, the DSEIS should be revised to consider other alternatives and reissued to give the public another opportunity to comment on the draft EIS documents. The concerns expressed in the WAFWA letter are echoed in NWMA's report entitled, BLM's NTT Report: Is It the Best Available Science or a Tool to Support a Pre-Determined Outcome, published in May 2013 which raises significant questions as to whether the NTT Report represents Best Available Science. Internal inconsistencies must be addressed. For example, BLM concludes: Compared to the other alternatives, management methods applied under Alternative E for the protection of greater sage-grouse (severe restrictions on fire suppression) may result in the greatest short-term adverse impact to fire and fuels management by limiting the types of treatments used, but would decrease the risk of large, catastrophic fires in the long term through a return to natural fire regimes (DSEIS at 4-31; 4-32).	3027-1

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1050	1050-2	The conservation measures proposed by the Sage-grouse National Technical Team (NTT) in the NTT Report are draconian and will have severe negative impacts on NWMA members, other multiple-users of federal lands, and numerous resource-dependent communities in the ten state area . The limit in the NTT Report on the percent of land that can be disturbed is unsupported, arbitrary and will have a dramatic adverse impact on multiple-use activities; . The draconian conservation measures proposed in the NTT Report will further stifle investment in the U.S. mining industry and exacerbate the Nation's mineral import dependency. NWMA also encouraged BLM to address the following issues in subsequent EISs: . Incorporate the continuation of existing Federal, State and Local management and conservation measures into the No Action Alternative - "with an emphasis on specific provisions of Manual 6840 such as, Section 1(3); . Making State-led conservation measures a mandatory and enforceable alternative; . The EIS must analyze impacts to interference with expectation-backed investments; . Analyze the cost of validity exams and the cost of regulatory takings if lands are withdrawn from mineral entry; . The EIS documents must include a thorough discussion of how the NTT Report conservation measures are based on: 1) the best available scientific and commercial data; and 2) take into account the existing state and local conservation measures; . The EIS must evaluate whether and how the conservation measures and regulatory mechanisms recommended in the NTT Report achieve the required balance in managing the public lands.. The proposal to withdraw lands within key/core habitat from mineral entry is not supported by any authority under the ESA or FLPMA and should not be included as part of BLM's Preferred Alternative; . The EIS needs to include a full range of alternatives.2 However, BLM has failed to address any of these concerns or issues raised during the regional call for public comment (76 Fed. Reg. 77008 (December 9, 2011). NWMA believes Alternatives E and F, which were developed to incorporate the recommendations contained in the NTT Report, are inappropriate. The NTT Report creates policies that assume that sage-grouse conservation is the highest and best use of the land, while subordinating other interests, like locatable mineral exploration and development, without adequate analysis of the economic impacts these policies will have on the area as well as the hardrock mining industry as a whole (discussed in detail below), as recognized in internal emails between Department of the Interior (DOI) employees who were involved with developing the NTT Report:	3035_1
1051	1051-3	First, the overarching goals of the MLPs, which should be stated explicitly in the "vision," is to resolve potential resource conflicts within each of the analysis areas. Those conflicts include potential impacts on lands with wilderness characteristics, Greater sage-grouse "key" habitat (and other critical wildlife habitat), open space, recreation, and working ranches.	3023-6

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1052	1052-18	We suggest BLM utilize additional published articles and guidance, particularly the use of the Western Association of Fish and Wildlife Agencies recommendations on mule deer habitat guidance and energy development (Lutz et al. 2011), the recently approved technical review by The Wildlife Society on impacts of oil and gas development on wildlife (Riley et al. 2012), and a recent USGS synthesis of sage grouse research (Manier et al. 2013). Other relevant articles on sage grouse we did not see in the RMP include Doherty et al. (2008, 2010), Holloran et al. (2010), Kirol (2012), Naugle et al. (2011), and Walker et al. (2007).	3049
1052	1052-17	The TRCP FACTS recommendations (see attached document) and recent economic studies on the impacts of hunting, fishing and the outdoor industry on the economy (Southwick Associates 20012 a, b) should be incorporated in the analysis and decision making process. We encourage the BBFOBLM to use of best available and most contemporary science, particularly for sage grouse and mule deer management, when making evaluations, developing alternatives, and finalizing decisions.	3036-1
1052	1052-15	We fully support a management action that would designate a Sagebrush Ecosystem ACEC: public lands within 4.0 miles of the perimeter of occupied or undetermined Greater Sage-Grouse leks and winter concentration areas.	3035_1
1052	1052-14	We support a stipulation that would impose an NSO restriction prohibiting surface-disturbing activities, disruptive activities, and occupancy within 4.0 miles of the perimeter of occupied or undetermined Greater Sage-Grouse leks and wintering areas.	3035_1
1052	1052-13	We suggest that prior to allowing such activities as additional development to take place, the BBFO must work with all appropriate wildlife management agencies, federal and state, to determine current populations and objectives while establishing criteria and developing thresholds to help minimize and mitigate any adverse impacts that could result from extraction and associated developments.	3006

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1052	1052-3	The report's findings identifies that natural resource development has been and will continue to be an important benefit to Wyoming's economic health. Employment in some of the commodity production on public lands has been cyclical, unlike the jobs and revenue generated by people fishing, hunting and recreating on public lands which have helped expand economic growth. The report showed that the case study community of Cody, WY, benefits by as much as $30 million (2010-2011, Southwick Associates) through fish and wildlife related activities. The natural amenities have served as a magnet for and businesses looking for a high-quality lifestyle. The diverse economy provides a buffer against cyclical markets. This is dependent in part on the surrounding public-lands. Sustaining the economic diversity will depend on the conservation of the regions natural resources. Fishing, hunting, and wildlife related activities are a sustainable part of the economy and must be considered in the decision of whether or not to move forward with energy development and other activities, and to what level in the BBFO administered area. The importance of our public lands - is identified in the TRCP's Sportsman Values Mapping Project where sportsmen and women from around the state participated in a data collection that prioritized areas of importance for their passions of hunting and angling. In this case, the area in and around the proposed project area is important to sportsmen.[see figure in comment] The highlighted areas demonstrate an importance to sportsmen. More importantly, the area possesses high fish and wildlife values.	3036-1
1052	1052-2	This guidance clearly indicates BLM already has policy in place to work in close coordination with state agencies to set population goals for wildlife species and that important habitats for game species, as well other species of wildlife, should be designated for special management or protection. We recommend the BLM's BBFO 1) coordinate with Wyoming Game and Fish Department more closely to establish land use planning and habitat management objectives that are tied to achieving and maintaining the state wildlife agency's population management objectives, and 2) ensure commitments made in the proposed RMP are flexible enough to change if state needs require such management flexibility. This includes coordination with WAFWA recommended dates for big game restrictions and for sage grouse management.	3006

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1054	1054-1	MY CONCERNS IS WITH ALTERNATIVE E, F OF THE E.I S. THE PRIMARY IMPACTS TO LIVESTOCK GRAZING WOULD RESULT FROM MANAGEMENT THAT ALTERS THE AREA AVAILABLE TO LIVESTOCK GRAZING, CONSTRAINS ON THE PLACEMENT OR TYPES OF RANGE IMPROVEMENTS, OR CHANGES THE NUMBER OF ANIMALS UNIT MONTHS (AUMS) AVAILABLE TO THE OPERATORS. THE REASONS FOR THESE REGULATION ARE NOT BASED ON GOOD SCIENTIFIC DATA. WHEN I WORKED ON COPPER MTN IN 1956-57 AND AGAIN IN 1960-63. THERE WERE A LOT OF SAGE GROUSE. THERE WAS MORE PEOPLE, SHEEP AND COWS THERE AND MORE ACTIVITY THEN, THEN THERE IS NOW. WE MOVED ON TO THIS PLACE IN 1968. (AT THE END OF COUNTY RD 9, HOT SPRINGS CO.) IN 1970 WE PLANTED POTATOES ON THE SOUTH SIDE OF MUD CREEK AND THE SAGE GROUSE DUG THEM UP AND ATE THEM. THERE WERE PLENTY OF SAGE GROUSE UNTIL SOME TIME IN THE 80'S. THE COONS SKUNKS AND RAVENS WERE NONEXISTING, ON MUD CREEK AT THAT TIME. THERE WAS A LOT OF ACTIVITY THEN AND MORE EVEN THEN NOW.	3017-3
1057	1057-15	Annual grasslands are referenced throughout the document Wyoming doesn't really have much in the way of annual grasslands, even following fire disturbance. Annual Grassland ecosystems in the West are predominately found in California. Changing the language to "areas with undesirable annual grasses" will differentiate the discrete areas of annual grasses occurring on Wyoming's rangelands from the ˜ecosystem type" that is generally associated with the term Annual Grasslands.	3042
1057	1057-14	We would like to see 4.4.2 Vegetation - Grassland and Shrubland Communities. 4.4.2.3 Detailed Analysis of Alternatives, Alternative F, Resource Uses, page 4-46 removed ("Livestock grazing management in this ACEC includes multiple management actions that would benefit grasslands and shrublands, including requirements for land health assessments to determine whether rangeland health standards are being met"). BLM is currently required to determine whether rangeland health standards are being met for wildlife habitat, including the sage grouse. Alternative F does not change or enhance this requirement its inclusion here is redundant.	3042
1057	1057-13	There is so much in this document that expresses a bias against livestock grazing. Grazing is not a surface disturbing activity; it is a management tool. In table 2.5, Detailed Alternatives, 7000 Special Designations (SD) “ACECs“ Proposed Greater Sage Grouse Priority Habitat Area ACECs, Record #110, page 2-35 it states, ˜Identify the specific allotment(s) where retirement of grazing privileges is potentially beneficial". Appendix P goes on to list all grazing allotments in the Core Habitat Area; not just those currently identified for retirement. WyFB is concerned about identifying allotments through a resource management planning process in which retirement of grazing privileges is ˜potentially beneficial". Rangelands have always been grazed - removing grazing tends to have a detrimental effect over the medium and long term.	3017-1

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1057	1057-10	In the third paragraph on page 3-3, it states "Declines of sage grouse near oil and gas fields in this area have been well documented (USFWS 2013). However, recent conservation actions, including the Wyoming Governor's EO designating protective stipulations for Core habitat Areas and the implementation of conservation easements within these areas have reduced the threat risk to populations in the Wyoming portion of the Wyoming Basin Management Zone (USFWS 2013). Designated state Core Habitat Areas adequately capture redundancy and representation for the Wyoming portion of the Wyoming Basin Management Zone population. Due to the large size of this population, the presence of large, contiguous habitats, and regulatory measures providing habitat protection, this population is considered low risk (USFWS 2013). Within the planning area, greater sage grouse are distributed in habitat that has not been rendered unsuitable due to fragmentation and degradation". We feel this discussion supports our comment that you defer to the state and state agencies in determining management strategies for the greater sage grouse in your planning area.	3035_1
1057	1057-9	Oil and gas development and conversion of sagebrush to grasslands are also identified as a primary source of decline in MZ I (Great Plains Management Zone). Why are they included when the majority of your planning area lies within MZ II (Wyoming Basin Management Zone), and the majority of the sage grouse habitat managed by the BLM in the planning area also lies within MZ II, which covers about two thirds of the State of Wyoming? Primary threats in MZ II are identified as energy development and transfer, including both renewable and non-renewable resources, long-term drought and brush eradication programs; quite different from those in MZ I.	3035_2
1057	1057-8	Encroachment of conifers and juniper is blamed on changes in fire return intervals and overstocking of domestic livestock (page 3-3). Where is this overstocking? Permitted AUMs and actual use AUMs have declined on federally managed lands over the last several decades. Proper stocking rates and use of the land by domestic livestock actually serves to alleviate some of the things on your list, including weed and annual grass invasion and conifer and juniper encroachment	3017-3
1057	1057-6	The closure of priority sage grouse habitat to surface uses under Alternative E and B is unacceptable (page 2-14). Even the moderate constraints on resource uses under Alternatives F and D may prove detrimental to the sage grouse. These restraints are not supported by scientific data, especially in the case of livestock grazing and range improvements. Livestock grazing can be managed to meet sage-grouse habitat objectives and management considerations. This has been proven over a long period of time on Wyoming's privately managed agricultural lands.	3017-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1057	1057-5	We ask that Wyoming Executive Order 2011-5 and its supplement 2013-3; the Bighorn Basin Sage Grouse Conservation Plan, and the individual county Land Use and Management Plans be published in their entirety in the Final RMP. The economy of the basin relies greatly on the proper management of BLM lands occurring in Big Horn, Hot Springs, Park and Washakie counties. As stipulated in Executive Order 2011-5 (and all other orders before it),"State and federal agencies, including the U.S. Fish and Wildlife Service, Bureau of Land Management, U.S. Forest Service, and other federal agencies shall work collaboratively to ensure a uniform and consistent application of this Executive Order to maintain and enhance Greater Sage Grouse habitats and populations"?.	3027-2
1057	1057-4	On page 2-1 in paragraph 3, the supplement 2013-3 to Wyoming Executive Order 2011-5 is badly misrepresented as outlining a process to remove livestock grazing if sage grouse conservation objectives are not achieved and improper livestock grazing is suspected. What it really says is ˜The State of Wyoming will collaborate with Federal agencies in defining a framework for evaluating situations to determine if a causal relationship exists between improper grazing(by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives where conservation objectives are not being achieved on federal land. The State of Wyoming will also collaborate with appropriate federal agencies on appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework. Monitoring data will at minimum reflect 5 years of information, include rangeland health assessments and require conclusion or action to be based on 3 out of 5 years of data". It also states that ˜It is Wyoming's primary premise that grazing activities are compatible with Greater Sage-Grouse conservation and may improve habitat for Greater Sage-Grouse. Grazing is considered a de minimus practice (Executive Order 2011-5, Attachment C). Grazing management practices maintain or enhance Wyoming rangelands. Properly managed rangelands are capable of sustaining viable Greater Sage-Grouse populations and a diversity of plant species appropriate to suitable Greater Sage-Grouse habitat". The true focus of the supplement is coordination among Land Management Agencies when Grazing Adjustments are Believed Necessary to Benefit Greater Sage-Grouse; not the removal of livestock grazing. We are more likely to experience damaging grazing practices from feral horses than from domestic livestock.	3017-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1057	1057-3	Throughout the supplement it is stated that "BLM manages the density of disturbance to not exceed an average of one disruptive activity location per 640 acres and cover less than 3 percent of the total greater sage grouse Core Habitat Areas"□. Wyoming Executive Orders state, "Surface disturbance will be limited to 5% of suitable sage grouse habitat per an average of 640 acres". We would like to remind the BLM that U.S. Fish and Wildlife Service has been collaborating with the State of Wyoming and the Wyoming Game and Fish Department, and that BLM has agreed to this process. We would like to see you defer to Wyoming's management desires for the sage-grouse. It is far more beneficial to the sage grouse if Wyoming's sage grouse management scheme; the Bighorn Basin Sage Grouse Conservation Plan, and the individual counties' Land Use and Management Plans are relied upon to inform management decisions made by BLM. These documents are appropriate resources to use to identify sage grouse habitat requirements and best management practices in the Bighorn Basin, and should be included in section 1.4.2 Planning Criteria #33.	3035_4
1057	1057-2	We strongly object to the use of Areas of Critical Environmental Concerns (ACECs) as a management approach for sage grouse. ACECs tend to not move across the landscape; sage grouse do, and so does their habitat. The proposed increased restrictions of activities (grazing, oil and gas, recreation, etc.), on ACECs promotes a single dominant use of 1.4 million acres (under Alternative F; page ES-4); almost 45 percent of the surface acres managed by BLM in the Bighorn Basin. This violates your mandate to manage for multiple uses. The increased restrictions also violate the management desires set forth in every Wyoming Executive Order issued.	3001
1057	1057-1	On page ES-1 in the third paragraph, there is a discussion of the State of Wyoming Executive Orders used to determine the boundaries and potential management of the greater sage grouse Key Habitat Areas ACEC (Alternative E), and the greater sage grouse Core Habitat Areas ACEC under Alternative F. WY Executive Order 2008-02 used for Alternative E; and WY Executive Order 2010-04, used for Alternative F were made available at the time of the ACEC nomination. These two Executive Orders have been replaced (2011-05 replaces 2010-04), or rescinded (2008-02) was rescinded on April 27, 2011. The current Executive Order in place is 2011-5. This order remains in effect until August 18, 2015; we feel EO 2011-5 should be used to inform sage grouse management decisions by the BLM in the Big Horn Basin.	3001
1062	1062-4	Record # 50" It is unrealistic to assert that an entire allotment/pasture should be shut off from grazing if the burned area can't be fenced. This is completely unnecessary and extreme. It reflects an absence of on the ground realities. These allotments can be huge, burned areas can be huge and fencing unrealistic. It again reflects the obvious agenda against livestock grazing under the guise of caring about restoration.	3011

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1062	1062-3	Record #49 " Alternative F: It is counterproductive for sage grouse to exclude livestock from grazing in burned areas until wood and herbaceous plants achieve sage-grouse habitat objectives. Woody shrubs in this ecology could take as long as 60 years to re-establish and in the meantime grasses could compete with them. Livestock grazing should be permitted during this time frame, if in fact sage-grouse stewardship is on the radar screen.	3011
1062	1062-2	Proactive Management section - Marginalizing and restricting the use of fire within areas of environmental concern will only worsen the invasive weed problem already ahead of land managers. We need all tools to help control invasive weeds and not worsen the weed problem by slowing management. Proactive fire management must not move slowly, it must continue at a rapid and consistent pace to improve habitat.	3011
1062	1062-1	Alternatives E&F Not necessary to put 1,857,485 acres or 1,786,241 acres under the restrictions of Areas of Environmental Concern (ACECs). While sage-grouse may be present, it does not mean that they will be negatively impacted or the area degraded if left open to the public. This document and these alternatives seek to manage for one species---the sage-grouse to the detriment of all other resources	3001
1063	1063-6	Record#50 - It is unrealistic to assert that an entire allotment/pasture should be shut off from grazing if the burned area can't be fenced. This is completely unnecessary, extreme, and reflects an absence for consideration of on-the-ground realities. The allotments can be huge; burned areas can be huge; fencing costly and unrealistic.	3011
1063	1063-5	Record#49-(Alternative F) would exclude livestock from grazing on burned areas until woody and herbaceous plants have reached projected goals for sage grouse habitat objectives. In some areas, that could take 60 years for re-establishment of all woody type cover, during which time, livestock could and should be grazing off competitive grasses and forbs, thereby allowing for earlier realization of expected goal	3011
1063	1063-4	Chapter 2, Table 2.3 (Alternatives E & F): Both of these Alternatives would seek to manage for one species (sage grouse) to the detriment of all other resource uses. It is not necessary to put 1,857,485 acres or 1,786,241 acres under the restrictions of Areas of Critical Environmental Concern. This maneuver has been used in the past to create defacto wilderness areas in perpetuity, a power given only to the Congress of the United States. While sage grouse MAY BE present on the proposed lands, livestock, the oil & gas industry, the mining extraction industry, and the public in general can and have demonstrated co-existence is readily accomplished and has been for decades. Where is the justification and science to support the closeout of nine additional areas as proposed by Alternative E?	3001
1063	1063-3	Chapter 2, Table 2.2 (Alternative E), would lock up Desert Land Entry opportunities to the public. Though these entries have been under utilized, not allowing this option would be unjustified. Any entry would be supposedly managed so as to consider the life cycle of sage grouse, IF they were present, before any grants were made.	3016-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1063	1063-2	In particular, Chapter 2, Table 2.2, (Alternative E), would result in the closure of 1,988,927 acres of grazing land. The greatest impact would immediately be reduced oil and gas exploration and development, constraints on mineral exploration and mining operations, as well as huge reductions in livestock grazing. Livestock and sage grouse, as well as other wildlife, have co-existed sustainably on public and private lands for decades. There is no credible scientific data included in the EIS to support or back up this land use proposal, but appears to be only an idea dreamed up by someone very biased.	3001
1064	1064-2	Chapter 2, Table 2.3: Alternatives E & F It is not necessary to put 1,857,485 acres or 1,786,241 acres under the restriction of Areas of Environmental Concerns. While sage-grouse may be present, it does not mean that they will be negatively impacted or the area destroyed if left open to the public. This document and these alternatives seek to be managed for one species - the sage-grouse to the detriment of all other resources.	3001
1065	1065-2	Chapter 2, Table 2.3: Alternatives E & F It is not necessary to put 1,857,485 acres or 1,786,241 acres under the restriction of Areas of Environmental Concerns. While sage-grouse may be present, it does not mean that they will be negatively impacted or the area destroyed if left open to the public. This document and these alternatives seek to be managed for one species - the sage-grouse to the detriment of all other resources.	3001
1068	1068-3	Moreover, when examining the difference between Alternatives D and F there exists a $5 million net reduction (a calculation the four counties call into question as being significantly undervalued) to the counties' bottom line. Further, all analytical values should aspire to represent current conditions to avoid relying on an inaccurate baseline analysis. To aid in achieving this, we encourage BLM to use present dollar value rather than undertaking its analysis based on 2008 dollars.	3036-2
1068	1068-2	Socioeconomic concerns of the counties in the Planning Area. In examining two proposed alternatives, Alternative D (BLM's preferred alternative) and Alternative E, the contrast and potential implications for the counties in the Planning Area could not be more distinct. BLM projects earnings from resource development in the Planning Area to be $70.8 million under Alternative D; while under Alternative E BLM projects earnings $36.9 million. No doubt a reduction in revenue to the tune of $34 million will affect the four counties' fiscal bottom line, and will bring with it significant impacts to the social and cultural fabric of the Planning Area.	3036-2

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1068	1068-1	Consistency with the Wyoming Sage Grouse Executive Order. We ask that BLM ensure full consistency with the Wyoming Greater Sage-Grouse Core Area Protection Executive Order (EO). The EO has been recognized by the Fish and Wildlife Service as a "sound framework for a policy by which to conserve greater sage-grouse in Wyoming." Further, the EO was developed in partnership with key stakeholders, including BLM, and represents an agreement made by all parties to implement and abide by the core area strategy, including any subsequent EO supplements. Actions that require core area protections outside of core areas, or actions that add additional protective stipulations inside of core areas are inconsistent with the EO and are therefore contrary to the fundamental agreements included in the EO that the stakeholders, again, including BLM, reached.	3035_1
1069	1069-15	There is no way to disconnect the path pursued by the BLM from the economic future of the cities, towns and counties in the Bighorn Basin. The alternatives analyzed in the Supplement, if adopted in whole, will have severe consequences to the economic base of Bighorn, Hot Springs, Park and Washakie Counties and inextricably alter the custom and culture of the Bighorn Basin. Now is the time to pursue an alternative that promotes additional employment and revenue opportunities and celebrates Wyoming's historic fabric. I	3036-2
1069	1069-14	In the Summary of Environmental Consequences by Alternative (p. 2-43), Table 2-6, the BLM projects annual earnings of $75 million under the no action alternative, Alternative A. For comparison, the BLM projects annual earnings under Alternative C (BLM's resource development alternative) to be $83.4, Alternative D (BLM's preferred alternative) to be $70.8 million and under Alternative E to be $36.9 million. Over the life of the RMP (projected to be 20 years) the overall impact of implementing Alternative E would be a reduction of more than $678 million, in comparison to the BLM's preferred alternative. In consideration of impacts to quality of life and local culture the BLM considers the selection of Alternative C to have a medium impact, while the selection of Alternative E to have low impact. The BLM does not justify this conclusion. A reduction of more than half of all revenues generated from BLM lands does not constitute a "low impact" to the quality of life and local culture in the Bighorn Basin. The BLM has significantly understated the impact such an action would have. The impact will not just be felt by these sectors. Industries supporting energy, as well as government services, recreation, local businesses and other indirect beneficiaries and local communities will feel the impact. Collectively, energy, tourism, and agriculture in the Bighorn Basin form a balanced economic base that, when supported by federal land management agencies, will grow, expanding into the future. Alternatives E and F disrupt that balanced use in major ways and should be rejected.	3036-2

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1069	1069-13	Hot Springs County estimates that approximately 80 percent of its operating budget is generated from oil and gas revenues and property taxes. The majority of oil and gas production in Hot Springs County is production on BLM lands. In the Bighorn Basin Draft RMP and EIS (p. 3241) the BLM reported that mineral and severance taxes and federal mineral royalties represented 49 percent of total state revenues in fiscal year 2009. The BLM's analysis, as indicated in Table 4-25 (p. 4-142), provides that under Alternative E federal mineral royalties' will be reduced by approximately $20 million per year in comparison to the BLM's preferred alternative, Alternative D. Further, there would be a reduction of $9.5 million in state severance taxes and a reduction of $11 million in local ad valorem production taxes. These are significant figures and are not easily replaced by other revenue streams.	3036-2
1069	1069-11	Record# 9 (p. 2-18) was developed to conform with EO 2011-5. I request that it be modified as follows: Allow only below ground ROWs within designated ROW corridors that cross Greater Sage-Grouse core area. Do not limit the width of below ground ROW corridors as long as new linear facilities are constructed adjacent to existing linear facilities accounting for adequate separation for operating system integrity; safety (construction and operations); appropriate federal, state, and local statutes, regulations, and policies; and land use constraints. If a linear facility is moved away from an adjacent utility to avoid a resource cont1ict, the new linear facility will still be considered to be within the ROW corridor. Construct new transmission lines between July 1 and March 14 (or between July 1 and November 30 in mapped Greater Sage-Grouse winter concentration areas) and within 0.5 miles on either side of existing l 15 kV or larger transmission lines (Map SEIS-23) .	3033-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1069	1069-10	Grazing management practices maintain or enhance Wyoming rangelands. Properly managed rangelands are capable of sustaining GSG populations and a diversity of plant species appropriate to suitable GSG habitat. EO 2013-3 is consistent with the 2010 FWS identification of improper grazing practices as a potential threat. The language recently added to EO 20l3-3 addresses this issue in a manner acceptable to permittees, land management agencies and conservation interests. I request that the BLM incorporate the following language in the section for Sensitive Species: The BLM will collaborate with appropriate Federal agencies, and the State of Wyoming as contemplated under Governor Executive Order 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a significant causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework. While this language is not a verbatim recitation of the directive contained in EO 2013-3, it is, however, generally consistent with EO 2013-3 and was developed in consultation with the BLM. As contemplated in the proposed language, the State and BLM Wyoming, along with other appropriate federal agencies, will need to coordinate actions during implementation of the Final RMP in order to achieve maximum consistency with EO 2013-3.	3017-1
1069	1069-9	Under Alternative E, the BLM analyzes the closure of the Greater Sage-Grouse Key Habitat Areas ACEC [Area of Critical Environmental Concern] to livestock grazing, even where rangeland health standards have been achieved. This management prescription would apply to 1,988,927 acres-nearly two-thirds of the 3.2 million acres of the public lands managed by the BLM in the Bighorn Basin. Alternative F, although not as egregious, layers additional and unreasonable management constraints on livestock producers. These management actions are not consistent with the BLM's multiple-use mandate and should be dismissed from further consideration.	3017-3
1069	1069-8	Alternative E of the Supplement analyzes the withdrawal of 1,764,621 acres from locatable mineral development. This action would preclude locatable mineral development in areas of known occurrence, including 141,563 acres of bentonite (41 percent reduction) and 17,867 acres of uranium (97 percent reduction). Such an action will have far-reaching impacts on the bentonite industry, which is important to the Bighorn Basin economy. Uranium production which is increasing throughout Wyoming will be eliminated on federal land. Producers of locatable minerals will face additional constraints (i.e., timing) under the management prescriptions outlined in Alternative F. The mining industry, including bentonite producers, has contributed to our understanding of the Greater Sage-Grouse. The BLM should reject Alternatives E and F.	3020

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1069	1069-7	In Record# 76 (p. 2-30) the BLM considers applying a no surface occupancy (NSO) stipulation on all existing leases with lease acreage within 0.6 miles of occupied or undetermined Greater Sage-Grouse leks as a condition of approval. This is contrary to EO 2011-5, stipulation 9, which states: "Existing rights should be recognized and respected." The BLM should dismiss from further consideration this management action.	3019
1069	1069-6	The BLM introduced Record# 72 (p. 2-29) in the Proposed Lander RMP and Final EIS. If the BLM carries this management action forward I request the following modification: Encourage Require unitization when deemed advantageousnecessary for proper development and operation of an area or to facilitate more orderly (e.g., phased and/or clustered) development as a means of minimizing adverse impacts to resources, including greater sage-grouse, so long as the unitization plan adequately protects the rights of all parties including the United States, according to the Federal Lease Form, 3100-11, Sections 4 and 6.	3019
1069	1069-5	It appears that Record# 71 (p. 2-28) was intended to conform to EO 2011-5 stipulations. If the BLM carries Record# 71 forward I request the following modifications: Apply an NSO stipulation within 0.6 mile of occupied or undetermined sagegrouse leks (Map SEIS-15). Lease f1uid minerals dependent upon lease location and habitat suitability. Ensure that leasing activities in core and connectivity areas comply with Greater SageGrouse resource management plan actions and remain in compliance with laws, regulations, and policy.Apply a minimum lease size of 640 contiguous acres of federal mineral estate Â·.within sage grouse Core Habitat Areas.Lease smaller parcels only when 640 contiguous acres of federal mineral estate is not available and leasing is necessary to remain in compliance 'with laws, regulations, and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or commtmitization agreement Apply a TLS to restrict disruptive activity within 0.6 mile of occupied or undetermined sage-grouse leks from March 15 to June 30.	3019
1069	1069-4	EO 2011-5, Attachment A, Sage-Grouse Core Breeding Areas Version 3, defines boundaries of Greater Sage-Grouse core areas in the Bighorn Basin. The core area delineation in Attachment A was not analyzed in the Draft RMP and EIS. This analysis was conducted in the Supplement, Alternative F. I request that the BLM adopt the Version 3 core area geographic boundaries in its final plan.	3035_1
1069	1069-2	Unfortunately, Alternatives E and F of the draft Bighorn Basin RMP Supplement, if adopted, will erode the multiple-use balance Wyoming has achieved. Ninety-seven percent (5,483,281 acres) of the Bighorn Basin planning area is Greater Sage-Grouse occupied habitat. I request that the BLM reject Alternatives E and F. These Alternatives are unreasonable and are inconsistent with EO 2011-5 and 2013-3. The Federal Land Policy and Management Act (FLPMA) provides that land use plans of the BLM "shall be consistent with State and local plans to the maximum extent possible he [Secretary of the Interior] finds consistent with federal law and the purpose of this Act." (43 U.S.C. § 1712 (c)(9)) If the BLM is unable to achieve consistency with EO 2011-5 and 2013-3, I request the BLM to explain how achieving consistency would have resulted in a violation of federal law.	3027-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1069	1069-1	I request that the BLM provide its analysis of NTT management actions and other conservation measures as set forth in the BLM's Proposed Lander RMP and Final EIS and noted above in the BLM's Proposed Bighorn Basin RMP and Final EIS. Further, the BLM should provide consideration of other wildlife protections or protections of other resources analyzed which would provide secondary benefit to Greater Sage-Grouse.	3035_1
1070	1070-7	In Alternative E and F, folks will need special permits to recreate, in the proposed Greater Sage-Grouse Key Habitat Areas ACEC - would those permits apply to hunting and trapping? For example could you restrict wolf or cougar hunting in Key Habitat Areas ACEC?	3030
1071	1071-5	In Alternative E and F, folks will need special permits to recreate, in the proposed Greater Sage-Grouse Key Habitat Areas ACEC - would those permits apply to hunting and trapping - for example could you restrict wolf or cougar hunting in Key Habitat Areas ACEC?	3030
1073	1073-15	The purposes of the BLM's Resource Management Plans are "to ensure the best balance of uses and resource protections for America's public lands". Wind farms provide clean, renewable energy for the nation and generate lease revenue on public lands. Power lines provide needed electricity to residential, agricultural and industrial customers. Pacificorp urges the BLM to recognize the values of wind energy to the American public in conjunction with available and effective management of potential impact to the landscape. Wind energy does not necessarily constitute an industrial setting to citizens enjoying public land. Observing a wind turbine can create a profound reminder of the strength of natural forces in on lookers, and it should not be assumed that siting wind turbines will create an industrial setting for everyone who sees them. The value of wind development for the public good should be evaluated in comparison to the value of visual areas for the public good. Pacificorp encourages BLM not to automatically override one resource over another.	3032
1073	1073-14	Wind energy projects typically have surface disturbance of less than 3% of the project area, leaving most of the land and vegetation within a project undisturbed. Road and turbine site locations can be designed to minimize surface impacts near water resources, and erosion mitigation techniques can be effectively utilized to reduce erosion during construction. If forest cover needs to be removed for development of a wind project, turbine site, and associated infrastructure layout can be designed to minimize disturbed areas. Areas used only during construction, such as equipment laydown areas, could be restored and allowed to grow to forest after construction was complete. Assuming that all habitats within a wind facility project boundary would be impacted for the life of the project is incorrect. Additionally, wind farm construction can be scheduled to limit disturbance to big game, sage-grouse and other pertinent wildlife habitat, particularly during crucial winter months, or breeding seasons.	3032
1073	1073-13	Co-location of transmission lines in existing or designated corridors can be applied in some circumstances, but may not always be feasible due to conflicts with other mandated reliability and redundancy requirements. Pacificorp recommends that co-location be considered a possible BMP, but not a requirement.	3033-1

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1073	1073-11	Pacificorp supports the statement in BLM's Alternative F, that allows motor vehicle access to existing roads, however discourages the prohibition of new road construction within 1.9 miles of Greater Sage-Grouse Core Habitat Areas as it may have a negative impact on Pacificorp customers by limiting access for outage response and maintenance activities.	3039-1
1073	1073-10	In order to provide reliable service to customers, and maintain access to power lines, Pacificorp requests the BLM to provide exceptions to Alternative E that currently prohibit new road construction within four miles of an active lek site, and currently restrict motorized use from February 1 through July 31. Additionally, Alternative E would prevent upgrading existing routes and would change route categories. Pacificorp requests the use of existing roads and the authority to make maintenance improvements to access roads associated with our facilities and ROWs. Access to respond to outages and emergencies is necessary in order for Pacificorp and other electric utilities to meet federal mandates for reliability.	3039-1
1073	1073-9	Consequently, utilities often seek conservation partnerships that serve a specific conservation need, provide a benefit to the species and/or habitats considered, provide a cost-effective benefit to ratepayers, and are reasonably commensurate with the level of impact. Pacificorp encourages the BLM to develop incentives for industry that meet these conservation and customer goals. Numerous state sage-grouse plans have either included or are developing incentive programs for industry and private landowners, as these are critical to the overall conservation of sage-grouse and their habitat. Pacificorp encourages the BLM to consider mitigation banks and offsite mitigation as mechanisms to pool habitat conservation resources and target conservation efforts in highest priority areas. Likewise, Pacificorp encourages the BLM to adopt measures consistent with the Wyoming state's efforts regarding mitigation efforts and incentives for early mitigation. Because habitat is the primary factor influencing sage-grouse populations, habitat conservation and enhancement efforts should be a primary focus of minimization and mitigation efforts. For unknown impacts of power lines, Pacificorp recommends that the BLM provide opportunities and incentives to conduct additional research using the research protocols developed by Utah Wildlife in Need (UWIN) in 2012 and endorsed by the Western Association of Fish and Wildlife Agencies (WAFWA). As indicated by WAFW A, such research should be acceptable as a component of a mitigation package for ·unknown project impacts. In addition, Pacificorp encourages the BLM to continue to work with APLIC to identify potential sage-grouse conservation partnership opportunities with the electric utility industry.	3027-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1073	1073-8	APLIC has been working with a group of member utilities and state/federal agency representatives including the BLM to develop Best Management Practices for electric utilities in sage-grouse areas. The APLIC model of collaborative, voluntary efforts -such as the Avian Protection Plan Guidelines, short courses, and guidance documents developed in partnership with the FWS -is serving as a framework for the sage-grouse BMPs. These BMPs are intended to be a living document that is updated and refined as new research is available. Consequently, these BMPs would be easier to update (compared to a RMP) to reflect new science and technology. Pacificorp and its peers in APLIC are interested in working with the BLM, FWS, and other agencies to develop measures that are practical, effective, science-based, and justifiable to customers and public service commissions. Pacificorp applauds the BLM for its continued involvement in this BMP effort and encourages the BLM to recognize these BMPs in the Big Horn Basin RMP as an adaptive tool to address sage-grouse/power line issues	3033-1
1073	1073-7	Pacificorp has agreements in place with FWS regarding our Avian Protection Plans (APP) and efforts to prevent electrocutions of raptors and other protected migratory birds. The use of perch discouragers is precluded in our APPs and agreements with FWS due to associated electrocution concerns. Therefore, Pacificorp recommends that the BLM remove stipulations that require or recommend perch discourager use in the RMP revision. Pacificorp also recommends that the BLM seek additional information from APLIC and FWS regarding these concerns; Pacificorp environmental staff are also available to discuss these concerns with BLM staff and provided associated documentation. Rather than call for the use of perch discouragers, Pacificorp recommends that the BLM reference the BMPs (see below) currently being developed for power lines in sage-grouse habitat. Likewise, current APLIC guidance should be applied to minimize avian electrocution and collision risks.	3033-1

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Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1073	1073-6	Perch discouragers were originally designed to reduce raptor electrocutions by moving birds from an unsafe (electrocution risk) perching location to a safer alternative, either on the same structure or an alternate structure located nearby. Recent data has documented poor effectiveness in perch discouragers and greater effectiveness of covers for preventing electrocutions (see Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006), pages 17-18). Despite their declining use by electric utilities, perch discouragers have been installed in attempts to dissuade raptors and corvids from perching or nesting on power poles in areas with sage-grouse or other sensitive prey species. Perch discourager research has shown limited effectiveness in preventing perching, potential for increased nesting on discouragers, and increased electrocution risk associated with perch discouragers. In areas where raven predation on sage-grouse nests is a concern, perch discouragers may aid in the accumulation of nest material (APLIC 2006), and could potentially increase raven predation pressure due to nest construction on discouragers in sensitive areas. The negative impacts of perch discouragers must be weighed against the limited benefits they may provide, particularly if they are contributing to mortalities of protected birds and facilitating increases in predator nesting populations. The avian predators of sage-grouse should also be considered, as different species ~exhibit different hunting strategies, and employ different hunting techniques for different prey species. For example, golden eagle diet is largely mammalian (80-90%, Kochert et al. 2002). Golden eagles prey on sage-grouse opportunistically, and typically hunt sage-grouse by stooping from a high soar (Watson 1997, Kochert et al. 2002). Consequently, power poles may not play an important role in eagle predation of sage-grouse. Golden eagles are vulnerable to electrocution mortality (APLIC 2006) and perch discouragers have been correlated with increased eagle electrocution risk (PacifiCorp, in prep.). Common ravens are known predators of sage-grouse nests, yet ravens are able to overcome perch discouragers and may experience higher nesting rates on poles with perch discouragers. Because of these concerns, Pacificorp requests that the BLM consider other more effective alternatives to sage-grouse conservation, such as habitat conservation or enhancement efforts, that are compatible with conservation measures for other protected species (e.g. electrocution prevention measures for raptors and other migratory birds).	3033-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1073	1073-5	Installing new power lines underground or converting existing lines from overhead to underground are often raised as possible permit stipulations or mitigation options. However, underground power lines result in increased cost, reduced reliability, greater ground disturbance during construction and repairs, and longer outage periods for customers, and may not always be feasible from an engineering and operations perspective. Underground power lines require a continuous excavation through all habitat types. In sagebrush habitat, this would result in ground disturbance for the entire line route. This is in contrast to overhead lines, which result in a disturbance only at the structure locations. Underground lines would also require excavation for repairs or maintenance, which would result in ground disturbance occurring temporally over the life of the line, not just during initial construction. Ground disturbance during construction, repairs, and maintenance can result in large, permanent displacement of excavated soil and subsequent issues with re-establishing native vegetation and preventing the overgrowth of invasive species. A University of California study (Bumby et al. 2009) found that underground power lines have more environmental impacts than overhead power lines for all categories and most scenarios in southern California. For more detailed discussion of environmental and engineering constraints associated with underground power lines, see Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012), pages 62-63. Pacificorp encourages the BLM to allow overhead power lines an acceptable alternative in the Wind River/Big Hom Basin District and requests that requirement for placement of lines underground be removed.	3033-2
1073	1073-4	PacifiCorp has been actively engaged with the U.S. Fish and Wildlife Service, BLM, and state agencies on sage-grouse conservation efforts related to projects, planning documents, and utility Best Management Practices (BMPs). This has resulted in consideration of sage-grouse habitat in line siting, efforts to schedule activities to minimize disturbance impacts to sage-grouse, and other conservation measures. PacifiCorp is also working with other APLIC-member utilities and resource agencies (including the BLM, FWS, and state agencies) in the development of Best Management Practices for electric utilities in sage-grouse areas (see discussion below). Pacificorp encourages the BLM to reference these BMPs in the Big Horn Basin RMP.	3035-7
1073	1073-3	Pacificorp encourages the BLM to ensure that sage-grouse stipulations included in the Big Horn Basin RMP are consistent with the Wyoming Governor's Executive Order for Sage-grouse.	3035_1
1073	1073-2	Pacificorp requests that the BLM consider these studies, which use current telemetry techniques and specifically investigate sage-grouse responses to power lines, when addressing power lines in its RMP update.	3033-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1074	1074-14	We urge the agency to focus further analysis on an improved Alternative E and the designation of Areas of Critical Environmental Concern for Greater Sage-Grouse and to make these the basis for the final Big Horn Basin RMP. The draft EIS analyzed conservation measures that can be included in the final plan to ensure sustainable management and provide an adequate regulatory mechanism to ensure conservation of the grouse. These include requiring a three percent disturbance standard and designating protected areas.	3035_4
1074	1074-12	e. The Wyoming Core Area Strategies are unlikely to conserve sage-grouse. The new Sage-Grouse Conservation Objectives Draft Report (COT), an accompaniment to the NTT report prepared by a team of federal and state sage-grouse scientists, recommends conserving all sage-grouse populations and avoiding anthropogenic disturbances in key sage-grouse habitat (COT 2012, draft: 29, 33, 35). The COT report indicates that Wyoming's sage-grouse populations must be maintained or restored to help support the species's long-term persistence (COT 2012, draft: 35). The Wyoming Core Area strategies will fail to achieve these goals. New research (Copeland et al, submitted) projects continued sage-grouse population declines at 14-29 percent in Wyoming. The same study estimates that, even when bolstered by $250 million in targeted conservation easements on private property (a very unlikely assumption), the Core Area policies would only cut anticipated sage-grouse population declines by half in Wyoming, and by two-thirds within high abundance areas.	3035_2
1074	1074-11	d. The Wyoming BLM Core Area strategy's 11-square-mile fluid mineral leasing loophole leaves much core sage-grouse habitat unprotected. The Wyoming BLM Core Area strategy proscribes future leasing of fluid minerals in Core Areas, but only in areas of 11 contiguous square miles of unleased, BLM-managed minerals (BLM IM WY-2012-019). Unfortunately, many sage-grouse Core Areas were already encumbered with prior existing oil and gas leases at the time of their establishment, and the BLM is in many cases citing the existence of these prior existing leases (the majority of which are undeveloped paper assets that have yet to have any effect on sage-grouse habitat on the ground) as a justification for allowing new leasing inside Core Areas. As of July 10, 2012, twelve of the 31 Core Areas in Wyoming were at least 20 percent leased according to WGFD data, ranging up to 66 percent leased. These 12 Core Areas represent almost 4.5 million acres of sage-grouse habitat. Compounding this problem, all but three of the 31 Core Areas have at least 20 percent non-federal mineral ownership, meaning that a large proportion of Core Area is exempt from protection from future leasing. The NTT report takes a much stricter approach to future mineral leasing. It recommends two alternatives: closing all priority habitat (Core Areas) to future leasing, or closing all priority habitat to future leasing unless it could be shown that proposed development would result in a net gain in sage-grouse populations for that Core Area.	3023-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1074	1074-10	c. Sage-grouse lek buffers in the Wyoming Core Area strategies are too small. Protecting sage-grouse leks and associated nesting and brooding habitat are fundamental to conserving the species. The best available science has recorded significant negative impacts from producing oil and gas wells drilled within 1.9 miles from active leks (Holloran 2005), [footnote:1 Calculations derived from data presented in the Lost Creek In Situ Recovery Project Final EIS at ES-2, 4.9-8, 4.9Â27, and Appendix D.] measureable impacts from coalbed methane fields extend out to 4 miles (Walker 2008), and new research has recorded effects as far away as 12.4 miles from leks (Taylor et al. 2012). WGFD, using lek buffers of 0.25 mile, 0.5 mile, 0.6 mile, 1.0 mile, and 2.0 mile, estimated lek persistence of 4, 5, 6, 10, and 28 percent, respectively (Christiansen and Bohne 2008, memorandum). Unfortunately, both the State and Wyoming BLM Core Area strategies only require protective buffers of 0.6 miles around leks in designated core habitat. By comparison, the NTT report generally recommends a 4-mile lek buffer for siting industrial development in sage-grouse habitat (SGNTT 2011), a prescription in greater accord with the science.	3035_9
1074	1074-9	b. The Wyoming Core Area strategies allow too much development density in core sage-grouse habitat. Scientific research has determined that one energy site per square mile is the density threshold at which significant impacts to sage-grouse populations begin to occur. In accordance with these findings, the Wyoming Core Area strategies set a limit of one energy development site per square mile in core habitat. The same DDCT area used to determine a project's disturbance limit is also used to calculate the density of sites (e.g., number of well sites) that may be developed per square mile. But the DDCT only calculates site density per square mile, rather than capping density at one site per square-mile of land. In cases where the DDCT area is very large, the Core Area strategies may allow more than one well or mine site to be developed in a given square mile as long as the surrounding Core Area lands are relatively free from other development disturbance.	3035_4

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1074	1074-8	The five percent disturbance threshold is not known to conserve sage-grouse long-term and is only a best guess by agencies and others seeking to accommodate development in sage-grouse habitat. Past projects approved prior to implementation of the Wyoming Core Area strategies indicate that sage-grouse are adversely affected at lower levels of disturbance. For example, for the Continental Divide/Wamsutter II Natural Gas Project approved in 2000, 3,000 wells were proposed with 22,400 acres of new surface disturbance, representing 2.1 percent of the planning area (with an average well density of 4 well sites per square mile) (BLM 2000); today, sage-grouse are virtually extirpated in this area, although more than 50 leks existed prior to the project. In contrast to the Wyoming Core Area strategies, the NTT report recommends managing priority sage-grouse habitat so that discrete anthropogenic disturbances cover less than three percent of any single square-mile section regardless of ownership (SGNTT 2011 at 7). Furthermore, once the three percent limit is reached, additional surface-disturbing projects are precluded, and in cases where the three percent limit is already exceeded, restoration must occur to meet this threshold under the NTT recommendations.	3035_4
1074	1074-7	The Wyoming Core Area Strategy Needs Strengthening A study by Copeland et al. (2013) assessing the Wyoming "core area" conservation strategy, which Bureau of Land Management (BLM) plans including the Buffalo draft RMP have generally adopted as the preferred alternative, predicted that recommended conservation measures will reduce the rate of sage-grouse's decline, but will not stabilize grouse numbers or provide for the species's recovery. This indicates that the preferred alternative must be modified. Another study by Knick et al. (2013) concluded that sage-grouse appear to need greater protection, a three percent disturbance standard, rather than the five percent standard provided by the Wyoming core area strategy. The State and Wyoming BLM have failed to incorporate new scientific information in their strategies to enhance sage-grouse conservation "even, in the case of Wyoming BLM, that produced by their own agency. In 2011, the BLM convened a Sage-Grouse National Technical Team (NTT) to review scientific and management information on sage-grouse and sagebrush steppe and produce" A Report on National Greater Sage-grouse Conservation Measures (SGNTT 2011). The report recommended new management prescriptions that are more conservative than the Wyoming Core Area strategies. The NTT report is a scientific benchmark against which the Wyoming Core Area strategies can be measured.	3035_2
1074	1074-6	Proposed measures for livestock grazing management under Alternatives F represent a strong step in the right direction, and they need to be further strengthened. There are a number of allotments in the Bighorn Basin that are not meeting Healthy Rangeland standards, and these sites of overgrazing are having a negative impact on sage grouse populations and their habitats.	3017-3

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1074	1074-5	Protection measures remain a bit weak for oil and gas development in priority sage grouse habitats, particularly the 0.6-mile NSO buffer to be applied as a Condition of Approval. The one wellpad per square mile and 3% overall disturbance percentage are the appropriate thresholds for sage grouse habitat management, but they need to be applied on a per-square-mile basis and not using a DDCT calculation, which allows for inflation of disturbance density inside the project area.	3023-3
1074	1074-4	We recommend the adoption of the following measures which are proposed for adoption in the Preferred Alternative of other BLM plan revisions or sage grouse amendments {note: comment lists 31 measures, see letter #1074}:	3035_8
1074	1074-3	We are concerned that the cumulative impacts section of the draft was incomplete and did not include information from the USGS baseline study. Our review the USGS study finds extensive and overlapping direct and indirect impacts on nearly every acre of priority sage grouse habitat. It is important to analyze these overlapping threats and develop solutions, such as the creation of protected areas that will alleviate these threats and provide an adequate mechanism to conserve the species.	3008
1074	1074-2	In the Douglas Core Area, the State of Wyoming has proposed to subdivide Core Area boundaries into subunits (most of which do not get fill Core Area protections) and grant exceptions for development density criteria, timing limitations, and other Core Area protections contained in EO 2011-5 or IM 2012-019 to facilitate oil drilling and production by Chesapeake and other companies. There is no sound scientific basis for these exceptions; proposed compensatory funds cannot reliably purchase the increase of sage grouse populations elsewhere in the Core Area (or indeed anywhere), and the loss of sage grouse populations in this Core Area is not readily remediated. The Bighorn Basin RMP should cure these problems for BLM-managed lands and projects on BLM-managed minerals by establishing Priority and General Habitat boundaries as inviolate and permanent designations (at least throughout the life of the Plan) and by precluding exceptions or waivers of sage grouse measures within these respective habitats. BLM must ensure that all Core Area/Priority Habitat/ACEC protections are nondiscretionary standards, so the agency can rely on them as conservation measures that are adequate and reliable in the context of Endangered Species decisionmaking by the U.S. Fish and Wildlife Service.	3023-3

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1074	1074-1	We strongly urge the BLM that Priority Habitats should be withdrawn from future oil and gas leasing, allowing existing leases to lapse as they expire, as in Alternative E. SDEIS at 2-29. From the standpoint of scientific supportability, the Alternative E measures on development density (3% cap, and per square mile section rather than using a DDCT) are scientifically sound, while other Alternatives are inconsistent with scientific findings. Similarly, the one pad per 640-acre section in Alternative E is the proper limit; the 1 pad per 640 acres averaged across a DDCT area does not comport with any of the scientific analyses, each one of which specified that disturbance density calculations were made on a per-section basis and none of which used a DDCT. The NSO/CSU Condition of Approval of 0.25 to 0.6 miles from a lek in the various alternatives will likely result in major impacts to active leks within the Core Areas themselves, as this proximity results in significant impacts to breeding grouse on the lek and will result in development occurring in the midst of the most prime nesting habitats that surround the affected lek.	3023-3
1075	1075-10	Co-location of transmission lines in existing or designated corridors can be applied in some circumstances, but may not always be feasible due to conflicts with other mandated reliability and redundancy requirements. APLIC recommends that co-location be considered a possible BMP, but not a requirement.	3033-2
1075	1075-9	APLIC encourages the BLM to follow Alternative F, which allows motor vehicle access to existing roads, however the prohibition of new road construction within 1.9 miles of Greater Sage-Grouse Core Habitat Areas may have a negative impact for electric utility customers due to limiting access for outage responses and maintenance activities. Rather, BMPs should be applied on a case-by case basis to minimize potential impacts to sage-grouse and their habitat.	3039-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1075	1075-7	If mitigating for environmental impacts associated with new construction, utilities often seek conservation partnerships that serve a specific conservation ·need, provide a benefit to the species and/or habitats considered, provide a cost-effective benefit to ratepayers, and are reasonably commensurate with the level of impact. APLIC encourages the BLM to develop incentives for industry that meet these conservation and customer goals. Numerous state sage-grouse plans have either included or are developing incentive programs for industry and private landowners, as these are critical to the overall conservation of sage-grouse and their habitat. Because habitat is the primary factor influencing sage-grouse populations, habitat conservation and enhancement efforts should be a primary focus of minimization and mitigation efforts. APLIC encourages the BLM to consider mitigation banks and offsite mitigation as mechanisms to pool habitat conservation resources and target conservation efforts in highest priority areas. In the development of such mitigation banks, the potential for future power line corridors should be considered. For unknown impacts of power lines, APLIC recommends that the BLM provide opportunities and incentives to conduct additional studies using the research protocols developed by Utah Wildlife in Need in 2012 and endorsed by the Western Association of Fish and Wildlife Agencies (WAFWA). As indicated by W AFWA, such research should be acceptable as a component of a mitigation package for unknown project impacts. In addition, APLIC encourages the BLM to jointly identify potential sage-grouse incentives and partnerships with the electric utility industry.	3027-3

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1075	1075-6	Perch discouragers were originally designed to reduce raptor electrocutions by moving birds from an unsafe (electrocution risk) perching location to a safer alternative, either on the same structure or a nearby structure. Recent data has documented poor effectiveness of perch discouragers and greater effectiveness of covers for preventing electrocutions (see Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 [APLIC 2006], pages 17-18). Despite their declining use by electric utilities, perch discouragers have been required by resource agencies and installed to dissuade raptors and corvids from perching or nesting on power poles in areas with sage-grouse or other special status species. Perch discourager research has shown limited effectiveness in preventing perching. Discouragers can actually increase the potential for nesting on structures because they provide a firm foundation for nest material. Furthermore, use of discouragers to avoid perching on a structure increases electrocution risk by forcing birds to perch in unsafe areas. Perch discouragers may aid in the accumulation of nest material (APLIC 2006), and could potentially increase raven predation pressure due to nest construction on discouragers in areas where raven predation on sage-grouse nests is a concern. The negative impacts of perch discouragers must be weighed against the limited benefits, if any, they may provide, particularly if they contribute to mortalities of protected birds and facilitate increases in predator nesting opportunities. Hunting techniques and strategies of avian predators of sage-grouse should also be considered, because they differ for different prey species. For example, golden eagle diet is largely mammalian (80-90%, Kochert et aL 2002). Golden eagles prey on sage-grouse opportunistically, and typically hunt sage-grouse by stooping from a high soar (Watson 1997, Kochert eta!. 2002). Consequently, power poles may not play an important role in eagle predation of sage-grouse. Golden eagles are vulnerable to electrocution mortality (APLIC 2006) and perch discouragers have been correlated with increased eagle electrocution risk (PacifiCorp, in prep.). Common ravens are known predators of sage-grouse nests, yet ravens are able to overcome perch discouragers, will perch on wires, and may experience higher nesting rates on poles with perch discouragers. Because of these concerns, APLIC requests that the BLM consider other more effective alternatives to sage-grouse conservation, such as habitat conservation or enhancement efforts, that are compatible with conservation measures for other protected species (e.g. electrocution prevention measures for raptors and other migratory birds). APLIC supports BLM's integration of the Suggested Practices for Avian Protection on Power Lines: The State of the Art 2006 (APLIC 2006) manual to reduce avian electrocutions and mortality.	3033-1

Table D-1. Individual Comments and BLM Response Index (Continued)

Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1075	1075-5	Installing new power lines underground or converting existing lines from overhead to underground are often raised as possible permit stipulations or mitigation options. However, underground power lines result in significant cost increases, reduced reliability, greater ground disturbance during construction and repairs, longer outage periods for customers, and may not always be feasible from an engineering and operations perspective. Underground power lines can result in impacts to other federally listed species, pose a threat of negative impacts on cultural resources, and may have a negative impact to waterways. Underground power lines require a continuous excavation, including blasting in rocky terrain, through all habitat types. In sagebrush habitat, this would result in ground disturbance for the entire line route and associated access roads. This is in contrast to overhead lines, which result in a disturbance only at the structure locations, and the power line's associated access. Underground lines would also require excavation for repairs or maintenance, which would result in ground disturbance occurring temporally over the life of the line, not just during initial construction. Ground disturbance during construction, repairs, and maintenance can result in large, permanent displacement of excavated soil and subsequent issues with re-establishing native vegetation and preventing the overgrowth of invasive species. A University of California study (Bumby et aL 2009) found that underground power lines have more environmental impacts than overhead power lines for all . categories and most scenarios in southern California. For more detailed discussion of environmental and engineering constraints associated with underground power lines, see Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012), pages 62-63. APLIC supports BLM alternatives that allow overhead power lines to minimize habitat impacts versus installing underground power lines.	3033-2
1075	1075-4	APLIC submits that stipulations for sage-grouse included in the Big Horn Basin RMP revision should not include any mitigation requirement unless it is based on valid science, not anecdotal or casual observation, and is specific to sage-grouse. APLIC encourages the BLM to apply the APLIC/agency sage-grouse BMPs, much like the BLM has for APPs, to serve as the current best practices for sage-grouse issues related to electric utility facilities.	3033-1
1075	1075-3	APLIC requests that the BLM consider these studies, which use current telemetry techniques and specifically investigate sage-grouse responses to power lines, when addressing power lines in its RMP updates.	3033-1

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Comment Document Number	Individual Comment Number	Comment Text	Summary Comment Response Number
1075	1075-2	APLIC has been working with a group of member utilities and state/federal agency representatives including the BLM, to develop BMPs for electric utilities in sage-grouse areas. The APLIC model of collaborative, voluntary efforts -such as the Avian Protection Plan Guidelines, short courses, and guidance documents developed in partnership with the FWS -is serving as a framework for the sagegrouse BMPs. These BMPs are intended to be a living document that is updated and refined as new research becomes available. APLIC is interested in working with federal and state agencies to develop measures that are practical, effective, science-based, and justifiable to customers and public service commissions. APLIC encourages BLM to recognize this continued positive partnership in its RMP revision.	3035-7
1075	1075-1	Likewise, APLIC encourages the BLM to ensure that Greater sage-grouse stipulations included in the Big Horn Basin RMP are consistent with the Wyoming Governor's Executive Order for Sage-grouse.	3035_1
1076	1076-2	2) We have concerns of the suggestion that exploration drilling for bentonite, in either core or non-core areas, be elevated from a notice level to a plan of operations level. Bentonite drilling is fairly low impact, and we feel that the activity can easily be managed within the notice-level structure.	3020
1076	1076-1	1) Of the two new supplement options, we support Alternative F as it more closely mirrors the boundaries set forth by the Governor's Executive Order core areas. Conversely, Alternative E is neither a viable or realistic option for our industry. Should the final alternative become a blend of all six options, we would ask that the size of the core area does not exceed the recommendations of the Executive Order.	3035_1
1079	1079-2	Designation of additional areas of critical environmental concern would, however, have negative socioeconomic impacts. The Committee has received testimony from both local government cooperating agencies and state officials to that effect. We support those entities formal comments to the BLM regarding those effects and ask that the BLM consider those impacts and impacts on the local culture in adopting a resource management plan.	3036-2
1079	1079-1	We ask that the BLM work with Governor Mead and state agencies to ensure the Big Horn RMP is fully consistent with the original Executive Order and those modifications made by Executive Orders 2011-5 and 2013-3, Greater Sage-Grouse Area Protection. The Committee further believes the executive orders encompass all of the lands in Wyoming which require additional land use restrictions to ensure a thriving and sustainable greater sage-grouse population in Wyoming. For these reasons, we urge that the BLM reject both alternative E and F. The designation of additional areas as areas of critical environmental concern, whether based upon BLM's "key habitat" labeling or Wyoming's "core area" strategy simply is not necessary given the State's actions in this area.	3035_1

PLACEHOLDER FOR ATTACHMENT E

COMPLETE COMMENTS DOCUMENTS

See the Bighorn Basin RMP Revision website:

http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn.html

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix B

Laws, Regulations, Policies, and Guidance

APPENDIX B

LAWS, REGULATIONS, POLICIES, AND GUIDANCE

Appendix B lists the various laws, regulations, policies, and directives applicable to management of Bureau of Land Management-administered lands within the Planning Area, including the following:

- Table B-1: Federal Laws and Statutes;
- Table B-2: Bureau of Land Management Regulations and Policies;
- Table B-3: Applicable Wyoming State Laws and Regulations; and
- Table B-4: Memoranda and Agreements.

Table B-1. Federal Laws and Statutes

Federal Law or Statute	Year
Acquired Lands Act – Act of August 7, 1947; 61 Stat. 913	1947
Act of April 23, 1932; 47 Stat. 136	1932
Act of August 13, 1954 (68 Stat. 708, 30 U.S.C. 521 subpart)	1954
Act of July 23, 1955 (Pub. L. 167; 43 CFR 3710)	1955
Act of June 30, 1950 (16 U.S.C. 508(C) and (e))	1950
Act of October 30, 1978 (92 Stat. 2073-2075)	1978
Act of September 1, 1949, Section 3 (30 U.S.C. 192c)	1949
Act of September 28, 1962 (Pub. L. 87-713, 76 Stat. 652)	1962
American Indian Religious Freedom Act (42 U.S.C. 1996)	1978
Antiquities Act (P.L. 59-209; 34 Stat. 225; 16 U.S.C. 431-433)	1906
Archaeological Resources Protection Act (P.L. 96-95; 93 Stat. 721; 16 U.S.C. 47Oaa et seq.) as amended (P.L. 100-555; P.L. 100-588)	1979
Archeological and Historic Preservation Act (16 U.S.C. 469-469c-1, P.L. 86-523, 74 Stat. 220, 88 Stat. 174)	1974
Archeological and Paleontological Salvage for Federal Highway Projects (23 U.S.C. 305; 72 Stat. 913 (1958), 74 Stat. 525 (1960)	1960
Bald Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250)	1940
Carey Act of August 18, 1894 as amended (43 U.S.C. 641 et seq.)	1894
Carlson-Foley Act of 1968 (42 U.S.C. 1241-1243)	1968
Classification and Multiple Use Act of September 19, 1964 (78 Stat. 986, 43 U.S.C. 1411–18)	1964
Clean Air Act, as amended	1963
Coastal Zone Management Act (P.L. 92-583, 16 U.S.C. 1451-1456)	1972
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601)	1980
Department of the Interior Secretarial Order 3226, Climate Change and the Department of the Interior	2001
Department of the Interior Secretarial Order 3336, Rangeland Fire Prevention, Management and Restoration	2015
Desert Land Act (19 Stat. 377; 43 U.S.C. 321-323), as amended	1877
Domestic Minerals Program Extension Act	1953
Earl Douglass, 44 L.D. 325, August 6, 1915	1915
Economy Act 1932, as amended, (P.L. 72-211; 47 Stat. 417; 31 U.S.C. 686)	1932
Emergency Planning and Community Right-to-Know Act (42 U.S.C. 11001-11050)	1986
Emergency Wetland Resources Act	1986
Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884), as amended	1973

Table B-1. Federal Laws and Statutes (Continued)

Federal Law or Statute	Year
Energy Independence and Security Act	2007
Energy Policy Act (P.L. 109–58)	2005
Executive Order – Public Water Reserve 107	1926
Executive Order 10355 – Delegating to the Secretary of the Interior the Authority of the President to withdraw or reserve lands of the United States for public purposes	1952
Executive Order 11514 – Protection and Enhancement of Environmental Quality	1970
Executive Order 11593 – Protection and Enhancement of the Cultural Environment	1971
Executive Order 11644 – Use of Off-Road Vehicles on the Public Lands	1972
Executive Order 11738 – Administration of the Clean Air Act and the Federal Water Pollution Control Act	1973
Executive Order 11987 – Exotic Organisms	1977
Executive Order 11988 – Floodplain Management	1977
Executive Order 11989 – Off-road Vehicles on Public Lands	1977
Executive Order 11990 – Protection of Wetlands	1977
Executive Order 11991 – Relating to protection and Enhancement of Environmental Quality	1977
Executive Order 12088 – Federal Compliance with Applicable Pollution Control	1978
Executive Order 12580 – Superfund Implementation and 13016 – Amendment to Executive Orders 12580	1987 and 1996
Executive Order 13007 – Indian Sacred Sites	1996
Executive Order 13084 – Consultation and Coordination with Indian Tribal Governments	1998
Executive Order 13112 – Invasive Species	1999
Executive Order 13148 – Greening of the Government through Leadership in Environmental Management	2000
Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments	2000
Executive Order 13816 – Responsibilities of Federal Agencies to Protect Migratory Birds	2001
Executive Order 13195 – Trails for America in the 21st Century	2001
Executive Order 13212 – Actions to Expedite Energy-Related Projects	2003
Executive Order 13287 – Preserve America	2003
Executive Order 6910 and Executive Order 6964, and amendments	1934
Federal Aid Highway Act (23 U.S.C. 107(d) and 317)	1958
Federal Cave Resources Preservation Act (16 U.S.C. 4301 – 4309)	1988
Federal Coal Leasing Amendments Act (90 Stat. 1083-1092), as amended	1976
Federal Coal Management Program Coal Screening Process (43 Code of Federal Regulations [CFR] 3420.1-4)	1997
Federal Facilities Compliance Act of 1992	1992
Federal Land Policy and Management Act	1976
Federal Lands Recreation Enhancement Act	2004
Federal Noxious Weed Act of 1974 (section 15), as amended (7 U.S.C. 2801 et seq.); the first section and section 15 of that Act (7 U.S.C. 2801 note and 7 U.S.C. 2814)	1974
Federal Oil and Gas Royalty Management Act	1982
Federal Plant Pest Act (7 U.S.C. 150aa et seq.)	1957
Federal Property and Administrative Services Act of 1949	1949
Federal Water Pollution Control Act (33 U.S.C. 1251 - 1376), as amended	1948
Federal Water Projects Recreation Act (16 U.S.C 460(L)(12)- 460(L)(21)), as amended	1965
Federal Wildland Fire Management Policy	2001
Fish and Wildlife Conservation Act (16 U.S.C. 2901-2911)	1980
Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-667e), as amended	1934
Food Security Act of 1985 (16 U.S.C. 3801-3862)	1985

Table B-1. Federal Laws and Statutes (Continued)

Federal Law or Statute	Year
General Allotment Act, Section 4 (25 U.S.C 334), as amended	1887
General Mining Law of 1872, as amended	1872
Healthy Forests Restoration Act (P.L. 108-148)	2003
Historic Sites Act of 1935 (16 U.S.C. 461 et seq.)	1935
Independent Offices Appropriation Act of 1952 (31 United States Code [U.S.C.] 9701)	1952
Lacey Act (18 U.S.C. 42), as amended	1988
Land and Water Conservation Act, as amended (16 U.S.C. 4601-4)	1965
Lode Law Act of 1866 (14 Statute 251)	1866
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715r)	1929
Migratory Bird Treaty Act of 1918 (16 U.S.C. 703 et seq.)	1918
Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351 et seq.)	1947
Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.)	1920
Mining and Mineral Policy Act of 1970 (30 U.S.C. 181 et seq.)	1970
Mining Claim Rights Restoration Act (30 U.S.C. 621-625)	1955
Multiple Mineral Development Act of August 13, 1954 (30 U.S.C. 521-531 et seq.)	1954
National Environmental Policy Act	1969
National Fire Plan	2000
National Historic Preservation Act of 1966 (16 U.S.C. 470)	1966
National Trails System Act (16 U.S.C. 1241-1249), as amended	1968
National Materials and Minerals Policy, Research and Development Act of 1980 (Pub. L. 96-479, 94 Stat. 2305)	1980
National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300)	1998
National Parks and Recreation Act of 1978 (16 U.S.C. 1242 and 1243)	1978
National Trails System Act of 1968 (16 U.S.C. 1241 et seq.), as amended	1968
National Wild & Scenic Rivers Act (16 U.S.C. 1271 et seq.)	1968
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 et seq.)	1990
Naval Petroleum Reserves Production Act (43 CFR 2361.1(f))	1976
Neotropical Migratory Bird Conservation Act (P.L. 106-247)	2000
Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 et seq.)	1990
Noxious Weed Control Act of 2004 (P.L. 108-412)	2004
O&C Lands Act of 1937 (62 Stat. 162)	1948
Occupational Safety and Health Act (29 U.S.C. 651 et seq.)	1970
Oil Pollution Act (33 U.S.C. 2701 et seq.)	1990
Paleontological Resources Preservation Act of 2009 (P.L.111–11)	2009
Placer Law - Act of July 9, 1870 (16 Stat. 217)	1870
Plant Protection Act (7 U.S.C. 7701-7772)	2000
Pollution Prevention Act (42 U.S.C. 13101)	1990
Public Range Improvement Act (43 U.S.C. 1901 et seq.)	1978
Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901 et seq.)	1978
Reorganization Plan No. 3 of 1946 (5 U.S.C. Section 402)	1946
Reservoir Salvage Act of 1960 (16 U.S.C. 469), as amended by Archeological and Historic Preservation Act of 1974	1960
Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901 et seq.) and the Bevill Amendment (Section 3001(b) (3) (A) (ii) and 40 CFR 261.4(b)(7))	1976

Table B-1. Federal Laws and Statutes (Continued)

Federal Law or Statute	Year
Riparian-Wetlands Initiative for the 1990s, The U.S. Department of the Interior, Bureau of Land Management, January 22, 1992	1992
Rivers and Harbors Act of 1899 (10 U.S.C. 1899, Section 10)	1899
Safe Drinking Water Act, as amended 1977 (Pub. L. 95-190; 42 U.S.C. 201, 300 et seq.)	1977
San Juan Basin Wilderness Protection Act of 1984 (16 U.S.C. § 1132)	1984
Sikes Act of 1974, as amended (16 U.S.C. 670 et seq.)	1974
Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001 et seq.)	1977
Soil Conservation and Domestic Allotment Act of 1935, as amended (16 U.S.C. 590)	1935
Soil Information Assistance for Community Planning and Resource Development Act of 1966 (42 U.S.C. 3271)	1966
Stock Raising Homestead Act of 1916 as amended (43 U.S.C. 299)	1916
Surface Mining Control and Reclamation Act (30 U.S.C. 1201 et seq.)	1977
Surface Resources Act of 1955 (30 U.S.C. 611-614)	1955
The Act of June 28, 1934; Section 7 (43 U.S.C. 315f), as amended	1934
The Airport and Airway Improvement Act, Section 516 (49 U.S.C. 2215)	1982
The Department of Energy Organization Act (42 U.S.C. 7101 et seq.)	1977
The Engle Act (43 U.S.C. 155 et seq.)	1958
The Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.), as amended	1970
The Land and Water Conservation Fund (43 U.S.C. 460 et seq.)	1965
The Materials Act of July 31, 1947 (30 U.S.C. 601-604), as amended	1947
The Mining and Minerals Policy Act of 1970	1970
The Multiple Mineral Development Act (30 U.S.C. 521-531 et seq.)	1954
The Recreation and Public Purposes Act (43 U.S.C. 869), as amended in 1988	1926
The Wilderness Act of 1964 (16 U.S.C. 1131), as amended	1964
Toxic Substance and Control Act of 1976 (PL104-66), as amended in 1995	1976
U.S. v. Peck, No. 97-8122, 1999 WL 33022	1999
Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management	2000
U.S. Onshore Orders:	
Onshore Order No. 1 – Approval of operations on onshore Federal and Indian oil & gas leases	2007
Onshore Order No. 2 – Onshore oil and gas drilling operations on Federal and Indian oil and gas leases	1988
Onshore Order No. 3 – Site security on Federal oil and gas leases	1989
Onshore Order No. 4 – Measurement of oil on Federal oil and gas leases	1989
Onshore Order No. 5 – Measurement of gas on Federal oil and gas leases	1989
Onshore Order No. 6 – Hydrogen sulfide operations on Federal oil and gas leases	1991
Onshore Order No. 7 – Disposal of produced water from Federal oil and gas leases	1993
Water Quality Act of 1987, as amended from the Federal Water Pollution Control Act of 1977 (Clean Water Act) as amended (33 U.S.C. 1251 et seq.)	1987
Water Resources Development Act	1974
Water Resources Planning Act (42 U.S.C. 1962a - 1962(a)(4)(e)), as amended	1965
Watershed Protection and Flood Protection Act, as amended (16 U.S.C. 1001 et seq.)	1954
Watershed Restoration and Enhancement Agreements ("Wyden Amendment") (Public Law (PL)-104-208, Sec. 124, PL 10-5-277, Sec. 136 of the 1999 Interior Appropriations Act of 1998)	1998
Wild and Free Roaming Horse and Burro Act (P.L. 92-195)	1971
Wild and Scenic Rivers Act (16 U.S.C. 1271 et seq.)	1968

Table B-2. Bureau of Land Management Regulations and Policies

BLM Directive	Year
Abandoned Mine Lands (AML) National Strategic Plan	2006
Applications for Permit to Drill (APD)	2007
Applications for Permit to Drill Fees	2007
BLM National Greater Sage-Grouse Habitat Conservation Strategy	2004
BLM National Greater Sage-Grouse Planning Strategy Charter	2011
BLM Policy Statement on Riparian Area Management	1987
BLM Wyoming Riparian Management Activity Guide	1991
BLM Wyoming Sensitive Species Policy and List	2002
Cave Management (43 CFR 37.4(c)) and (37.11(c)(3)(iii))	1988
Competitive Leasing (43 CFR 3120)	2002
Delegation of Authority, Cooperative Agreements, & Contracts for Oil & Gas Inspection (43 CFR 3190)	1987
Federal Coal Management Program Regulations (43 CFR Group 3400)	1979
Federal Manual for Identifying and Delineating Jurisdictional Wetlands	1991
Fish and Wildlife 2000 BLM National, State and District policies	2000
Geothermal Resource Leasing (43 CFR 3200)	1998
Geothermal Resources Unit Agreements (43 CFR 3280)	1973
Grazing Administration Range Improvements and Water Rights (43 CFR 4100 et seq.)	2002 (revised)
Handbook H-1112-2, Safety and Health for Field Operations Manual	1998
Handbook H-1601-1, Land Use Planning	2005
Handbook H-1703-1, Response Actions NCP/CERCLA	2001
Handbook H-1734-1, Interagency Ecological Site Handbook for Rangelands	2013
Handbook H-1740-2, Integrated Vegetation Management	2008
Handbook H-1741-1, Fencing	1989
Handbook H-1741-2, Water Developments	1990
Handbook H-1742-1, Burned Area Emergency Stabilization and Rehabilitation Handbook	2007
Handbook H-1745-1, Introduction, Transplant, Augmentation and Reestablishment of Fish, Wildlife & Plants	2001
Handbook H-1790-1, National Environmental Policy Act	2008
Handbook H-2101-4, Pre-Acquisition Environmental Site Assessments	2000
Handbook H-2101-5, Environmental Site Assessments for Disposal of Real Property	2004
Handbook H-2200-1, Land Exchange Handbook	2005
Handbook H-3042-1, Solid Minerals Reclamation Handbook	1992
Handbook H-3101-1, Issuance of Leases	1987
Handbook H-3109-1, Leasing under Special Acts	1995
Handbook H-3110-1, Noncompetitive Leases	1993
Handbook H-3120-1, Competitive Leases (Revised)	2013
Handbook H-3150-1, Onshore Oil and Gas Geophysical Exploration Surface Management Requirements	2007
Handbook H-3160-9, Communitization	1988
Handbook H-3600-1, Mineral Materials Disposal	2002
Handbook H-3720-1, Abandoned Mine Land Program Policy	2007
Handbook H-3809-1, for Mineral Examiners, v. 3-332, Sept., 11, 2007	2007
Handbook H-3809-3, Validity Mineral Reports, June 1969	1969
Handbook H-4180-1, Rangeland Health Standards	2001

Table B-2. Bureau of Land Management Regulations and Policies (Continued)

BLM Directive	Year
Handbook H-4700-1, Wild Horses and Burros Management Handbook	2010
Handbook H-8120-1, General Procedural Guidance for Native American Consultation	2004
Handbook H-8270-1, General Procedural Guidance for Paleontological Resource Management	1998
Handbook H-8342, Travel and Transportation Handbook	2012
Handbook H-9011, Chemical Pest Control	2013
Handbook H-9112, Bridges and Major Culverts	2011
Handbook H-9211-1, Fire Planning Handbook	2012
Instruction Memorandum 1989-201, Legal Responsibilities of BLM for Oil and Gas Leasing and Operations on Split Estate Lands	1989
Instruction Memorandum 99-039, Issuance of Grazing Permits in Compliance with Applicable Laws, Regulations and Policy	1999
Instruction Memorandum 1999-076, Policy on the Use of Certified Weed-Free Hay, Straw, and Mulch on BLM Lands	1999
Information Bulletin 2002-101, Cultural Resource Considerations in Resource Management Plans	2002
Instruction Memorandum 2002-034, Recent Changes in Management Direction: Federal Wildland Fire Management Policy, National Fire Plan	2002
Instruction Memorandum 2002-164, Guidance to Address Environmental Justice (EJ) in Land Use Plans and Related National Environmental Policy Act (NEPA) Documents	2002
Instruction Memorandum 2002-196, Right-of-Way Management-Land Use Planning	2002
Instruction Memorandum 2003-020, Interim Wind Energy Development Policy	2003
Instruction Memorandum 2003-131, Permitting Oil and Gas on Split Estate Lands and Guidance for Onshore Oil and Gas Order No. 1	2003
Instruction Memorandum 2003-147, Application for Permit to Drill – Process Improvement #3 – Cultural Resources	2003
Instruction Memorandum 2005-003, Cultural Resources and Tribal Consultation for Fluid Minerals Leasing	2005
Instruction Memorandum 2005-014, Water Disposal and Land Application Disposal (LAD) in the Powder River Basin	2005
Instruction Memorandum 2005-069, Offsite Compensatory Mitigation Guidelines	2005
Instruction Memorandum 2005-176, Filing of Protests on lands Included in Oil and Gas Lease Sales	2005
Instruction Memorandum 2005-210, Energy Policy and Conservation Act (EPCA) Inventory – Data Compilation for Phases III and IV	2005
Instruction Memorandum 2005-227, NHPA Section 106 and Oil and Gas Permitting	2005
Instruction Memorandum 2005-247, National Environmental Policy Act (NEPA) Compliance for Oil, Gas, and Geothermal Development	2005
Instruction Memorandum 2006-071, Process Improvement for Oil, Gas, Geothermal, Geophysical, and Related Rights-of-Way Approvals	2006
Instruction Memorandum 2006-073, Weed-Free Seed Use on Lands Administered by the Bureau of Land Management	2006
Instruction Memorandum 2006-145, Cooperative Conservation Based Strategic Plan for the Abandoned Mine Lands Program	2006
Instruction Memorandum 2006-060, Incorporating Benefits-Based Management within Recreation and Visitor Services Program Policy Change	2006
Instruction Memorandum 2006-197, BLM Energy and Non-Energy Mineral Policy	2006
Instruction Memorandum 2006-206, Oil and Gas Bond Adequacy Reviews	2006
Instruction Memorandum 2006-216, Wind Energy Development Policy	2006
Instruction Memorandum 2007-043, A Unified Strategy to Implement "BLM's Priorities for Recreation and Visitor Services" Workplan (Purple Book)	2007

Table B-2. Bureau of Land Management Regulations and Policies (Continued)

BLM Directive	Year
Instruction Memorandum 2007-096, Refinement of the Methodology to Identify Abandoned Mine Land Sites Near Populated Places and High Use Areas	2007
Instruction Memorandum 2007-097, Solar Energy Development Policy	2007
Instruction Memorandum 2008-009, Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands	2007
Instruction Memorandum 2008-014, Clarification of Guidance and Integration of Comprehensive Travel and Transportation Management Planning into Land Use Planning	2008
Instruction Memorandum 2008-030, Instructions for Implementing the Final Programmatic Environmental Impact Statement (Final PEIS) Record of Decision	2008
Instruction Memorandum 2008-032, Exceptions, Waivers, and Modifications of Fluid Minerals Stipulations and Conditions of Approval, and Associated Rights-of-way Terms and Conditions	2007
Instruction Memorandum 2008-190, Ensuring Compliance with all Abandoned Mine Lands (AML) Program Policies and Procedures	2008
Instruction Memorandum 2009-011, Assessment and Mitigation of Potential Impacts to Paleontological Resources	2008
Instruction Memorandum 2009-113, Casual Collecting of Common Invertebrate and Plant Paleontological Resources under the Paleontological Resources Preservation Act of 2009	2009
Instruction Memorandum 2009-018, Process for Setting Priorities for Issuing Grazing Permits and Leases	2008
Instruction Memorandum 2009-039, Transmittal of Revised 6840 Special Status Species Manual and Direction for State Directors to Review and Revise Existing Bureau Sensitive Species Lists	2009
Instruction Memorandum 2009-043, Wind Energy Development Policy	2009
Instruction Memorandum 2009-078, Processing Oil and Gas Applications for Permit to Drill for Directional Drilling into Federal Mineral Estate from Multiple-Well Pads on Non-Federal Surface and Mineral Estate Locations	2009
Instruction Memorandum 2009-153, Financial Guarantees for Notices and Plans of Operations	2009
Instruction Memorandum 2010-022, Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser Prairie-chicken	2010
Instruction Memorandum 2010-088, Guidance on 43 CFR 3809.100 and its Application	2010
Instruction Memorandum 2010-113, Areas of Critical Environmental Concern Boundary Data Standard	2010
Instruction Memorandum 2010-117, Oil and Gas Leasing Reform Land Use Planning and Lease Parcel Reviews	2010
Instruction Memorandum 2010-181, White-nose Syndrome	2010
Instruction Memorandum 2011-004, Transmittal of Revised Recreation and Visitor Services Land Use Planning Guidance	2010
Instruction Memorandum 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures	2011
Instruction Memorandum 2012-044, BLM National Greater Sage-Grouse Land Use Planning Strategy	2011
Instruction Memorandum 2012-067, Clarification of Cultural Resource Considerations for Off-Highway Vehicle Designations and Travel Management	2012
Instruction Memorandum 2012-140, Collecting Paleontological Resources Under the Paleontological Resources Preservation Act of 2009	2012
Instruction Memorandum 2012-141, Confidentiality of Paleontological Locality Information Under the Omnibus Public Lands Act of 2009	2012
Instruction Memorandum 2012-169, Resource Management Plan Alternative Development for Livestock Grazing	2012
Instruction Memorandum 2013-106, Bureau of Land Management Manual No. 6310 and 6320 - Additional Guidance Regarding Public and Cooperating Agency Involvement in and Access to Wilderness Characteristics Inventory Information and the Land Use Planning Process	2013
Instruction Memorandum 2013-142, Interim Policy, Draft - Regional Mitigation Manual Section - 1794	2013
Instruction Memorandum 2013-184, Relinquishment of Grazing Permitted Use on the Bureau of Land Management Administered Lands	2013

Table B-2. Bureau of Land Management Regulations and Policies (Continued)

BLM Directive	Year
Instruction Memorandum WY-98-061, Guidance for Water Quality Assessment and Monitoring for the Implementation of Standard Number Five of the Wyoming Standards for Healthy Rangelands and Guidelines for Livestock Grazing	1998
Instruction Memorandum WY-2001-040, Issuance of BLM (Wyoming) Sensitive Species Policy and List	2001
Instruction Memorandum WY-2003-011	2002
Instruction Memorandum WY-2005-034, Travel Management Guidelines for the Public Lands in Wyoming	2005
Instruction Memorandum WY-2005-046, Conservation Measures and Best Management Practices for the Management of Potential Gray Wolf Habitat	2005
Instruction Memorandum WY-2005-058, Conservation Measures and Best Management Practices for the Management of Potential Canada Lynx Habitat	2005
Instruction Memorandum WY-2006-009, Mass Appraisal – Wyoming Minimum Rental Rates (Small Site Appraisals) – Appraisal Services Directorate	2006
Instruction Memorandum WY-2006-037, Conservation Measures and Best Management Practices for the Management of Potential Black-footed Ferret Habitat	2006
Instruction Memorandum WY-2006-049, Conservation Measures and Best Management Practices for the Management of Grizzly Bear Habitat	2006
Instruction Memorandum WY-2007-018, Conservation Measures and Best Management Practices for the Management of Mountain Plover Habitat	2007
Instruction Memorandum WY-2010-012, Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management Administered Public Lands including the Federal Mineral Estate	2010
Instruction Memorandum WY-2010-013, Oil and Gas Leasing Screen for Greater Sage-Grouse	2010
Instructional Memorandum WY-2012-019, Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management Administered Public Lands Including the Federal Mineral Estate	2011
Instruction Memorandum WY-2012-032, Wyoming BLM Reclamation Policy	2012
Instruction Memorandum WY-2013-046, Transmittal of Mineral Materials Memorandum of Understanding	2013
Instruction Memorandum WY-87-672, August 26, 1987	1987
Instruction Memorandum WY-89-402, Inspection and Enforcement Program for Locatable Minerals Activities	1989
Instruction Memorandum WY-97-111, Report of Conformance of BLM Land Use Plans with the Standards and Guidelines on the Public Lands; Follow-up Maintenance of Land Use Plans	1997
Instruction Memorandum WY-99-20, Complying with Section 106 in Conformance with IM-99-039	1999
Manual Section 1601, Land Use Planning	2000
Manual Section 1613, Areas of Critical Environmental Concern	1988
Manual Section 1626, Travel and Transportation Manual	2011
Manual Section 1703, Hazardous Materials Management	2007
Manual Section 1734, Rangeland Interagency Ecological Site Manual	2010
Manual Section 1740, Renewable Resource Improvements and Treatments	2008
Manual Section 1745, Introduction, Transplant, Augmentation & Reestablishment of Fish, Wildlife & Plants	1992
Manual Section 2220, Land Exchanges	2005
Manual Section 2800, Cadastral Surveys – General	1985
Manual Section 2880, Mineral Leasing Act Rights-of-Way, Glossary of Terms	2012
Manual Section 3060, Mineral Reports – Preparation and Review, April 7, 1994	1994
Manual Section 3809, Surface Management (1985, revised 2001, 2012)	2012
Manual Section 4100, Grazing Administration – Exclusive of Alaska	2009
Manual Section 4180, Land Health	2001
Manual Section 4700, Wild Free-Roaming Horses and Burros Management	2010
Manual Section 3600, Mineral Materials Disposal	2013

Table B-2. Bureau of Land Management Regulations and Policies (Continued)

BLM Directive	Year
Manual Section 6250, National Scenic and Historic Trail Administration	2012
Manual Section 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation	2012
Manual Section 6301, Wilderness Characteristics Inventory	2011
Manual Section 6310, Conducting Wilderness Characteristics Inventory on BLM Lands	2012
Manual Section 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process	2012
Manual Section 6330, Management of Wilderness Study Areas	2012
Manual Section 6400, Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management	2012
Manual Section 6500, Manual of Wildlife, Fish and Plant Resources	2002
Manual Section 6840, Special Status Species Management	1988
Manual Section 6840, Special Status Species Policy	2008
Manual Section 7240, Water Quality	1978
Manual Section 7250, Water Rights	1984
Manual Section 7300 Air Resource Management Program Manual	2009
Manual Section 8100, Cultural Resource Management	2004
Manual Section 8110, Identifying Cultural Resources	2004
Manual Section 8120, Tribal Consultation Under Cultural Resource Authorities	2004
Manual Section 8130, Planning for Uses of Cultural Resources	2004
Manual Section 8140, Protecting Cultural Resources	2004
Manual Section 8160, Native American Consultation and Coordination	1990
Manual Section 8270, Paleontological Resource Management	1998
Manual Section 8340, Off-Road Vehicles	1982
Manual Section 8341, Conditions of Use (Off-Road Vehicles)	1979
Manual Section 8342, Designation of Roads and Trails	1988
Manual Section 8343, Vehicle Operations	1979
Manual Section 8344, Permits	1979
Manual Section 8380, Cave and Karst Resources Management	2008
Manual Section 8400, Visual Resource Management	1980
Manual Section 8410-1, Visual Resource Inventory	1986
Manual Section 8431-1, Visual Resource Contrast Rating	1986
Manual Section 9112, Bridges and Major Culverts	2011
Manual Section 9113, Roads Manual	2011
Manual Section 9211, Fire Planning Manual	2012
Mineral Leasing Act of 1920 (43 CFR 2006 3425.1-7(a)(2)(iv, v))	1920
Mineral Leasing Act of 1920 (43 CFR 2006 3461.5(h)(2)(i))	1920
Mineral Leasing Act of 1920 (43 CFR From 3100-11 (July 2006), 43 CFR Part 3160)	1920
Mineral Leasing Act of 1920 and others (43 CFR 2006 3591.1(b)(10))	1920
Mineral Leasing Act of 1920 and others (43 CFR 2006 3430.4-4(a)(10); 43 CFR 2006 3430.4-4(b)(8))	1920
Minerals Management, Generally (43 CFR 3000)	1983
National Contingency Plan Regulations (40 CFR 300)	1994
National Management Strategy for Motorized Off-highway Vehicle Use on BLM Public Lands	2001
National Register Bulletin 38: Guidelines for Evaluating and Documenting Traditional Cultural Properties	1990
Natural Resource Damage Assessment Regulations (43 CFR Part 11)	1986

Table B-2. Bureau of Land Management Regulations and Policies (Continued)

BLM Directive	Year
Noncompetitive Leasing (43 CFR 3110)	1988
Off-Road Vehicle Implementation Strategy Washakie Resource Area	1994
Oil and Gas Leasing (43 CFR 3100)	1983
Onshore Oil and Gas Geophysical Exploration (43 CFR 3150)	1988
Onshore Oil and Gas Operations (43 CFR 3160)	1982
Onshore Oil and Gas Unit Agreements; Unproven Areas (43 CFR 3180)	1983
Permits for Recreation on Public Lands (43 CFR 2930)	2004
Riparian-Wetlands Initiative for the 1990's, The U.S. Department of the Interior, Bureau of Land Management	1992
Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming	2004
Standards for Healthy Rangelands, Standard #2	1997
Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book	2007
Technical Reference 1734-6 Version 4: Interpreting Indicators of Rangeland Health	2005
Technical Reference 1737 Series: Riparian Area Management Assessing Proper Functioning Condition (PFC) for Lotic and Lentic areas	1998
The Standards for Healthy Rangelands and Guidance for Livestock Grazing Management (43 CFR 4180)	1997
Wyoming BLM Coal/Coal Bed Methane Policy	2000
Wyoming Bureau of Land Management Soil Program Ten Year Strategy	2003

Table B-3. Applicable Wyoming State Laws and Regulations

Wyoming State Laws and Regulations
State of Wyoming Occupational Health and Safety Rules and Regulations
State of Wyoming Oil and Gas Conservation Commission Rules and Regulations
Wyoming Department of Environmental Quality Rules and Regulations
Wyoming State Engineer's Office Statutes, Rules and Regulations
State of Wyoming Water Quality Rules and Regulations
Wyoming Executive Order 2011-5, Greater Sage-Grouse Core Area Protection
Wyoming Executive Order 2013-3,Greater Sage-Grouse Core Area – Grazing Adjustments

Table B-4. Memoranda and Agreements

Memoranda and Agreements	Description	Year
Assistance agreement KAA990028-Abandoned Mine Land (AML) Reclamation Agreement	The AML program in Wyoming currently operates pursuant to this assistance agreement between the Wyoming State Office of the BLM and the Wyoming DEQ. It provides for the cooperative effort between the two agencies for a long-term relationship to efficiently and economically plan for, and share responsibilities to ensure, effective abandoned mine land reclamation on public lands in Wyoming.	
Association of Fish and Wildlife Agencies (AFWA), United States Forest Service (USFS), Bureau of Land Management (BLM), United States Fish and Wildlife Service (FWS)	Policies and guidelines for fish and wildlife management in National Forest and BLM Wilderness.	2006
BLM Memorandum of Understanding WO300-2006-07, April 2006	Facilitate interagency coordination and establish policies and procedures to implement Section 225 of the Energy Policy Act of 2005.	2006
BLM Memorandum of Understanding WO-230-2010-04	Between the U.S. Department of the Interior Bureau of Land Management and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds.	2010
Memorandum of Understanding among federal land managers and U.S. EPA on oil and gas development and NEPA	Memorandum of Understanding Among the U.S. Department of Agriculture, U.S. Department of the Interior, and U.S. Environmental Protection Agency, Regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions Through the National Environmental Policy Act Process.	2011
Clean and Diversified Energy Initiative	Recommends initiatives to facilitate the timely leasing and permitting of geothermal resources.	2005
Cooperative Agreements with Weed and Pest Districts: Bighorn County, Hot Springs County, Park County, Washakie County	Details cooperative efforts for noxious weed control on BLM-administered lands by the county weed and pest districts.	
Cooperative Management Agreement between BLM, Worland District, LU Sheep Company, WGFD, Wyoming State Board of Land Commissioners	Details cooperative efforts for road and motor vehicle management for the benefit of watershed and big game within the upper Grass and Enos creek drainages.	1989
Cooperative Management Agreement between BLM, Worland District, WGFD, Wyoming State Board of Land Commissioners, Double-H Ranch	Details cooperative efforts for road and motor vehicle management for the benefit of watershed and big game within the upper Grass, Enos, Lefthand and Middle creek drainages.	June 1994
Double H Ranch Access Area	BLM, Double H Ranch, WG&F – Public Access.	
Grass Creek Travel Management Area	BLM, Wyoming State Board of Land Commissioners, WGFD, LU Sheep Company, Travel Management in Grass Creek area.	
Interagency Agreement between the USFS and the BLM	Establishes procedures for the administration of oil and gas operations on federal leases within the National Forest System.	2006
Interagency between BLM and Bureau of Reclamation Agreement	The BLM has jurisdiction over NOIs to conduct geophysical exploration which involve Bureau of Reclamation (BOR) lands. The BOR will be contacted for their conditions of approval.	
Medicine Lodge Habitat Management Unit Areas	BLM, WGFD – Public Access.	
Memorandum of Agreement WY-117	Memorandum of Agreement among the BLM and the Wyoming Board of Land Commissioners, the Wyoming SHPO and the Advisory Council on Historic Preservation, addresses cultural resource protection in state exchanges.	

Table B-5. Memoranda and Agreements (Continued)

Memoranda and Agreements	Description	Year
Memorandum of Agreement WY-118	Memorandum of Agreement between the BLM and the Wyoming Board of Land Commissioners, addresses processing state exchanges.	
Memorandum of Agreement WY-119	Memorandum of Agreement between the BLM and the ASCS, addresses management of agricultural trespass.	
Memorandum of Agreement WY-121	Memorandum of Agreement between the BLM and the National Park Service, addresses management of the Oregon National Historic Trails.	
Memorandum of Agreement WY-122	Memorandum of Agreement among the BLM and the USFS, Wyoming Department of Public Lands, Wyoming Game and Fish Commission, Wyoming Recreation Commission, Wyoming Department of Agriculture, and the Wyoming State Planning Coordinator's Office, addresses access to public land.	
Memorandum of Agreement WY-131	Memorandum of Agreement between the BLM and the Wyoming Game and Fish Department (WGFD), addresses overall coordination on land and resource management.	
Memorandum of Agreement WY-19	Memorandum of Agreement between the BLM and the Wyoming Governor, addresses overall cooperation in public and state land management efforts.	
Memorandum of Agreement WY-20	Memorandum of Agreement between the BLM and the Wyoming Game and Fish Commission, addresses a myriad of land and resource management issues, including classifications, land acquisition and disposal, and access.	
Memorandum of Agreement WY-21	Memorandum of Agreement between the BLM and Region II and Region IV of the USFS, addresses overall coordination on a myriad of land and resource management issues.	
Memorandum of Agreement WY-63	Memorandum of Agreement among the BLM, the USFS, Wyoming Department of Public Lands and the Wyoming Game and Fish Commission, addresses public land access and management of access problems.	
Memorandum of Agreement WY-65	Memorandum of Agreement between the BLM and the Agricultural Stabilization and Conservation Service (ASCS), addresses overall coordination on a myriad of land and resource management issues.	
Memorandum of Agreement WY-7	Memorandum of Agreement between the BLM and the Wyoming Recreation Commission; addresses land classifications and withdrawals to protect public lands generally, and specifically to protect historic trails.	
Memorandum of Agreement WY-77	Memorandum of Agreement among the BLM, the ASCS, USFS, AES, and Wyoming State Conservation Commission, addresses overall coordination on conservation planning projects.	
Memorandum of Agreement WY930-91-06-38	Memorandum of Agreement between the BLM and the Wyoming Board of Land Commissioners, addresses exchange pooling.	
Memorandum of Agreement WY930-91-06-39	Memorandum of Agreement between the BLM and the Wyoming Board of Land Commissioners, addresses exchange of state land in holdings in wilderness areas.	
Memorandum of Agreement, between the Wyoming DEQ and the State of Wyoming Oil and Gas Conservation Commission	Wyoming DEQ delegated permitting of road applications for oilfield wastes when the wastes are to be applied on the lease, unit, or communitized area. Wyoming DEQ still has the jurisdiction for permitting road application of oil field wastes outside of the lease, unit, or communitized area.	1999

Table B-5. Memoranda and Agreements (Continued)

Memoranda and Agreements	Description	Year
Memorandum of Understanding between BLM and State of Wyoming Oil and Gas Conservation Commission	Outlines the handling of NOIs to conduct geophysical exploration and sharing of information and compliance inspections. The State of Wyoming Oil and Gas Conservation Commission has jurisdiction over injection wells and spacing.	
Memorandum of Understanding between the BLM and the Department of Agriculture (60F26045-48)	Predator control protocols were formalized in this Interagency Memorandum of Understanding.	1995
Memorandum of Understanding BLM/APHIS-Wildlife Services (ADC)	Detailing cooperative efforts between the two groups on suppression of grasshoppers and Mormon crickets on BLM lands (Document #03-8100-0870-MU, February 27, 2003), and local National Resource conservation Service (NRCS).	2003
Memorandum of Understanding No. WY 19	Between the United States Department of the Interior (DOI) BLM and the Wyoming Department of Environmental Quality (DEQ) Land Quality Division (LQD) and addresses Management Of Surface Mining and Exploration for Locatable Minerals On Public Lands. It was signed November 11, 2003. This is a Supplemental Memorandum to the General Statewide Memorandum of Understanding (Memorandum of Understanding) dated October, 1975, between the Governor of Wyoming and the United States, by and through the State Director, BLM, United States DOI.	2003
Memorandum of Understanding No. WY-920-1301	Between the United States Department of the Interior (DOI) BLM and the Wyoming Department of Environmental Quality (DEQ) Land Quality Division (LQD) for Management of Surface Mining and Exploration for Mineral Materials (Salable Minerals) on Public Lands, signed on September 11, 2013. This is a Supplemental Memorandum to the General Statewide Memorandum of Understanding (Memorandum of Understanding) dated October, 1975, between the Governor of Wyoming and the United States, by and through the State Director, BLM, United States DOI.	2013
Memorandum of Understanding WY920-02-09-108	Between the BLM, the FHWA, and the Wyoming Department of Transportation that defines each agency's responsibilities in regard to processing federal-aid highway appropriations.	2002
Memorandum of Understanding WY920-08-07-192	Memorandum of Understanding WY920-08-07-192 between BLM, the Federal Highway Administration (FHWA), and the Wyoming Department of Transportation, addresses each agency's responsibilities in regard to processing federal-aid highway appropriations. To implement Sections 107(d) and 317 of the federal Aid Highway Act (23 U.S.C. 107(d) and 317), as amended, the agencies operate under this Memorandum of Understanding (updated in August 2007). All appropriations under the Federal Aid Highway Act are required to be consistent with the referenced Memorandum of Understanding.	2007
National Memorandum of Understanding between the BLM and the Department of Defense	This Memorandum of Understanding outlines procedures for processing Notices of Intent (NOIs) to conduct geophysical operations when Air Force, Army, and Navy lands are involved. The Department of Defense will be the lead agency when their lands are involved in an NOI.	
Nowater Off-highway Vehicle (OHV) Trail System	BLM, Wyoming State Trails Program, Worland chamber of Commerce, Ten Sleep Chamber of Commerce.	

Table B-5. Memoranda and Agreements (Continued)

Memoranda and Agreements	Description	Year
Programmatic Agreement Among BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Offices (SHPOs)	Regarding the Manner in which BLM will meet its Responsibilities Under the National Historic Policy Act (NHPA).	2012
Public Access Area Agreements Between BLM and WGFD	Public access area agreements to numerous BLM parcels on South Fork, Shoshone, North Fork Shoshone, Clarks Fork of the Yellowstone River, and Luce and Hogan Reservoirs.	
Renner, Carter Billy Miles Tensleep Public Access Area	BLM, WGFD – Public Access.	
State Protocol Agreement Between the Wyoming BLM State Director and the Wyoming SHPO	Programmatic agreement among the BLM Advisory Council on historic preservation, and the national conference of state historic preservation officers regarding the manner in which BLM will meet its responsibilities under the National Historic Preservation Act.	2014
Western Association of Fish and Wildlife Agencies (WAFWA)/USFS/BLM/USFWS Memorandum of Understanding (08-31-2000)	Involving the management of sage grouse and their habitat.	2000
Wyoming DEQ	There are currently no agreements between BLM and the State of Wyoming DEQ-LQD regarding exploration for or development of non-energy leasable minerals. Wyoming DEQ-LQD processes applications for these minerals under their "Non-Coal" rules and regulations. It is possible that the same Memorandum of Understanding between BLM and Wyoming DEQ-LQD for locatable minerals would have some valuable application should these two agencies need to work together to process applications related to non-energy leasable minerals.	
Yellowstone River Compact	Between the states of Wyoming, Montana, and North Dakota was agreed upon to create an equitable division and apportionment of such waters; this compact ultimately controls the future and current uses of water resources in the basin.	1950

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Appendix C

Monitoring and Evaluation

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APPENDIX C

MONITORING AND EVALUATION

1.0 INTRODUCTION

This appendix provides an overview of the Bighorn Basin Monitoring and Evaluation protocol. Conditions may change over the life of the land use plan and these changes may require different management actions to protect resources and minimize resource conflicts. To address the changing conditions and provide management flexibility that incorporates best management practices (BMP), the Bureau of Land Management (BLM) reviews effectiveness of management actions, assesses the current resource conditions and, if needed, alters management actions.

Due to staffing and funding levels, monitoring will be prioritized consistent with the goals and objectives of the Resource Management Plan (RMP) in cooperation with local, state, and other federal agencies. A system should be established to regularly collect, coordinate and distribute monitoring data collected by other federal and state agencies. Changes to monitoring may result from developing technologies or a better understanding of information.

The monitoring framework for greater sage-grouse is provided in Appendix Y.

2.0 DATA COLLECTION

In cooperation with local, state and other federal agencies, the BLM will collect, analyze, and report monitoring data that allows for the determination of cause and effect, conditions, trends and predictive modeling of land use authorizations. Monitoring methods are implemented to collect data that establish current conditions and reveal any change in the indicators. Monitoring techniques consider when, where, and frequency. The data collected through monitoring provide a variety of information applicable to one or more resource uses. To increase effectiveness, efficiency and eliminate duplication, monitoring methods should be designed to address as many uses as possible. The BLM will collaborate with cooperating agencies and permittees to assist in or perform this data collection.

3.0 DATA ANALYSIS

Data will be analyzed to determine the change that has occurred as a result of management actions. Data analysis will be conducted on a predetermined schedule that considers the data collection frequency for detecting change. Data will also be recorded and organized to facilitate analysis to be used in assessing management actions. Analyzed data will be assessed to determine whether the resource conditions are meeting the planned goals; whether a change has occurred, and if so, identify the cause; and what appropriate action should be taken to achieve the desired outcome if the objective is not being met. New technology and management methods will be reviewed to determine their applicability in modifying or replacing current management actions. The BLM will collaborate with cooperating agencies to assist in or perform this data analysis.

4.0 DECISION

When the assessment shows that the goals are still valid but the outcome is not being achieved, the cause of non-achievement will be documented and a change or modification in management actions would be warranted to address the causal factors. The assessment will develop recommendations to be considered by management for continuation, modification, or replacement of current management actions. Because adoption of a new management action may require changes in the monitoring plan, the assessment will also evaluate the effectiveness of the monitoring and data collection methods and recommend continued use, modification, or elimination of those methods.

5.0 ESTABLISHMENT OF MONITORING PROTOCOLS

Establishing monitoring protocols will follow BLM program specific policy and, where appropriate, the general seven step principles outlined in the Regional Framework for Water-Resources Monitoring Related to Energy Exploration and Development. Those steps are:

1. Specify monitoring goals and objectives.
2. Characterize anthropogenic stressors that may affect receptors and parameters of interest.
3. Develop regional questions and conceptual models to describe the process and pathways anthropogenic stressors may affect receptors.
4. Suggest indicators to measure the effects of anthropogenic stressors, and define existing information availability and needs.
5. Estimate the sensitivity of the indicators to detect change, to guide final indicator choice, and monitoring design.
6. Describe a process by which management can identify thresholds of change requiring a management response as indicated by causal factors.
7. Identify clear connections between the overall monitoring program and management decision process.

6.0 RESOURCE MONITORING TABLE

The resource monitoring table (Table C-1) identifies the indicator that will be monitored to detect change in resource conditions, the method or technique of monitoring, the locations for monitoring, the unit of measurement for monitoring, the frequency for monitoring, and the action triggers that indicate the effectiveness of the management action. Footnotes in Table C-1 indicate where monitoring is generally conducted by stakeholders or cooperating agencies.

Table C-1. Resource Monitoring Table

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Air Quality[1]	M-1	Air quality.	Ambient air sampling and air quality modeling.	Established Monitoring Stations.	Parts per million.	Hourly to 24-hour samples in accordance with standards.	Samples exceeding National Ambient Air Quality Standards.
	M-2	Gaseous and particulate critical air pollutants.	Emission inventory.	Established Monitoring Stations.	Pounds per hour and tons per year.	Annually.	Samples exceeding Ambient Air Quality Standards or levels of concern.
Cultural[2]	M-3	National Register eligible sites.	Site inspection.	Area wide.	Disturbance.	Annually.	Disturbance as a result of land uses or vandalism, fire, and severe weather events such as flooding and erosion.
Fire	M-4	Fire fuels.	Site inspection.	Wildland-urban interface and industrial interface areas.	Acres.	Annually.	Presence of fire fuels that present a risk to communities and industrial sites.
	M-5	Vegetation condition.	Ecological site condition and trend studies.	Vegetation types where there is a history of fire in the ecosystem.	Representative sample.	Annually.	Vegetation growth trend is moving away from desired conditions for the vegetation type.
	M-6	Resource and property damage.	Fire behavior.	Individual fire.	Fire temperature, flame length, burn rate, and acres burned.	While the fire is burning.	Acres burned and fire intensity that exceed prescription.
Forestry	M-7	Forest Health.	Ecological site condition and trend.	Forested lands.	Representative sample area.	Every 3 to 5 years.	Disease, insect infestation, or encroachment of undesirable plant species threatens forest health.
	M-8	Timber stands.	Timber stand examination.	Commercial forested areas.	Board feet, age class, and damages.	Every 10 to 20 years.	Basal area growth does not meet timber type standards.
Lands and Realty	M-9	Realty authorization compliance.	Site compliance inspection.	Area wide.	Number of site inspections.	Annually.	Non-compliance or non-use.

Table C-1. Resource Monitoring Table (Continued)

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Livestock Grazing	M-10	Vegetation condition	BLM approved monitoring methods; monitoring plans are included in Allotment Management Plans.	All areas being grazed.	Representative sample of grazed area.	Every 5 to 10 years On a priority basis monitor allotments before livestock turnout.	Conditions are not meeting goals and objectives for vegetation due specifically to livestock grazing management. Inconsistent with Guidelines for Livestock Grazing Management, and Wyoming Rangeland Monitoring Guide, and similar guidance updated over time. Not meeting or moving towards Wyoming Standards for Healthy Rangelands.
	M-11	Forage utilization	Utilization study plot or site visit; monitoring plans are included in Allotment Management Plans.	Priority allotments or as needed.	Representative sample of grazed area.	On a priority basis, monitor during and after the area has been grazed.	Utilization consistently exceeds prescribed levels identified in the utilization Appendix W or the vigor of key plant species is declining.
	M-12	Livestock numbers.	Counts and site visits; monitoring plans are included in Allotment Management Plans.	Varies by allotment.	Number of allotments or operators inspected.	Annually or when livestock are moved on or off the allotment.	Livestock numbers exceeding permitted numbers or in areas unauthorized.
Minerals	M-13	Surface disturbance.	Remote sensing or site inspection.	Mineral development sites.	Acres disturbed.	Bi-annual or more.	Acres disturbed exceeding the range established for the area.
	M-14	Compliance with authorization.	Area inspection.	Area wide.	Compliance.	During operations at least bi-annually.	Non-compliance.

Table C-1. Resource Monitoring Table (Continued)

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Off-Highway Vehicles	M-15	Off-highway vehicle disturbance; establishment of unauthorized vehicle routes.	Remote sensing or site visit; traffic counter data.	Travel Management Area; site-specific to area of disturbance.	Miles of routes; acres of disturbance.	Prioritize areas and monitor higher priority areas every 1-3 years and lower priority areas every 2-4 years.	Disturbance exceeding the baseline, accelerated soil erosion occurring, and vegetation being removed.
Paleontology	M-16	Significant paleontological resources.	Site inspection.	Site.	Degradation or loss of significant fossil resources.	Annually.	Loss or damage to significant fossil resources as a result of human or natural causes.
Recreation	M-17	General recreation use; realization of desired beneficial outcomes.	Onsite Inspection, visitor use data, surveys; document user conflicts or complaints.	Area wide with emphasis on SRMAs and ERMAs with high visitation; areas not managed as recreation management areas but recognized for recreational use and resources.	Changes to desired recreation setting characteristics; changes in experiences and realized desired beneficial outcomes; changes in types, seasons or levels of use.	Prioritize areas and monitor higher priority areas (SRMAs and ERMAs) every 1-3 years and lower priority areas every 3-5 years.	When visitor surveys or public comments indicate that recreation area management objectives are not met; when desired settings, experiences, and beneficial outcomes are not realized; when change is causing undue or unnecessary degradation of the site or area; when change is causing goal interference and conflicts.
	M-18	Concentrated recreation use.	Inspect developed recreation sites or areas that have facilities.	Recreation site.	Condition of recreation site, facilities, visits and visitor days.	Annually.	When change is causing undue or unnecessary degradation of facilities and use areas; public complaints.
	M-19	Compliance with commercial authorization.	Administrative review, site inspection.	Activity site.	Permit stipulations, resource conditions, and site restoration.	During and after an event; annually for other commercial users.	When non-compliance is determined or degradation of resources is occurring.

Table C-1. Resource Monitoring Table (Continued)

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Special Designations and Management Areas	M-20	Resource condition.	Site visit or remote sensing.	Special designation and management area.	Amount of degradation or loss of resources; impacts to important and relevant resources.	The BLM will monitor the impacts that Resource Management Plan implementation and other approved projects have on National Trail resources, qualities, values, and associated settings and the primary use or uses, including determining the effectiveness of design features, project stipulations, and mitigation measures on a regular basis as the Resource Management Plan and projects are implemented.	Undue or unnecessary degradation or loss of resources or important and relevant resources as a result of human or natural causes.
Wilderness Study Areas	M-21	Wilderness Characteristics (size, naturalness, outstanding opportunities for primitive and unconfined recreation or solitude, supplemental values).	Site visits; aerial monitoring.	Wilderness Study Areas (141,068 acres).	Miles of linear human intrusions; acres disturbed; impacts to wilderness characteristics identified by onsite visit or public comment.	Annually.	Failure to meet the non-impairment standard or other objectives outlined in Manual 6330.

Table C-1. Resource Monitoring Table (Continued)

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Travel and Transportation Management	M-22	Roads and trails.[3]	Route management categories and maintenance levels; onsite inspection or remote sensing; traffic counter data.	Area wide.	Miles.	Per Facility Asset Management System Condition Assessment Plans.	Conditions represent a hazard to life and property; route conditions do not meet identified road standards.
	M-23	Seasonal closures.[6]	Aerial and field inspections.	Travel Management Areas with seasonal closures for wildlife.	Acres.	Every 5 years.	Changes in use of seasonal habitat requiring closure.
Vegetation	M-24	Trend.	BLM approved monitoring methods.	Area wide.	Representative sample.	Every 2 to 10 years.	Not meeting or moving towards the goals and objectives for 4000 Biological Resources (BR) Vegetation-Grassland and Shrubland Communities or the Wyoming Standards for Healthy Rangelands.
	M-25	Precipitation.[1]	Weather stations.	Representative sample to detect precipitation patterns.	Inches of precipitation.	Monthly and annually.	N/A.
	M-26	Climate.[1]	Weather stations.	Representative sample to detect patterns.	Degrees.	Monthly and annually.	N/A.
	M-27	Noxious weed and invasive plant trends.[4]	Remote sensing or site visit.	Priority areas.	Acres of established weeds and potential habitat areas.	Annually.	Spreading or establishment of invasive species in new areas.
	M-28	Special Status Species.	Site inspection.	Special Status Species' habitats.	Population and trend.	Annually.	A declining trend in populations.
	M-29	Wetland/riparian condition.	Proper Functioning Condition.	Priority wetlands/ riparian areas.	Stream miles and acres along with rating.	Every 1 to 3 years.	Not achieving Proper Functioning Condition or not exhibiting and upward trend.

Table C-1. Resource Monitoring Table (Continued)

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Visual Resource Management	M-30	Project conformance with VRM Class Objectives.	Remote sensing or site visit; Visual Resource Contrast Rating from Key Observation Points; Visual simulations.	Class I, II, and sensitive III and IV areas.	Measure the degree of contrasting elements against the surrounding natural elements of the landscape (color, form, line, etc.) before and after implementation of an action.	Visual Contrast Ratings will be prepared for projects in visually sensitive areas; comparison of pre and post implementation data will evaluate the sufficiency of project design features in meeting VRM Class Objectives.	Intrusion that exceeds thresholds for meeting VRM Class Objectives.
Water Quality, Watershed and Soils Management	M-31	Surface water quality.[5]	Water sampling.	All surface water.	Milligrams per liter and tons per day.	On a priority basis.	Water quality does not meet state standards.
	M-32	Groundwater quality.[5]	Groundwater sampling.	Established monitoring stations.	Representative sample of water quality.	Annually.	Water quality does not meet state standards and water is migrating from one aquifer to another.
	M-33	Channel geometry.	Riparian cross sections.	Priority streams.	Change in stream channel (width, depth, side channel modification, and bank sloughing).	Every 1 to 3 years.	Conditions are moving away from Proper Functioning Condition.
	M-34	Soil erosion uplands.	Visual observation and surveyed erosion pins.	Area wide where land use activities are occurring.	Soil loss in tons per acre.	Visual examination while land use activity is active and annual site surveys.	When soil loss is accelerated beyond natural levels.
	M-35	Soil erosion on stream banks and floodplains.	Visual observation and surveyed erosion pins.	Area wide where land use activities are occurring.	Area affected in square feet or acres.	Visual examination while land use activity is active and annual site surveys.	Water table is shrinking beyond average precipitation fluctuations.
	M-36	Soil compaction.	Penetrometer or visual inspection.	Area affected by land use activities.	Pounds per square inch.	1 to 2 times annually.	Compaction restricts water infiltration and plant growth.
	M-37	Soil compaction, porosity, permeability, and depth to water.	Monitoring wells (peizometers).	Riparian areas.	Depth to water table.	Every 2 to 3 years.	Accelerated stream bank soil loss.

Table C-1. Resource Monitoring Table (Continued)

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Wildlife and Fisheries[6]	M-38	Big game seasonal habitat.	Aerial and field inspections.	Crucial wildlife habitat areas.	Numbers during occupancy periods.	Annually.	A change in numbers beyond the normal fluctuations.
	M-39	Special Status Species occupancy and productivity.	Aerial and field inspections.	Habitat areas and established buffer zones.	Numbers during occupancy periods.	Annually.	A decline in numbers beyond the normal fluctuations.
	M-40	Threatened and endangered species occupancy and productivity.	Aerial and field inspections.	Habitat areas and established buffer zones.	Numbers during occupancy periods.	Annually.	A decline in numbers beyond the normal fluctuations.
	M-41	Macroinvertebrate indicator species.	Collecting macroinvertebrate species.	Perennial streams.	Species and condition of macroinvertebrates.	Every 2 to 10 years.	No presence of macroinvertebrates that represent good quality water in the stream.
	M-42	Neo-tropical bird habitat.	Site visit.	Area wide.	Numbers during occupancy period.	Every 2 to 3 years.	Declining trend in habitat occupancy.
	M-43	Raptors.	Site visit.	Area wide.	Nest occupancy rate.	Every 2 to 5 years.	Declining trend in nest site occupancy.
Waterway corridors eligible for inclusion into the National Wild and Scenic River System	M-44	Waterway-specific identified ORV.	Site visits, monitoring, and project proposals.	Eligible waterway corridors.	Miles of linear human intrusions; acres disturbed, impacts to corridor specific ORVs as observed by onsite visit, public comment, or project proposals.	Annually, or when site specific issue arises.	Impacts to corridor specific identified ORVs.

[1]Wyoming Department of Environmental Quality, Air Quality Division is responsible for data collection.
[2]The State Historic Preservation Officer is responsible for data collection.
[3]The County with jurisdiction is responsible for data collection.
[4]The Weed and Pest District and the Animal and Plant Health Inspection Service are responsible for data collection.
[5]Wyoming Department of Environmental Quality, Water Division is responsible for data collection.
[6]Wyoming Game and Fish Department is responsible for data collection.

BLM	Bureau of Land Management
ERMA	Extensive Recreation Management Area
N/A	Not Applicable
ORV	Outstandingly Remarkable Value
SRMA	Special Recreation Management Area
VRM	Visual Resource Management

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Appendix D

Implementation

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APPENDIX D

IMPLEMENTATION

1.0 GENERAL

Implementation of the Bighorn Basin Resource Management Plan (RMP) will require continued involvement of cooperating agencies, both in terms of funding and time, and continued public participation. This appendix describes the basic elements of implementing the Bighorn Basin RMP.

2.0 IMPLEMENTATION WORKING GROUP

Each field office will implement its respective RMP. To ensure overall coordination, Bureau of Land Management (BLM) and the cooperating agencies should meet at least yearly to provide support for the implementation prioritization, review recommendations for changes to implementation strategies and review monitoring evaluation results. This group is called the Implementation Working Group. Implementation Working Groups will serve in a recommending capacity as the BLM cannot relinquish its decision-making authority or responsibility. A single Implementation Working Group may serve both field offices, or an Implementation Working Group may be convened for each field office. All Implementation Working Group meetings will be open to the public, and announced on the BLM website.

The Implementation Working Group will ensure implementation is orderly and without duplication or confusion. The Implementation Working Group will look at interdisciplinary and interagency implementation rather than resource-by-resource implementation to make recommendations regarding the best use of funding and personnel from both cooperating agencies and the BLM.

3.0 IMPLEMENTATION TRACKING DATABASE

A database has been developed for both the Cody and Worland Field Offices to track the budget, monitoring, and implementation actions. Once the database has been populated, it will require continual maintenance and updates to accurately track the implementation process. Information will be collected based on quarterly performance evaluation (PE) accomplishment reporting, and complete fiscal year reports will be published with analysis on the BLM website by December 31 of each calendar year.

4.0 MONITORING WORKING GROUP

To ensure that monitoring methods are in place, a Monitoring Working Group will be assembled to develop an overall monitoring plan, utilizing existing monitoring information from the various members of the Implementation Working Group. The team's guidance and direction will be provided through Appendix C, Monitoring and Evaluation. The BLM is responsible to apply monitoring procedures and protocols that are based on BLM policies, field office priorities and available funding. The BLM intends to monitor the implementation of the entire RMP as a separate process from monitoring the impacts. The appropriate field manager will make final decisions on the monitoring plans, monitoring priorities, and whether or not monitoring data collected by other agencies meets the specific needs of the BLM.

The BLM Field Manager will assess the monitoring needs and consider additions or changes proposed by the Monitoring Working Group.

Since some monitoring data is being collected and provided by other federal and state agencies to the extent of their specific missions and expertise, a system will be established to regularly collect and coordinate this data. The team will also be responsible for collecting data to determine if the implemented actions are meeting stated goals and objectives or desired outcomes.

5.0 ACTIVITY PLAN WORKING GROUPS

Activity Plan Working Groups (APWG) consisting of local, state, and federal governments will be formed for new projects when circumstances dictate. Cooperating agencies in these APWGs will assist the BLM in developing alternatives and preparing environmental analyses. APWGs will serve in a recommending capacity as the BLM cannot relinquish its decision-making authority or responsibility. As an example, travel management plans would be developed with an APWG.

The objectives of APWGs include the following:

- Minimizing analysis and decision making controversy by being proactive rather than reactive to public land use and resource conflicts.
- Providing effective, cost-efficient, and collaboratively-based solutions to resource conflicts.
- Improving resource conditions by recommending practices appropriate to special situations.
- Streamlining public land authorizations, increasing implementation flexibility, and notifying public land users of required practices.
- All APWG meetings where recommendations are made to the BLM will be open to the public, and will provide for specific and helpful public involvement. This includes providing web-based information to the public prior to any APWG meetings; such that members of the public can provide input to the working session, both early and mid-way through the scheduled meetings.

6.0 PUBLIC INVOLVEMENT

A website where the public can quickly and easily access data concerning implementation should be developed and kept current. Creating this website and maintaining it through the implementation cycle will be a vital part of implementation success. The public is welcome to provide implementation comments to the BLM any time during the cycle, but schedules for implementation planning decisions will be posted so the public can make timely comments. All APWG meetings where recommendations are made to the BLM will be open to the public, and will provide for specific and helpful public involvement. This includes providing web-based information to the public prior to any APWG meetings; such that members of the public can provide input to the working session, both early and mid-way through the scheduled meetings.

Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix E

Consultation Letters and Cooperating Agency
Position Statements

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APPENDIX E

CONSULTATION LETTERS AND COOPERATING AGENCY POSITION STATEMENTS

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1.0 CONSULTATION LETTERS

Section 7 Consultation Letters

1175

Alex_Schubert@fws
.gov

To

11/17/2008 12:04 PM

BBRMP_WYMail@blm.gov

cc

Caleb_hiner@blm.gov

Subject

Scoping comments on Bighorn Basin RMP

Please see attached comments.

(See attached file: WY09FA0023 scoping for Bighorn Basin RMP.pdf)

Alex L. S. Schubert
Fish and Wildlife Biologist
USFWS Wyoming FO
307.772.2374 ext. 238
(See attached file: WY09FA0023 scoping for Bighorn Basin RMP.pdf)

1175

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

In Reply Refer To:
ES-61411/W.02/WY09FA0023

November 13, 2008

Memorandum

To: Field Managers; Bureau of Land Management; Cody and Worland Field Offices; Cody, Wyoming; Worland, Wyoming

From: Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming /s/ Scott Hicks for Brian T. Kelly

Subject: Scoping Comments for Bighorn Basin Resource Management Plan

Thank you for the opportunity to provide scoping comments on the proposed Bighorn Basin Resource Management Plan (RMP). The Bighorn Basin RMP will be a combined effort of the U.S. Bureau of Land Management's (BLM) Cody and Worland Field Offices and will replace the current Cody and Worland RMPs. The Bighorn Basin RMP will provide future direction for approximately 3.2 million surface acres and 4.2 million acres of Federal mineral estate in north-west Wyoming. The Bighorn Basin RMP will establish goals and objectives for resource management; identify lands that are open or available for certain uses, including any restrictions and lands that are administratively unavailable to certain uses; provide comprehensive management direction for all resources and uses; and make broad scale decisions guiding future site-specific implementation decisions. The area covered by the Bighorn Basin RMP includes 12 Wilderness Study Areas, nine Areas of Critical Environmental Concern, two areas of special designation, and seven special recreation management areas. The planning area for the Bighorn Basin RMP includes part of Hot Springs County, and all of Park, Washakie, and Big Horn Counties, Wyoming.

In response to your request to review the proposed action, we are providing you with comments on (1) threatened and endangered species, (2) migratory birds, and (3) wetlands and riparian areas. The Service provides recommendations for protective measures for threatened and endangered species in accordance with the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Protective measures for migratory birds are provided in accordance with the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703 and the Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. 668. Wetlands are afforded protection under Executive Orders 11990 (wetland protection) and 11988 (floodplain management), as well as section 404 of the Clean Water Act. Other fish and wildlife resources are considered under the Fish and Wildlife Coordination Act and the Fish and Wildlife Act of 1956, as amended, 70 Stat. 1119, 16 U.S.C. 742a-742j.

Section 7 Consultation Letters

Threatened and Endangered Species
The following threatened or endangered species could occur in the project area:

Black-footed ferret: Black-footed ferrets (*Mustela nigripes*) may be affected if prairie dog towns are impacted. Please be aware that black-footed ferret surveys are no longer recommended in black-tailed prairie dog towns (see our February 2, 2004, letter previously provided to your office). However, we encourage the Bureau to protect all prairie dog towns for their value to the prairie ecosystem and the many species that rely on them. We further encourage you to analyze potentially disturbed prairie dog towns for their value to future black-footed ferret reintroduction.

If white-tailed prairie dog towns or complexes greater than 200 acres will be disturbed, surveys for ferrets may be recommended in order to determine if the action will result in an adverse effect to the species. Surveys are recommended even if only a portion of the white-tailed prairie dog town or complex, as identified in our enclosed letter, will be disturbed. According to the *Black-Footed Ferret Survey Guidelines* (USFWS 1989), a prairie dog complex consists of two or more neighboring prairie dog towns less than 7 km (4.3 miles) from each other. If a field check indicates that prairie dog towns may be affected, you should contact this office for guidance on ferret surveys.

Canada lynx: Canada lynx (*Lynx canadensis*) and their primary prey, snowshoe hare (*Lepus americanus*), are strongly associated with boreal forest comprised of conifer species, in particular, spruce and fir types. Within critical habitat, four primary constituent elements necessary for the conservation of lynx have been identified. These include: (1) presence of snowshoe hares and their preferred habitat conditions, including dense understories of young trees or shrubs tall enough to protrude above the snow; (2) winter snow conditions that are generally deep and fluffy for extended periods of time; (3) sites for denning having abundant, coarse, woody debris, such as downed trees and root wads; and (4) matrix habitat (other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition such that lynx are likely to travel through such habitat unimpeded.

Canada lynx were listed on March 24, 2000 (65 FR 16052) in the contiguous United States as threatened. Concentrations of lynx observations occur in western Wyoming in the Wyoming and Salt River ranges and continue north through the Tetons and Absaroka ranges in and around Yellowstone National Park. Numerous records have also come from the west slope of the Wind River Range, with fewer observations in the Bighorn and Uinta mountains (Reeve *et al*. 1986). To most benefit lynx, habitats should retain an overstory for concealment and forested connectivity between feeding, security, and denning habitats. We recommend that you adequately assess the potential effects of this proposal to lynx and snowshoe hare in order to ensure the project does not result in loss of valuable lynx habitat.

Proposed revised Canada lynx critical habitat: On February 28, 2008, the Service published a Proposed Rule (73 FR 10860) to revise the designated critical habitat for the contiguous United States distinct population segment of the Canada lynx. Critical habitat receives protection under section 7 of the Act through the prohibition against Federal agencies carrying out, funding, or authorizing activities that result in the destruction or adverse modification of critical habitat. Section 7 of the Act requires consultation on Federal actions that may affect critical habitat. Section 7(a)(4) of the Act requires Federal agencies to confer with us on any action that is likely to result in destruction or adverse modification of proposed critical habitat.

The proposed revised critical habitat occurs in areas that are considered to be occupied by lynx and currently contain the physical and biological features essential to the conservation of lynx. In Wyoming, which is part of Unit 5 – Greater Yellowstone Area, critical habitat for lynx has been proposed for portions Fremont, Lincoln, Park, Sublette, and Teton Counties, including parts of Yellowstone National Park and Bridger-Teton and Shoshone National Forests, and small areas of Bureau of Land Management and private lands.

Maps of the proposed revised critical habitat and more detailed location information are available at http://mountain-prairie.fws.gov/species/mammals/lynx/.

Gray wolf: The Service had removed the Northern Rocky Mountain Distinct Population Segment of the gray wolf (*Canis lupus*) from the list of threatened and endangered species under the Act (73 FR 10514). On July 18, 2008, a Federal District Court issued a preliminary injunction that immediately reinstated the Act's protections for wolves in the northern Rocky Mountains. In September 2008, the Service requested the court vacate and remand the final delisting rule back to the Service. The court granted the Service's request on October 13, 2008. The Service recently reopened the public comment period on its proposal to delist the gray wolf in the northern Rocky Mountains and intends to make a new final listing determination. At this time, the Act's provisions currently in effect are the same ones in effect before wolves were delisted on March 28, 2008. All wolves within Wyoming are now considered part of the nonessential, experimental population. Although wolves in Wyoming currently remain listed and protected under the Act, additional flexibility is provided for their management under the provisions of the special regulations promulgated for the nonessential experimental population on January 6, 2005 (70 FR 1286) and January 28, 2008 (73 FR 4720).

Requirements for interagency consultation under section 7 of the Act differ based on the land ownership and/or management responsibility where the animals occur. Except on National Park Service or National Wildlife Refuge lands, wolves in Wyoming are treated as proposed for listing rather than listed. Two provisions of section 7 apply to Federal actions outside National Parks or National Wildlife Refuges: (1) section 7 (a)(1), which states all Federal agencies shall utilize their authorities to carry out programs for the conservation of listed species; and, (2) section 7 (a)(4), which requires Federal agencies to confer with the Service on actions that are likely to jeopardize the continued existence of the species. On National Park Service or National Wildlife Refuge lands wolves in the nonessential experimental population are treated as threatened species for the purposes of section 7. Wolves are dependant on movements of big game populations and may occur in large ungulate migration, wintering, or parturition areas. During project activities wolves may change their use of the project areas based upon changes to big game population numbers and changes in movement of herds. Project planning should consider impacts to big game populations, including wintering grounds and migration corridors.

Ute ladies'-tresses: Ute ladies'-tresses (*Spiranthes diluvialis*) is a perennial, terrestrial orchid, 8 to 20 inches tall, with white or ivory flowers clustered into a spike arrangement at the top of the stem. *S. diluvialis* typically blooms from late July through August; however, depending on location and climatic conditions, it may bloom in early July or still be in flower as late as early October. *S. diluvialis* is endemic to moist soils near wetland meadows, springs, lakes, and perennial streams where it colonizes early successional point bars or sandy edges. The elevation range of known occurrences is 4,200 to 7,000 feet (although no known populations in Wyoming occur above 5,500 feet) in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows. Soils where *S. diluvialis* have been found typically range from fine

Section 7 Consultation Letters

silt/sand, to gravels and cobbles, as well as to highly organic and peaty soil types. *S. diluvialis* is not found in heavy or tight clay soils or in extremely saline or alkaline soils. *S. diluvialis* seems intolerant of shade and small scattered groups are found primarily in areas where vegetation is relatively open. Surveys should be conducted by knowledgeable botanists trained in conducting rare plant surveys. *S. diluvialis* is difficult to survey for primarily due to its unpredictability of emergence of flowering parts and subsequent rapid desiccation of specimens. The Service does not maintain a list of "qualified" surveyors but can refer those wishing to become familiar with the orchid to experts who can provide training or services.

Species of Concern

Greater Sage-grouse: The Service is currently conducting a review to determine if the greater sage-grouse (*Centrocercus urophasianus*) warrants listing. Greater sage-grouse are dependent on sagebrush habitats year-round**.** Habitat loss and degradation, as well as loss of population connectivity have been identified as important factors contributing to the decline of greater sage-grouse populations rangewide (Braun 1998, Wisdom *et al.* 2002). Therefore, any activities that result in loss or degradation of sagebrush habitats that are important to this species should be closely evaluated for their impacts to sage-grouse. If important breeding habitat (leks, nesting, or brood rearing habitat) is present in the project area, the Service recommends no project-related disturbance March 1 through June 30, annually. Minimization of disturbance during lek activity, nesting, and brood rearing is critical to sage-grouse persistence within these areas. Likewise, if important winter habitats are present (Doherty *et al.* 2008), we recommend no project-related disturbance November 15 through March 14, annually.

We recommend you contact the Wyoming Game and Fish Department to identify important greater sage-grouse habitats within the project area, and appropriate mitigative measures to minimize potential impacts from the proposed project. The Service recommends surveys and mapping of important greater sage-grouse habitats where local information is not available. The results of these surveys should be used in project planning, to minimize potential impacts to this species. No project activities that may exacerbate habitat loss or degradation should be permitted in important habitats. Additionally, unless site-specific information is available, greater sage-grouse habitat should be managed following the guidelines by Connelly *et al.* 2000 (also known as the Western Association of Fish and Wildlife Agencies [WAFWA] guidelines).

In Wyoming, information suggests that greater sage-grouse populations are negatively affected by energy development activities, especially those that degrade important sagebrush habitat, even when mitigative measures are implemented (Braun 1998, Lyon 2000, Naugle *et al.* 2006). Greater sage-grouse populations can repopulate areas developed for resource extraction after habitat reclamation for the species (Braun 1987). However, there is no evidence that populations attain their previous levels and reestablishment of sage-grouse in a reclaimed area may take 20 to 30 years, or longer (Braun 1998). Therefore, this project should be carefully evaluated for long-term and cumulative effects on the greater sage-grouse, since reclamation may not restore populations to pre-activity levels. The Bureau should ensure this activity does not exacerbate greater sage-grouse declines on either a local or range-wide level.

Migratory Birds

In addition to requirements to consult on projects affecting threatened and endangered species, agencies also have obligations to protect migratory bird species, including eagles and other raptors, protected under the MBTA and BGEPA. Of particular focus are the species identified in the Service's *Birds of Conservation Concern 2002*. In accordance with the Fish and Wildlife

Coordination Act (16 USC 2912 (a)(3)), this report identifies "species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing" under the Act. This report is intended to stimulate coordinated and proactive conservation actions among Federal, State, and private partners and is available at http://www.fws.gov/migratorybirds/reports/bcc2002.pdf.

The MBTA, enacted in 1918, prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations and does not require intent to be proven. Section 703 of the MBTA states, "Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means or in any manner, to ... take, capture, kill, attempt to take, capture, or kill, or possess ... any migratory bird, any part, nest, or eggs of any such bird..." The BGEPA, prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing.

In order to promote the conservation of migratory bird populations and their habitats, the Service recommends that the Bureau implement those strategies outlined within the Memorandum of Understanding directed by the President of the U.S. under the Executive Order 13186, where possible. Work that could lead to the take of a migratory bird or eagle, their young, eggs, or nests (for example, if you are going to erect new roads, or power lines in the vicinity of a nest), should be coordinated with our office before any actions are taken.

Wetlands

The functions and values of wetlands are well documented and are especially important in the arid west. Substantial degradation diminishes the effectiveness of wetlands to function as food, cover, and breeding sites for wetland dependent species; sediment transport systems; water retention/storage sites; contaminant sinks; and chemical exchange sites. To ensure the Service has sufficient information to assess project impacts on wetlands, assessments should include:

1. An enumeration of the acreage of wetlands, by type, impacted by the proposed action.
2. A discussion of why wetlands cannot be avoided.
3. A description of the functions and values of the wetlands, including sediment transport, water storage, habitat for aquatic and terrestrial organisms, and contaminant sinks, as well as the potential risks of water removal for these functions and values.
4. Measures that will reduce or eliminate adverse impacts to wetlands such as a mitigation plan to offset unavoidable impacts, protective buffers, seasonal and physical restrictions, maintenance of the natural hydrograph, and development and implementation of a monitoring program to track the effectiveness of mitigation measures.
5. Results of wetland monitoring or management activities in, or adjacent to, the proposed project site.
6. The anticipated short and long term effects to wetland and riparian areas during and after project completion.

We recommend addressing each of the above concerns where applicable to the project. We appreciate your efforts to ensure the conservation of Wyoming's natural resources. If you have questions regarding this letter or resources described above, please contact Alex Schubert of my office at the letterhead address or phone (307) 772-2374, extension 238.

Section 7 Consultation Letters

cc: WGFD, Statewide Habitat Protection Coordinator, Cheyenne, WY (V. Stelter)
WGFD, Non-Game Coordinator, Lander, WY (B. Oakleaf)

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Example: Tribal Consultation Initiation Letters

BLM-0062

In Reply Refer To
(020)
(010)
1610
BB RMP

October 10, 2008

Mr. Richard Brannan, Chairman
Arapaho Business Council
PO Box 396
Fort Washakie, WY 82514

Mr. Brannan:

The Cody and Worland Field Offices are beginning a revision of their land use plans. The Cody, Grass Creek, and Washakie Resource Management Plans (RMP) currently serve as our general direction for all resource and land use management decisions for the BLM-administered public lands and resources in our administrative area. The new plan will guide the use, protection, and management of natural and cultural resources on the public lands in Big Horn, Hot Springs, Park and Washakie counties in Wyoming.

In an effort to keep you informed of the status of our planning effort, we are again contacting tribes who have previously expressed cultural concerns relating to the planning area, or whose traditional lands coincide with the planning area. To date, consultation on the RMP revision process with your tribe has included correspondence, telephone contacts, and meetings when requested.

We greatly appreciate the coordination we have accomplished with you in the past and would like to continue our relationship. BLM recently modified its policy on working with tribal governments during land use plan revisions. This new policy affords you the opportunity to provide further input into this process. We previously invited you to become a cooperating agency. Cooperating agency status is available to government entities with jurisdiction by law or special expertise. A cooperating agency provides staff to the BLM planning team to develop analysis for which they have particular expertise. The cooperating agency must develop a Memorandum of Understanding with the federal agency and must fund its own participation. Please note that the tribe's participation as a cooperating agency does not satisfy the BLM's obligation to consult on a government-to-government basis. Therefore, regardless of your tribe's decision to participate or not as a cooperating agency, our government-to-government consultation will continue.

BLM-0062

We expect to begin our formal scoping process for the RMP later this month. We would like to come to a Tribal Business Council Meeting and provide information about the planning area and the scope of our anticipated effort for the RMP. We are requesting your comments regarding any interests or concerns your Tribe might have with our agencies management of the Planning Area. Please assist us in identifying any places of traditional religious or cultural importance to your Tribe within the Planning Area, or needs for access to such places. Also are there any traditional cultural leaders or religious practioners who should be contacted?

We value your knowledge, concerns, and perspectives relating to the planning area. If you would like further information regarding cooperating agency status, please contact Caleb Hiner, Project Manager, at 307-347-5171. With regard to cultural heritage issues, you may wish to contact Michael T. Bies, Archaeologist, at 307-347-5154 or Kierson Crume at 307-578-5929. Thanks for your continued participation in our RMP revision process.

Sincerely,

E. Bateson

Eddie Bateson
District Manager
Wind River/Big Horn Basin District

Page 2 of 2

Example: Tribal Consultation Initiation Letters

SURNAME	
NAME	DATE
MHolly	3/28/13

In Reply Refer To:
1610 (WYR00)

March 29, 2013

CERTIFIED MAIL NUMBER 7009 2250 0000 9893 1818
RETURN RECEIPT REQUESTED
Silas C. Whitman, Chairman
Nez Perce Tribal Executive Committee
P.O. Box 305
Lapwai, ID 83540

Dear Mr. Whitman:

The Cody and Worland Field Offices of the Bureau of Land Management (BLM) wish to update you on the status of the Bighorn Basin Proposed Resource Management Plan (PRMP) revision.

The BLM most recently contacted you in February, 2012, in anticipation of issuance of the Final Environmental Impact Statement (FEIS) for the Bighorn Basin RMP revision.

In response to the National Technical Team's (NTT) focus on Alternative Development and analysis of Sage-Grouse conservation measures, the BLM is entering into a Draft Supplemental Environmental Impact Statement (DSEIS) phase for Proposed Sage-Grouse Priority Habitat, Area of Critical Environmental Concern (ACEC), nominations.

The newly designed ACEC nominations are the Key Area Boundary and the Core Area (V. 3) Boundary. These nominations are based on the Wyoming Governor's Core Area and Executive Order 2011-5, the NTT conservation measures, and citizen proposed alternatives.

In an effort to keep you informed about the DSEIS, we are again contacting tribes who have expressed cultural concerns relating to the planning area, or whose traditional lands coincide with the planning area. To date, consultation on the RMP revision process with your tribe has included correspondence, telephone contacts, and meetings when requested.

The BLM prepared the PRMP/DSEIS in consultation with cooperating agencies, and Native American groups, taking into account public comments received during this planning effort. The PRMP provides a framework for the future management direction and appropriate use of the Bighorn Basin planning area, located in portions of Big Horn, Hot Springs, Park, and Washakie Counties, Wyoming. The document contains both land use planning decisions and implementation decisions to guide the BLM's management of the Bighorn Basin.

The BLM will again move to the Final EIS phase of the proposed RMP revision upon completion of the DSEIS comment period.

We value your knowledge, concerns, and perspectives relating to the planning area. If you would like further information on the planning process, please contact Holly Elliott at (307) 347-5193, email- helliott@blm.gov.

With regard to cultural heritage issues, you may wish to contact Kierson Crume, Cody Field Office Archaeologist, at (307) 578-5929 or Marit Bovee, Worland Field Office Archaeologist, at (307) 347-5114. If you or your representatives would like to visit the planning area or meet with BLM managers and specialists please let us know. Thank you for your continued participation in our RMP planning process.

Sincerely,

s/Steve Dondero

Steve Dondero
District Manager

cc: Keith "Pat" Baird, THPO
Nez Perce Tribe
P.O. Box 365
Lapwai, ID 83540

WFO:03/27/13:u:\helliott\word\NA_DSEIS_letter_4_mar_13.docx
Final:mlr:03/28/13

2.0 COOPERATING AGENCY POSITION STATEMENTS

2.1 Washakie County Conservation District

The Washakie County Conservation District shall continue to promote and encourage the motive and means for the optimum production and conservation of resources to enhance economic opportunity and the quality of life. The Washakie County Conservation District shall strive to promote a clean and healthy environment.

2.2 Wyoming Department of Agriculture

The Wyoming Department of Agriculture (WDA) offers the following statements in regard to the Bureau of Land Management (BLM) Bighorn Basin Resource Management Plan revision:

The WDA supports no net loss of Animal Unit Months (AUMs). A net loss of AUMs may negatively impact livestock producers and Wyoming agriculture. We do not support the permanent closure of any area to livestock grazing, including the Alternative B proposal to close crucial winter range for elk and bighorn sheep and key areas for greater sage-grouse, or the proposal to prohibit new domestic sheep grazing on pronghorn crucial winter range. Instead, the WDA believes that the BLM should work with livestock grazing permittees to incorporate specific livestock management plans to address conflicts. The WDA supports the Alternative D proposal to allow livestock grazing in areas closed to grazing (e.g., the Bighorn River tracts) as a tool to maintain or improve resource conditions.

The WDA supports the BLM's decision to conduct all wild horse activities to remain compliant with the Wyoming Consent Decree (August 2003), including striving to maintain Appropriate Management Levels.

The WDA also supports BLM proposals to follow current best management practices and recommendations made by the Wyoming State Brucellosis Coordination Team. This helps reduce the spread of brucellosis and maintain viable livestock operations.

These positions are a reflection of the WDA mission: dedication to the promotion and enhancement of Wyoming's agriculture, natural resources and contribution to Wyoming quality of life.

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Bighorn Basin Resource Management Plan Revision Project

Appendix F

Special Designations: Wild and Scenic Rivers and
Areas of Critical Environmental Concern

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LIST OF TABLES

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APPENDIX F

SPECIAL DESIGNATIONS

1.0 INTRODUCTION

This appendix includes a brief description of the Wild and Scenic River (WSR) and Area of Critical Environmental Concern (ACEC) designation and evaluation processes. This appendix also contains information on where to obtain the full reports that provided additional information on these processes.

2.0 WILD AND SCENIC RIVER DESIGNATION PROCESS

The Bureau of Land Management (BLM) initiated a WSR review of all BLM-administered public lands along waterways within the Worland and Cody planning areas. This review was to determine eligibility, assign a tentative classification, and screen for suitability factors, as identified in the Wild and Scenic Rivers Act (WSRA) of 1968, as amended (see Table F-1). No waterway segments were determined eligible during this review in the Grass Creek Resource Area. The review process and decisions can be reviewed in the Grass Creek Resource Management Plan (RMP) (1999). Those segments in the remainder of the Planning Area determined eligible and assessed for suitability are all recommended as suitable for inclusion in the National Wild and Scenic River System under alternatives B and E.

The BLM WSR review includes a three-step process:

1. Determining whether public lands along waterways meet the WSR eligibility criteria to be tentatively classified as wild, scenic, or recreational.
2. Determining whether any of those public lands that meet the eligibility criteria are also assessed for suitability.
3. Determining what rivers and adjacent public lands are determined suitable and recommended for designation and how they will be managed.

The WSR review was conducted separately from the RMP planning process to expedite the review process, resulting in a stand-alone WSR review report. The BLM will use this land use planning process to gather additional data, in the form of public comments and the impact analysis contained in Chapter 4 of this Proposed RMP and Final Environmental Impact Statement (EIS), to support eligibility and suitability findings. This WSR suitability assessment may be modified as a result of public comments. Following the review and response to any public comments on the Draft RMP and Draft EIS that address WSR recommendations presented in this document, the BLM will release the map and Record of Decision that contain the agency's WSR findings.

The Worland and Cody *Wild and Scenic River* reports may be viewed online at:
http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn/docs/wsr.html

Table F-1. Characteristics for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area

Name	Length of Segment on BLM-administered Lands (miles)[2]	Outstandingly Remarkable Values	Tentative Classification	Suitability Screening from BLM WSR Review	Justification for Determination of Not Suitable[3, 4]
Cody Field Office					
Clarks Fork of the Yellowstone (2 segments)[1]	8.51	Cultural; Fish; Geologic; Historic; Other Values (whitewater); Recreational; Scenic; Wildlife	Scenic	Suitable (4.79 miles) Not Suitable (3.72 miles)	Segment 2: Majority private surface land and mineral estate Segment 3: Waterway segments met suitability factors
Cottonwood Creek[1]	4.05	Geologic; Historic; Other Values (endemic/rare vegetation, aspen stands, riparian); Scenic; Wildlife	Scenic	Suitable	Waterway segment met suitability factors
Cow Creek (2 segments)[1]	1.92	Cultural; Geologic; Historic; Other Values (aspen stands, riparian, endemic/ rare vegetation); Scenic; Wildlife	Wild	Suitable	Waterway segments met suitability factors
Deer Creek	1.46	Cultural; Fish; Recreational; Scenic	Scenic	Suitable	Waterway segment met suitability factors
Meeteetse Creek[1]	2.78	Geologic; Historic; Other Values (riparian, alpine vegetation, volcanic-specialized vegetation); Wildlife	Wild	Not Suitable	Private mineral estate
North Fork Shoshone River[1]	0.85	Cultural; Fish; Geologic; Historic; Recreational; Scenic; Wildlife	Recreational	Not Suitable	Majority private surface land and mineral estate
Oasis Spring Creek	2.07	Cultural; Fish; Recreational; Scenic	Wild	Suitable	Waterway segment met suitability factors[5]
Pat O'Hara Creek[1]	2.17	Cultural; Historic	Scenic	Not Suitable	Effective current management
Porcupine Creek	10.8	Cultural; Fish; Other Values (riparian); Recreational; Scenic	Wild/Scenic	Suitable	Waterway segment met suitability factors
South Fork Shoshone River[1]	1.99	Cultural; Fish; Geologic; Historic; Recreational; Scenic; Wildlife	Recreational	Not Suitable	Majority private surface land and mineral estate
Trout Creek	0.96	Cultural; Fish; Other Values (riparian); Recreational; Scenic	Wild	Suitable	Waterway segment met suitability factors
Worland Field Office					
Canyon Creek	1.30	Cultural	Scenic	Not Suitable	Land ownership conflicts; manageability
Deep Creek	5.20	Fish; Recreational; Scenic	Wild	Suitable	Waterway segment met suitability factors

Table F-1. Characteristics for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Length of Segment on BLM-administered Lands (miles)[2]	Outstandingly Remarkable Values	Tentative Classification	Suitability Determination	Justification for Determination of Not Suitable[3, 4]
Dry Medicine Lodge Creek	10.59	Cultural; Geologic; Other Values (caving, aquifer recharge); Recreational; Scenic	Scenic	Suitable	Waterway segment met suitability factors
Kirby Creek (3 segments)	0.10	Historic	Recreational	Not Suitable	Majority private surface land and mineral estate
Medicine Lodge Creek	5.70	Cultural; Geologic; Other Values (sinking streams, aquifer recharge); Recreational; Scenic	Wild	Suitable	Waterway segment met suitability factors
Laddie Creek (2 segments, part of Paint Rock Creek unit)	1.37	Cultural	Recreational	Suitable (0.63 miles) Not Suitable (0.74 miles)	Segment 1: Land ownership conflicts and manageability Segment 2: Waterway segments met suitability factors
Paint Rock Creek (2 segments, part of Paint Rock Creek unit)	7.02	Cultural; Recreational; Scenic	Recreational	Suitable	Waterway segment met suitability factors
Paint Rock Creek, South Fork (2 segments, part of Paint Rock Creek unit)	3.46	Cultural; Fish	Recreational	Suitable	Waterway segment met suitability factors
Powder River (Middle Fork)	2.53	Recreational	Recreational	Suitable	Waterway segment met suitability factors
Trapper Creek	10.91	Cultural; Geologic; Other Values (caving area); Recreational; Scenic	Wild	Suitable	Waterway segment met suitability factors
White Creek (4 segments)	6.98	Cultural; Scenic	Wild	Suitable (5.70 miles) Not suitable (1.28 miles)	Segments 1-3: Land ownership conflicts; manageability Segment 4: Waterway segment met suitability factors

Sources: BLM 2002; BLM 2003; BLM 2009a; BLM 2009b

[1]Waterway Segment Revaluated as part the 2009 Cody Field Office Wild and Scenic River Addendum Report.
[2]Approximate length based on available geographic information system data; segment lengths have been rounded to the nearest hundredth of a mile.
[3]To provide for a range of alternatives, all Wild and Scenic River eligible segments are recommended as suitable under alternatives B and E, and none of the Wild and Scenic River eligible segments are recommended as suitable under Alternative C.
[4]Detailed explanations of how suitable waterways met each of the suitability factors appears in the Worland and Cody Field Office Wild and Scenic River Reports, available on the project website.
[5]The 2003 Wild and Scenic Rivers Review Report found Oasis Spring Creek eligible, tentatively classified as Wild, and suitable for inclusion. However, the 2009 Wild and Scenic Rivers Review Addendum Report found Oasis Spring Creek not eligible because the waterway is identified as ephemeral, which also means that Oasis Spring Creek does not have a tentative classification, and is not suitable. The BLM decided to keep Oasis Spring Creek in the RMP for analysis and alternatives.

BLM Bureau of Land Management
WSR Wild and Scenic River

In following the WSR process, the BLM used the Bighorn Basin Resource RMP Revision as the vehicle to identify the suitability of each of the eligible waterway corridors. Each element of the revision process, including but not limited to scoping, RMP tours, workshops, cooperator meetings, and public comments, was used to for determining suitability. As identified earlier as the third process, the BLM determined that none of the eligible waterway corridors are suitable for inclusion into the National Wild and Scenic Rivers System. Refer to Table F-2 for suitability determination for each of the waterway corridors.

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
Cody Field Office		
Clarks Fork of the Yellowstone (Segment 1)	No	Factor 1: Scenic and recreation quality are outstanding. However, the amount of private land interspersed with BLM may make it difficult to maintain ORV's. Factor 2: BLM-administered mineral/surface estate interspersed with private land. Not suitable due to the preponderance of private land, dominating this portion of the waterway. Factors 2, 4, 5, 7, 9: Difficult to administer, due to the preponderance of private land interspersed with smaller segments of river on public land. Factors 3, 7, 8, 9, 11: Local interest would include those Valid Existing Rights to allow for irrigation water out of the Clarks Fork of the Yellowstone River. Those rights would be honored. Factors 3, 9: Irrigation uses off the Clarks Fork. Factors 3, 13: In 1993, during the first inventory, there was interest by the state to develop these waters into a dam/reservoir. Recent conversations with the governor's office reflected a change in that interest. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Clarks Fork of the Yellowstone River, Segment 1 as suitable for inclusion into the NWSRS.
Clarks Fork of the Yellowstone (Segment 2)	No	Factor 1: Includes outstanding scenic and recreation values. Factor 2: The majority of land along this waterway is privately owned. The BLM does not control actions on private property, so this preponderance of private ownership would make the maintenance of the identified ORVs difficult. Factor 3: State of Wyoming expressed interest in developing this waterway through the construction of a dam and reservoir. However, recent communication with the Governor's Office indicates that the state may no longer be considering this option; Valid existing water rights would be allowed to continue for the remainder of the permit term, and could potentially be renewed after the term ends. However, new irrigation rights-of-way would only be granted if they were designed to limit effects on the identified ORVs that make this waterway eligible. Factors 3, 8, 9, 10, 11, 13: Local interest in the potential designation of the Clarks Fork of the Yellowstone River includes concerns related to the withdrawal of irrigation water from the river. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Clarks Fork of the Yellowstone River, Segment 2 as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
Clarks Fork of the Yellowstone (Segment 2)	No	Factor 1: Outstanding area. Scenery, water sports, fisheries, geology, history, and recreation. Factor 2: BLM administers both surface and mineral estate. Factors 3, 7, 8, 11: Some water rights may include using this area for irrigation (pumping water out of the river). These are Valid Existing Rights and should not be affected. Factors 3, 8, 11, 13: Powersite Reservation 26 and Powersite Classification 201 currently apply to this portion of the Clarks Fork of the Yellowstone River. The suitable determination for Segment 3 is based on a revocation of this power site withdrawal. The decision to revoke this withdrawal would be made by the Federal Energy Regulatory Commission; Several ditches take water out with head-gates, one head-gate pumps water out of the river. Public Water reserve in segments. Factors 3, 13: In 1993, during the first inventory, there was interest by the state to develop these waters into a dam/reservoir. Recent conversations with the governor's office reflected a change in that interest. Factor 6: With the abutment of this segment of the river with the designated WSR on USFS, the BLM will be consistent with surrounding management and retention of those values that make this area suitable. Factors 8, 11: The RMP revision's preferred alternative manage this area under a CSU (historic trails) and NSO (Recreation), which will aid in protecting the identified ORVs within the waterway corridor. These underlying prescriptions negate the need to recommend this waterway corridor for inclusion into the National Wild and Scenic Rivers System. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Clarks Fork of the Yellowstone, Segment 3 as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Cottonwood Creek	No	Factor 1: Class A scenic area. Dramatic rise of canyon walls, good trail management for horseback rides and non-motorized vehicles. Factors 2, 4: BLM administers both surface and mineral estate and the water rights. Factor 3: Historically, this canyon water was diverted for irrigation 50-80 years ago, ending at Pete's Cabin. Factors 8, 11: The river corridor is within the Little Mountain ACEC and the Craig Thomas Special Management Area, which management prescriptions (such as administratively unavailable for oil and gas leasing, ROW avoidance, renewable exclusion area) in the BLM's preferred alternatives will benefit the identified ORVs within Cottonwood Creek. Factor 10: Public interest in this canyon has been supportive of this area receiving some special management. Cooperators, and local, state, and other affected federal agencies did not see the need to designate Cow Creek as suitable for inclusion into the NWSRS.
Cow Creek (Segment 1)	No	Factors 1, 12: This area is similar to other canyons in Little Mountain area - but it ties to Porcupine Creek which was already recommended as eligible and suitable in the 1993 inventory. This area will continue to be remote and inaccessible - very difficult to get to unless hiking. Factors 2, 4: BLM administers both estates (surface/mineral). Factors 2, 4, 11: BLM is currently managing the area and it is staying in character. Factors 8, 11: The river corridor is within the Little Mountain ACEC and the Craig Thomas Special Management Area, which management prescriptions (such as administratively unavailable for oil and gas leasing, ROW avoidance, renewable exclusion area) in the

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
		BLM's preferred alternatives will benefit the identified ORVs within Cow Creek. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Cow Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Cow Creek – Segment 2	No	Factor 1: Historic Area, Geological features. Factor 2: BLM-administered surface and minerals. Factor 3: Continued grazing and recreation opportunities. Factors 8, 11: The river corridor is within the Little Mountain ACEC and the Craig Thomas Special Management Area, which management prescriptions (such as administratively unavailable for oil and gas leasing, ROW avoidance, renewable exclusion area) in the BLM's preferred alternatives will benefit the identified ORVs within Cow Creek (Segment 2). Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Cow Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Deer Creek, Porcupine Creek, and Trout Creek River Corridors	No	Factors 1, 12: As determined during the ORV analysis for Porcupine Creek and its eligible tributaries, the scenic and recreational value of this river is very unique, particularly when compared to other rivers of this type in the region. The addition of the Porcupine Creek and its tributaries into the WSR system would provide a creditable addition. The scenic qualities are extremely unique when viewed from a regional perspective, since few canyons in the region have walls as high or as vertical, and remain in such an undisturbed pristine condition. Factor 2: With the exception of two small tracts of private land on Porcupine Creek encompassing a total of 0.5 miles, the remainder of Porcupine Creek and its eligible tributaries are public land administered by the BLM. This includes 9.7 miles on Porcupine Creek, 1.3 miles on Deer Creek, 2.4 miles on Oasis Spring Creek and 0.9 miles on Trout Creek, for a total of 14.3 miles. This abundance of public lands presents minimal land ownership conflict and would ensure effective manageability if the river is designated as a WSR. Factors 2, 6: As previously indicated, the majority of the analyzed portion of Porcupine Creek and its tributaries is public land. Acquisition of the existing 0.5 miles of private property is not deemed necessary to effectively manage the area as a WSR. Because of this large degree of public land, and no need to acquire the property to administer the river, estimates have not been prepared indicating the cost of federal acquisition of the involved private property. Factors 3, 5, 7: The United States Department of Interior, Bureau of Mines, indicates the areas adjacent to Porcupine Creek and its associated tributaries have occurrences of numerous mineral resources, and further indicate depending on the configuration of any associated withdrawal, may impact mineral development. The United States Department of Interior, Bureau of Indian Affairs, indicates they want to ensure continued involvement of the Bureau of Indian Affairs and the Crow Tribe during any analysis of this section of river for Wild and Scenic values. Correspondence has also been received from the Wyoming Water Development Commission opposing the designation of this river as a WSR, since it would mean more federal control of water resources. Factors 3, 7, 11: No known conflicts have been identified on the section of river under analysis in this document. Potential conflicts may exist upstream on lands administered by the USFS, or downstream on Crow Tribal Lands. The Bureau of Indian Affairs, representing the Crow Tribe, has indicated concern with potential conflict with Crow Tribal Lands in Montana as a result of this analysis. There are no known potential

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
		conflicts which would result from inclusion of Porcupine Creek and its associated tributaries in the WSR system. There are also no known projects or proposals which would be foreclosed or diminished if the area were not protected under the WSR system. Of course, the designation would provide congressional protection to the area. Factors 3, 8, 11: The river corridors are within the Little Mountain ACEC and the Craig Thomas Special Management Area, which management prescriptions (such as administratively unavailable for oil and gas leasing, ROW avoidance, renewable exclusion area) in the BLM's preferred alternatives will benefit the identified ORVs within these river corridors. Factors 3, 8, 12, 13: There are no known historical or existing rights which would be adversely affected by designation of Porcupine Creek or its associated tributaries. There is existing livestock trailing and a primitive access road occurring in the scenic section of the river, and it is not anticipated that the designation would adversely impact either of these ongoing uses. Infringement of other potential future land uses in the corridor; i.e., grazing privileges, mining claims, and rights-of-way, may occur to some degree. Wild and scenic characteristics now present in the river corridor would be protected from alteration resulting from future land uses and development. Factors 3, 9, 13: The WGFD has voiced concerns about maintaining the ability to do riparian habitat management adjacent to the river, but has not indicated opposition or support for designation. Factors 4, 7, 9: Porcupine Creek and its associated tributaries, if designated a WSR could be effectively managed by the BLM. If ongoing studies would determine portions of the creek administered by the USFS, are also suitable, the entire river could be effectively managed by either agency or jointly by both. Factor 5: There is no known interest, by any entity, in sharing the cost of administering the river as a WSR. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Porcupine Creek, Deer Creek, Trout Creek, or any waterway corridor as suitable for inclusion into the NWSRS, or to manage any river corridors to maintain or enhance the identified ORVs. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Meeteetse Creek	No	Factor 1: Scenic, geologic, wildlife, historic values in waterway corridor. Currently, there is no legal vehicular access. However, Carter Mountain and the Meeteetse Creek drainage are accessible via hiking from USFS. Factor 2: BLM-administered surface; private mineral estate. Factors 2, 4, 7, 11: The mineral estate along Meeteetse Creek is privately owned, and this ownership pattern is the primary reason a suitability determination was not supported for this waterway. While the BLM could impose certain conditions of approval for minerals development in this area, the preservation of the identified ORVs would be difficult if such development occurred. Factors 2, 7, 8: Segments 1 & 2 are divided by a parcel of Wyoming State Land. Factors 3, 7, 8, 11: Continued use for grazing, recreation, and wildlife. In the Carter Mountain ACEC. Hunt Oil could develop their mineral interest, but the BLM would have administrative control on surface conditions of approval. Factor 8: Agency can manage these resources with other than WSR designation. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Meeteetse Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
North Fork Shoshone River		Factor 1: Scenic, recreation and geology. Yellowstone National Park corridor leading to the East Gate of the park. Factors 1, 2, 7, 8, 9, 10: In the areas where the river crosses BLM-administered surface, the agency manages both the surface and the mineral estate. Public lands along this waterway provide important river access points and habitat for animals such as grizzly bears. However, the majority of land along this waterway is privately owned. The BLM does not control actions on private property, so this preponderance of private ownership would make the maintenance of the identified ORVs difficult. Factor 2: The BLM administers both surface and mineral estate. However, with the preponderance of private land interspersed along the river corridor, ORV's may be hard to maintain in the present state. Factor 3: No reasonably foreseeable potential uses known beyond current multiple uses. Factors 5, 6, 8, 9: Management of WSR in this area would be onerous due to the amount of private land and traffic. Factor 10: Heavy recreation area along the highway to Yellowstone National Park. Cooperators, and local, state, and other affected federal agencies did not see the need to designate North Fork Shoshone River as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Oasis Spring Creek	No	Factor 1: The 2003 WSR eligibility analysis originally found Oasis Spring Creek as eligible. The 2009 Cody Field Office Addendum found that Oasis Spring Creek is not eligible because it is ephemeral, not intermittent. Factors 8, 11: The river corridor is within the Little Mountain ACEC, which management prescriptions (such as administratively unavailable for oil and gas leasing, ROW avoidance, renewable exclusion area). These underlying management prescriptions will benefit the identified ORVs within the river corridor. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate the upstream portions of White Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Pat O'Hara Creek		Factor 2: BLM-administered (surface/mineral) with private interspersed. Factor 3: Active grazing leases. Factors 8, 11: The BLM is successfully managing the identified ORVs using existing cultural resource laws. The protection these laws afford the cultural and historic sites associated with this waterway is sufficient, making inclusion in the NWSRS unnecessary. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Pat O'Hara Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
South Fork Shoshone River		Factor 1: Very beautiful scenery and heavily used by recreationists and homeowners in the area. Factor 2: In the areas where the river crosses BLM-administered surface, the agency manages both the surface and the mineral estate. However, the majority of land along this waterway is privately owned. The BLM does not control actions on private property, so this preponderance of private ownership would make the maintenance of the identified ORVs difficult. Factor 3: Continued urban interface with BLM land interspersed with private. A large number of private residences and vacation homes have been built on private land along this waterway in recent years. Designation as part of the NWSRS would not stop the

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
		expansion of the wildland urban interface in this area, which would further complicate maintenance of the identified ORVs. Factors 5, 6, 8, 9: The agency would have a difficult time preserving the ORV's for this area, due to the preponderance of private land and continued growth of the area. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate South Fork Shoshone River as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Worland Field Office		
Canyon Creek	No	Factor 2: Potential management conflicts with interspersed and adjacent private lands that may compromise suitability of waterway. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Canyon Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Deep Creek	No	Factor 2: Majority of surface ownership up stream is private; Irrigation diversions and interests upstream of segment; Designated as WSR may prevent upstream water rights. Factors 3, 7, 8, 9, 13: Irrigation diversions and interests upstream of segment. Designated as WSR may prevent upstream water rights; WGFD interested in maintaining cutthroat species. Have done treatments in the past. In addition, WGFD has in-stream flow protection area within corridor. This allows WGFD to protect stream for minimum base flow requirements. Factors 8, 11: Entire waterway corridor within existing CSUs to manage for Big Game Migration Corridors, Raptors, and Rock Art Sites. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Deep Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Dry Medicine Lodge Creek	No	Factor 1: Downstream portion of Dry Medicine Lodge is intermittent, and perennial the upper half. Factors 3, 13: WGFD interested in maintaining cutthroat species, which at this location is one of few exceptional areas along the West Slope of the Bighorn of which support cutthroat trout. Factors 8, 11: Entire waterway corridor under CSU stipulations, majority from Canyons RMZ, Rock Art Sites, cutthroat trout, the remainder from big game migration corridors, Blue and Red Ribbon streams, raptor buffers, and sage-grouse. Approximately 9 miles (majority) within Spanish Point ACEC with an unavailable stipulation; 8.1 miles within the lands with wilderness characteristics. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Dry Medicine Lodge Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Kirby Creek	No	Factor 2: Land-locked by private lands and inaccessible to the public; unlikelihood of obtaining public access to the public lands via private property. Factors 2, 3, 11: Potential management conflicts with interspersed and adjacent private lands that may compromise suitability of waterway. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Kirby Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
Medicine Lodge Creek	No	Factors 3, 8, 11: Entire waterway corridor is within the Medicine Lodge WSA, and most of the waterway corridor is within the Spanish Point ACEC. Cave and Karst resources will benefit from WSR designation. ACEC and WSA are currently adequately managing resources. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Medicine Lodge Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Powder River (Middle Fork)	No	Factor 1: The identified area is too small to adequately manage as a WSR. Factors 1, 8, 11: The waterway corridor is too small to adequately manage as a WSR. The Buffalo Field Office manages the waterway downstream and proposes in the RMP revision to continue to retain the free-flowing characteristics and ORVs if Congress denies the Middle Fork Powder River WSR nomination. Entire waterway corridor within CSU stipulation for Class 1 and 2 streams; NSO stipulations within a segment of the corridor for recreation sites. Factor 2: Huge amount of private lands upstream of identified waterway corridor; Drainages in private lands upstream of corridor are scoured. Factors 3, 7, 9, 11, 13: BLM-administered lands immediately to the west of waterway is managed as a stock driveway; WGFD have implemented fish treatments, and wish to maintain fish management to sustain cutthroat species. Factor 3: Vegetation treatments such as mastication treatments will be precluded. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate the Middle Fork of the Powder River as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Paint Rock Creek Unit	No	Factors 2, 7, 11: The Bighorn USFS allows for motorized use within the valley bottom upstream of the identified waterway segment. Private lands within waterway segment. Factors 3, 7, 9, 11, 13: Historic livestock uses, and current livestock operations are observed in the Paint Rock Unit. Middle Fork Paint Rock is used to trail cattle, as well as motorized vehicles are used to support ranching activities. WGFD currently managing for cutthroat trout. Factors 3, 11, 13: South Fork Paint Rock contains pure strain of cutthroat trout which WGFD manages for. WSR designation may preclude appropriate management to maintain or enhance this resource. Factors 8, 11, 13: Management of identified ORVs will conflict with WSR criteria (cutthroat trout); CSU stipulations in place within the Middle Fork Paint Rock, Laddie Creek, and South Paint Rock from Class I and 2 streams and Canyons RMZ; Upper watershed in South Paint Rock under CSU from cutthroat trout stipulations; Major portion of Paint Rock under CSU stipulation from rocks art sites. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate the Paint Rock Creek Unit as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Paint Rock Creek Unit (upstream portion of Laddie Creek)	No	Factor 2: Land-locked by private lands and inaccessible to the public; unlikelihood of obtaining public access to the public lands via private property. Factors 8, 11: the potential management conflicts with interspersed and adjacent private lands that may compromise suitability of waterway. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see

Table F-2. Suitability Determinations for Waterways Determined Eligible for Wild and Scenic River Designation in the Planning Area (Continued)

Name	Suitable	Suitability Factors (refer to BLM Manual 6400)
		the need to designate this unit as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
Trapper Creek	No	Factor 1: Great X (significant cave resource) is located upstream of Trapper Creek segment, and exits within the WSA. Factors 1, 3, 12, 13: In-stream flow in Trapper Creek. Factor 2: Large amount of private surface ownership up stream. Factors 8, 11: Entire waterway segment is within the Trapper Creek WSA. This waterway segment will be suitable if Congress decides to release the WSA to multiple use. Upper reaches of corridor under an unavailable stipulation from Spanish Point ACEC. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate Trapper Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation. Factor 11: Currently managed under WSA objectives. WSR designation will create redundant management designations.
White Creek	No	Factors 2, 3, 7, 11, 13: Majority of surface ownership up stream is private. Diversion located at mouth of the Canyon; Two-track located within proximity to the upstream boundary used for livestock use and other operations. Designation of WSR will preclude use on the two-track; Proposed vegetation treatment project within proximity to the corridor located on top of the rims. Factor 3: Livestock use surrounding waterway, but managing livestock use within the waterway corridor will not be an issue. Factor 8, 11: NSO found in tiny portion in lower reaches from riparian areas, CSU on entire corridor from Canyon RMZ, as well as raptors, big game corridors, and wetland/riparian buffers. Factor10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate White Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.
White Creek (upstream portions)	No	Factor 2: Land-locked by private lands and inaccessible to the public; unlikelihood of obtaining public access to the public lands via private property. Factors 3, 8, 11: Potential management conflicts with interspersed and adjacent private lands that may compromise suitability of waterway. Factor 10: Cooperators, and local, state, and other affected federal agencies did not see the need to designate the upstream portions of White Creek as suitable for inclusion into the NWSRS. In addition, there were no comments during the Land Use Plan that supported the WSR designation.

Sources: BLM 2002; BLM 2003; BLM 2009a; BLM 2009b

ACEC	Areas of Critical Environmental Concern	RMZ	Recreation Management Zone
BLM	Bureau of Land Management	ROW	Rights-of-Way
CSU	Controlled Surface Use	USFS	United States Forest Service
NSO	No Surface Occupancy	WGFD	Wyoming Game and Fish Department
NWSRS	National Wild and Scenic River System	WSA	Wilderness Study Area
ORV	Outstandingly Remarkable Value	WSR	Wild and Scenic River

3.0 ACEC NOMINATION PROCESS

Part of the planning process for the Bighorn Basin RMP Revision Project included a review of BLM-administered lands to determine whether they met the criteria for designation as ACECs. The ACEC designation is an administrative designation used by the BLM that is accomplished through the land use planning process. It is unique to the BLM in that no other agency uses this form of designation. The Federal Land Policy and Management Act (FLPMA), states that the BLM will give priority to the designation and protection of ACECs in the development and revision of land use plans.

ACECs are composed of only BLM-administered lands, and private lands and lands administered by other agencies are not included in the boundaries of ACECs. Unlike other special designations, such as wilderness study areas (WSAs), the designation of an area as an ACEC does not by itself automatically prohibit or restrict other uses in the area (with the exception that a mining plan of operation is required for any proposed mining activity within a designated ACEC). However, to be considered for designation, special management beyond the standard provisions established by the RMP must be required to protect the BLM-administered public lands that meet the important and relevant criteria (described below).

Several steps are required to identify and evaluate ACECs. These steps include (1) the nomination of areas by the public during scoping or by BLM resource specialists, (2) evaluation of the nominated areas to determine if they meet the importance and relevance criteria described below, and (3) consideration of the potential ACECs as management scenarios analyzed in the RMP and EIS. As part of this evaluation, the BLM also considers whether the existing ACEC designations should be modified or terminated. The Draft RMP and Draft EIS contained recommendations proposing potential ACECs for designation. Following the closure of the comment period on the Draft RMP and Draft EIS, the BLM published a Notice of Intent (NOI) to begin preparation of EISs and Supplemental EISs to Incorporate Greater Sage-grouse Conservation Measures into Land Use Plans and Land Management Plans (76 FR 77008, December 9, 2011) in accordance with the BLM National Greater Sage-grouse Planning Strategy Charter released in August 2011 (BLM 2011). Nominations for greater sage-grouse-related ACECs were submitted by members of the public in response to the NOI. The Supplement to the Draft RMP and Draft EIS contains recommendations proposing Greater Sage-Grouse Key Habitat Area and Priority Habitat Management Area ACECs for designation and public comment.

Public comments on the Draft RMP and Draft EIS as well as the Supplement to that document were reviewed and adjustments were made as necessary before the release of this Proposed RMP and Final EIS. Designation of ACECs will be incorporated into the Record of Decision (ROD) approving the RMP.

Regulations at 43 Code of Federal Regulations (CFR) part § 1610.7-2 state that during the resource management planning process, inventory data should be analyzed to determine whether there are areas within the Planning Area containing resources, values, systems or processes or hazards eligible for further consideration for designation as ACECs. In order to be eligible for designation as an ACEC, an area must meet at least one of both the relevance and importance criteria described below.

3.1 Relevance

An area meets the relevance criteria if it contains one or more of the following:

1. A significant historic, cultural, or scenic value (including but not limited to rare or sensitive archeological resources and religious or cultural resources important to Native Americans).

2. A fish and wildlife resource (including but not limited to habitat for threatened, endangered, or sensitive species, or habitat essential for maintaining species diversity).
3. A natural process or system (including but not limited to threatened, endangered, or sensitive plant species; rare, endemic, or relic plants or plant communities which are terrestrial, aquatic, or riparian; or rare geological features).
4. Natural hazards (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the RMP process that it has become part of a natural process.

3.2 Importance

The values, resources, system, processes, and/or hazards that allowed the area to meet the relevance criteria must have qualities that are in need of protection or special attention in order for the area to meet the importance criteria. The area meets the importance criteria if its relevance qualities can be characterized by one or more of the following:

A. Has more than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.
B. Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.
C. Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA.
D. Has qualities that warrant highlighting in order to satisfy public or management concerns about safety and public welfare.
E. Poses a substantial threat to human life and safety or to property.

Based on comments received during scoping and internal recommendations from BLM specialists, nine existing ACECs were nominated for continued designation and five expansion areas associated with these existing ACECs were proposed, as were 14 new ACEC nominations. These 28 nominated areas were evaluated using the relevance and importance criteria described above. Twenty-two of the nominations met both the relevance and importance criteria and were analyzed in the Draft RMP and Draft EIS. Additionally, two ACECs were analyzed in the Supplement to the Draft RMP and Draft EIS.

Table F-3 lists the 28 nominations that were considered. This table lists the acreage of the proposed areas, the values of concern that warranted the nominations, the relevance and importance criteria that each area meets (numbers and letters correspond to the lists above), and whether the area was recommended for analysis in the Draft RMP and Draft EIS or the Supplement to the Draft RMP and Draft EIS.

Additional information relevant to ACECs in the Planning Area, including the original completed ACEC Evaluation Forms and detailed maps of the existing or proposed ACECs, can be viewed in the *Areas of Critical Environmental Concern Evaluation Report*, which is available online at: http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn/docs.html.

Table F-3. Summary Results of the ACEC Evaluation Process

Area	Acres	Value(s) of Concern	Relevance Criteria[1]	Importance Criteria[1]	Recommended	Comments
Existing ACECs (no expansion proposed)						
Big Cedar Ridge	264	Paleontological	1	A, B	Yes	The area contains abundant paleontological resources, in particular, fossilized plants. Sites with such in situ preservation of entire plant communities are extremely rare, both regionally and nationally.
Red Gulch Dinosaur Tracksite	1,798	Paleontological	1, 3	A, B	Yes	The area contains the largest tracksite in Wyoming, and one of only a few worldwide from the Middle Jurassic Period.
Sheep Mountain Anticline	11,520	Geologic; Caves; Cultural; Scenic	1, 3	A, B	Yes	This area is composed of a classic Laramide anticline featured in textbooks nationwide and studied by geology classes from all over the world. The area also contains several caves, some of international significance, which provide recreational, educational, and research opportunities.
Spanish Point Karst	6,298	Caves; Recreational; Sinking Stream Segments; Water Quality	1, 3	A, B	Yes	The cave/karst system in the area is an important recharge area for the Madison aquifer. The area also contains recreational qualities due to good public access, scenic values, and varied potential recreation activities (primarily hiking, rock climbing, and caving).
Existing ACECs with Proposed Expansions						
Brown/Howe (existing)	5,501	Paleontological	1, 3	A, B	Yes	This area contains paleontological values in the form of dinosaur fossils (primarily of Jurassic age), most notably from the suborder Theropoda and Sauropoda.
Brown/Howe (proposed expansion)	15,233	Paleontological	1, 3	A, B	Yes	The values of the expansion area are similar to the existing, but also includes vertebrate fossils and scientifically important paleobotanical, palynological (pollen), mammalian fossil, and dinosaur eggshell site resources.
Carter Mountain (existing)	10,867	Vegetation; Wildlife	1, 2, 3	B	Yes	This area contains alpine tundra and rare plants, and also includes for big game habitat (crucial winter range).
Carter Mountain (proposed expansion)	5,707	Cultural; Recreational; Special Status Species; Vegetation; Watershed; Wildlife; Soils	1, 2, 3, 4	A, B, C	Yes	The values of the expansion area are similar to the existing, but also include habitat for wildlife transition, and summer ranges. The area also includes special status species, and fragile and unstable soils and intense weather conditions that can cause hazards to visitors.

Table F-3. Summary Results of the ACEC Evaluation Process (Continued)

Area	Acres	Value(s) of Concern	Relevance Criteria[1]	Importance Criteria[1]	Recommended	Comments
Five Springs Falls (existing)	163	Recreational; Scenic; Special Status Species	1, 3	A, B	Yes	Five Springs Falls area provides unique habitat for four plant species that are known to occur only in Wyoming and one other state. This unique habitat is composed of vertical cliff walls that are kept moist by spray from the waterfall. The Five Springs Falls Campground and waterfalls in the area are of recreational and scenic value.
Five Springs Falls (proposed expansion)	1,646	Geologic; Scenic; Public Safety	1, 3, 4	A, B	Yes	Geologic strata situated in the proposed ACEC expansion have been severely uplifted, folded, and faulted, resulting in an area of exceptional scenic and geologic interest and value; the steep topography is unstable, and downslope movements of soil and rock presents a public safety risk.
Little Mountain (existing)	21,476	Caves; Cultural; Paleontological; Scenic	1, 3	A, B, E	Yes	The karst topography has resulted in the capture and preservation of animal fossils, and the area contains sites from Prehistoric occupation. The mine shafts and tailings from uranium mining are a safety hazard.
Little Mountain expansion area (proposed expansion)	50,575	Wildlife; Special Status Species; Recreational; Vegetation; Scenic	1, 2, 3	A, B, C	Yes	This area contains big game seasonal and migration corridors, and known or potentially occurring BLM Sensitive Species and rare plant species habitat; these habitats are under threat from invasive species, human development, and livestock-wildlife disease transfer. The area includes numerous cultural sites (e.g., rock shelters, vision quest sites) and is an important area for hunting, fishing, wildlife viewing, and scenic geologic features.
Upper Owl Creek Area (existing)	13,758	Cultural; Fish; Recreational; Scenic; Soils; Special Status Species; Vegetation; Wildlife	1, 2, 3	A, B	Yes	The ACEC contains wildlife resources and special status species (including migratory birds, wolves, grizzly bears, moose, and wolverines), cultural resources, and primitive recreational opportunities (e.g., hiking, camping, fishing, and horseback riding). Vegetation communities include endemic plant species growing in "moonscapes" where rocky, sparsely-vegetated soils support low-growing, cushion plant communities, as well as forested areas that include old-growth tree stands.
Upper Owl Creek Area (proposed expansion)	18,975	Cultural; Fish; Recreational; Scenic; Soils; Special Status Species; Vegetation; Wildlife	1, 2, 3	A, B	Yes	The values of the expansion area are similar to the existing.

Table F-3. Summary Results of the ACEC Evaluation Process (Continued)

Area	Acres	Value(s) of Concern	Relevance Criteria[1]	Importance Criteria[1]	Recommended	Comments
Proposed ACECs						
Black-tailed Prairie Dog Complex	182	Wildlife; Special Status Species	2, 3	-	No	The area met the relevance criteria for fish and wildlife resources (black-tailed prairie dog, a species that has been petitioned for listing under the ESA) and natural process (potential habitat for black-footed ferret, an Endangered species). It did not meet the importance criteria because special management attention is not required to protect the black-tailed prairie dog complex; standard and routine management prescriptions afforded to special status wildlife species are sufficient.
Chapman Bench	23,326	Special Status Species; Vegetation; Wildlife	2, 3	A, B, C	Yes	The area contains sagebrush habitat used by sensitive bird species and other wildlife.
Clarks Fork Basin/Polecat Bench West Paleontological Area	23,895	Paleontological; Scenic	1, 3	A, B	Yes	The area contains a stratigraphic contact zone and the paleontological and geochemical values associated with these rock layers that are exposed in only a few areas worldwide.
Clarks Fork Canyon	12,249	Geologic; Open Space; Recreational; Special Status Species; Wildlife	2, 3	A, B	Yes	The area contains geologic, crucial winter range for big game, one of only two ranges for mountain goats in the state and one of the largest bighorn sheep ranges in the country, special status species habitat (including plant, sagebrush obligate wildlife, and Yellowstone cutthroat trout), open space, and recreational resources and uses including along the Clarks Fork of the Yellowstone River.
Fifteen Mile and Manderson White-tailed Prairie Dog Complex	7,917	Wildlife; Special Status Species	2	-	No	The area met the relevance criteria for fish and wildlife resources (BLM Sensitive white-tailed prairie dog). It did not meet the importance criteria special management attention is not required to protect the white-tailed prairie dog complex; standard and routine management prescriptions afforded to special status wildlife species are sufficient.
Foster Gulch Paleontological Area	27,302	Paleontological; Scenic	1, 3	A, B	Yes	The area contains a stratigraphic contact zone and the paleontological and geochemical values associated with these rock layers that are exposed in only a few areas worldwide.

Table F-3. Summary Results of the ACEC Evaluation Process (Continued)

Area	Acres	Value(s) of Concern	Relevance Criteria[1]	Importance Criteria[1]	Recommended	Comments
Greater Sage-Grouse Priority Habitat Management Areas	1,116,698	Special Status Species; Vegetation	2, 3	A, B, C	Yes	The area contains sagebrush habitat used by sensitive bird species and other wildlife, including the greater sage-grouse, a candidate species for listing under provisions of the ESA. These habitats are under threat from surface disturbance associated with mineral (including gravel pits) and ROW development, renewable energy developments, heavy recreational and motorized vehicle use, and invasive and nonnative species infestations. These activities threaten important greater sage-grouse habitats, including breeding, later brood-rearing, and winter concentration areas.
Greater Sage-Grouse Key Habitat Area	1,232,583	Special Status Species; Vegetation	2, 3	A, B, C	Yes	Same as above.
McCullough Peaks South Paleontological Area	6,994	Paleontological; Scenic	1, 3	A, B	Yes	The area contains a stratigraphic contact zone and the paleontological and geochemical values associated with these rock layers that are exposed in only a few areas worldwide.
McCullough Peaks/ YU Bench	298,402	Scenic; Historic; Cultural; Wildlife; Recreational; Geologic	1, 2, 3, 4	-	No	The area met the relevance criteria for significant historic, cultural, or scenic value; fish and wildlife resources; natural process or system (for sage-grouse and wild horse habitat and geology); and natural hazards. It did not meet the importance criteria as management concerns are similar to other locations and can be addressed through other means (e.g., Herd Management Areas).
Rainbow Canyon	1,433	Paleontological; Geologic; Scenic	1, 3	A, B	Yes	The area contains scenic and geologic resources, as well as paleontological resources that include dinosaurian and paleobotanical fossils.
Rattlesnake Mountain	19,137	Special Status Species; Vegetation; Wildlife	2, 3	A, B, C	Yes	The area contains wildlife habitat (big game seasonal habitat and migration corridors), vegetation communities associated with the volcanic and limestone soils, and special status wildlife and plant species habitat.
Sheep Mountain	25,153	Vegetation; Wildlife; Special Status Species	1, 2, 3	A, B, C	Yes	The area contains wildlife habitat (big game seasonal habitat and migration corridors) and vegetation communities associated with the volcanic and limestone soils.

Table F-3. Summary Results of the ACEC Evaluation Process (Continued)

Area	Acres	Value(s) of Concern	Relevance Criteria[1]	Importance Criteria[1]	Recommended	Comments
Shoshone River Parcels	424	Wildlife	1, 2, 3, 4	-	No	The area contains riparian and river related values. Met the relevance criteria for significant historic, cultural, or scenic value; fish and wildlife resources; natural process or system; and natural hazards. It did not meet the importance criteria as management and other concerns are similar to other riparian areas in the Planning Area.

[1]Values in these columns correspond to the numbers or letters in the lists provided previously in this appendix.

- Not applicable
ACEC Area of Critical Environmental Concern
BLM Bureau of Land Management
ESA Endangered Species Act
ROW right-of-way

4.0 REFERENCES

BLM. 2002. Worland Field Office Review of Potential Wild and Scenic Rivers in the Washakie Resource Management Plan Planning Area. U.S. Department of the Interior, Bureau of Land Management, Worland, Wyoming.

BLM. 2003. Cody Field Office Review of Potential Wild and Scenic Rivers in the Cody RMP Planning. U.S. Department of the Interior, Bureau of Land Management, Cody, Wyoming.

BLM. 2013a. Geographic Information System (GIS) Data. U.S. Department of the Interior, Bureau of Land Management, Cody Field Office and Worland Field Office, Wyoming.

BLM. 2009b. Draft Addendum to the Cody Field Office Review of Potential Wild and Scenic Rivers in the Cody RMP Planning Area. U.S. Department of the Interior, Bureau of Land Management. Cody Field Office, Wyoming.

BLM. 2011. Bureau of Land Management National Greater Sage-Grouse Planning Strategy Charter. U.S. Department of the Interior, Bureau of Land Management. Available on Internet: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs/sage-grouse_planning/documents.Par.2415.File.dat/Final%20Signed%20GSG%20Planning%20Strategy%20Charter.pdf. August 22.

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix G

Lease Stipulations, including Exception, Modification, and Waiver Criteria

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APPENDIX G

LEASE STIPULATIONS, INCLUDING EXCEPTION, MODIFICATION, AND WAIVER CRITERIA

1.0 INTRODUCTION

This appendix lists the stipulations applicable under the Bureau of Land Management's (BLM's) Proposed Resource Management Plan (RMP) (Alternative D) on oil and gas leasing referenced in Chapter 2 of this Proposed RMP and Final Environmental Impact Statement (EIS).

The RMP determines which areas of the Planning Area are open to fluid mineral leasing, including the constraints or conditions open areas are subject to, and which areas are closed to fluid mineral leasing. Alternative D proposes to close the following areas to mineral leasing: Wilderness Study Areas, recommended Wild and Scenic Rivers, and certain Special Recreation Management Areas (Burnt Hollow, Dry Creek Petrified Tree, Middle Fork Powder River, Mosier Gulch, and Hole-in-the-Wall).

In areas open to leasing, the BLM may impose lease stipulations. A lease stipulation is a condition of lease issuance that provides a level of protection for other resource values or land uses by restricting lease operations during certain times or locations, or to avoid unacceptable impacts, to an extent greater than standard lease terms or regulations. These resource values and land uses generally include air, wildlife, soil, water, recreation, visual, and cultural resources. A stipulation is an enforceable term of the lease contract, which supersedes any inconsistent provisions of the standard lease form, and is attached to and made a part of the lease. Lease stipulations further implement the BLM's regulatory authority to protect resources or resource values. Lease stipulations are developed through the land use planning process. "The authorized officer may require stipulations as conditions of lease issuance. Stipulations shall become part of the lease and shall supersede inconsistent provisions of the standard lease form. Any party submitting a bid… shall be deemed to have agreed to stipulations applicable to the specific parcel…" (43 CFR 3101.1-3).

Exceptions, waivers, and modifications provide an effective means of applying "Adaptive Management" techniques to oil and gas leases and associated permitting activities to meet changing circumstances. The criteria for approval of exceptions, waivers, and modifications should be supported by National Environmental Policy Act (NEPA) analysis, either through the land use planning process or site-specific environmental review.

This appendix identifies fluid mineral lease stipulations and addresses the procedure for providing exceptions, modifications, and waivers of lease stipulations. Procedures for changing Conditions of Approval (COAs) placed on surface disturbance and disruptive activity authorizations to protect resource values are the same. The BLM cannot apply a NSO restriction after lease issuance. The BLM can apply TLS and CSU restrictions, as COAs on an Application for Permit to Drill (APD) consistent with lease rights. The criteria for exceptions to COAs on APDs is the same as that for leasing in Table G-1. Additionally, COAs on APDs do not apply to other portions of the lease such as maintenance and operation of existing facilities.

The RMP serves as the vehicle for explaining the conditions under which waivers, exceptions, or modifications of lease stipulations may be granted.

Definitions

The three types of surface stipulations the BLM applies are: (1) no surface occupancy (NSO), (2) timing limitation stipulation (TLS), and (3) controlled surface use (CSU).

- **NSO:** Use or occupancy of the land surface for fluid mineral exploration or development is prohibited in order to protect identified resource values. The minerals under NSO lands may potentially be developed by directionally or horizontally drilling from nearby lands that do not have the NSO limitation.
- **TLS:** Prohibits surface use during a specified time period to protect identified resource values. (Seasonal restriction).
- **CSU:** Use and occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify lease rights.

Surface use rights are described in more detail at 43 CFR 3101.1-2.

2.0 EXCEPTIONS, MODIFICATIONS, AND WAIVERS

An applicant may request an exception, modification, or waiver of a stipulation or restriction included in a lease or applied as a COA.

- **Exception:** A one-time exemption to a lease stipulation or COA determined on a case-by-case basis.
- **Modification:** A change to the provisions of a lease stipulation, either temporarily or for the term of the lease.
- **Waiver:** A permanent exemption to a lease stipulation.

2.1 Processing Exceptions, Modifications, and Waivers

An exception, waiver, or modification must be based on one of two criteria. According to 43 CFR 3101.1-4, "A stipulation included in an oil and gas lease shall be subject to modification or waiver only if the authorized officer determines that the factors leading to its inclusion in the lease have changed sufficiently to make the protection provided by the stipulation no longer justified or if the proposed operations would not cause unacceptable impacts." Waiver, exceptions, or modifications must be supported by appropriate environmental analysis and documentation.

The person requesting the exception, modification, or waiver is responsible to submit a written request including information that might assist the authorized official in making a decision. The authorized officer will review the information submitted in support of the request along with other pertinent information. Requests must be submitted to the BLM field office in which the lease is located. Modification and waiver requests will be forwarded to the BLM-Wyoming Deputy State Director for Minerals and Lands along with the Field Office's recommendation. Requests shall be subject to at least a 30-day public review if the authorized officer determines that a stipulation involves an issue of major concern to the public (43 CFR 3101.1-4).

The request is considered a unique action and is analyzed and documented individually for RMP and NEPA compliance. Processing may include coordination or consultation with the Wyoming Game and Fish Department (WGFD), U.S. Fish and Wildlife Service (USFWS), State Historic Preservation Office, or other agencies. For example, requests will not be granted for stipulations designed to protect

Threatened and Endangered species, unless the BLM consults with the USFWS and reinitiates consultation, if necessary. Consultation with other agencies requires additional time and resources to process.

The request must include the lease number and effective date, the stipulation(s) the request is for, the change in circumstances that lead the lessee or operator to believe the request is appropriate, and the name and/or number of any applicable authorization(s) (i.e., application for permit to drill, sundry, right-of-way). A map is strongly recommended. The following information must be addressed, when applicable, in the written request:

1. **WHY** the public land user wants the request. For example with a timing limitation exception request, include the reason(s) why an action could not be completed within the original stipulation period, any evidence of why the action would not adversely affect the resource or species being protected, or any other information (additional mitigation measures or alternatives) that would help the BLM (and WGFD or USFWS) in reviewing the request.
2. **WHO** is filing the request. This must include the company name, the name of the contact person, and the address, telephone number, e-mail address (if available), and fax number of the contact person.
3. **WHAT** is being requested. For example with a timing limitation request, include a detailed description of the activity including types of equipment or vehicles required and the number of trips expected.
4. **WHERE** the activity would take place. This must include the legal description of the activity and a map clearly depicting these areas. Proponent prepared Geographic Information System layers meeting BLM requirements can expedite the processing.
5. **WHEN** the activity would occur and it's duration. This must include the start date, end date, and time of day/night when activities would occur.

Requests must be made in writing and hard copy delivered to the Field Manager at the physical address of the office. When time is of the essence, the process may be initiated by fax or electronic delivery of a scanned copy but the original must be received by the Field Office within three working days. No exception, waiver, or modification will be issued until the hard copy request is received.

An exception request must be initiated near the time of the proposed activity. As a general rule, the request should be made within two weeks of conducting the proposed activity. The unpredictability of weather, animal movement and condition, and so on precludes analysis of requests related to wildlife far in advance of the time periods in question. The BLM uses a set of criteria when considering an exception request. Professional judgment plays a key part in the BLM's decisions on whether to grant exceptions. There is no clear-cut formula.

The following example describes some of the factors considered by the BLM when determining whether a request for a big game winter range timing limitation exception should be granted.

Factors Considered

1. Resource Concern
    - Animal presence or absence
    - Additional or new resource concerns
    - Potential for increased wildlife accidents or poaching

2. Animal Conditions
    - Physical condition of individual animals (e.g., fat reserves)
    - Local animal population condition (animal density)
    - Potential for additive mortality
    - Likelihood of introduction or increased incidence of disease
    - Likelihood of decreased recruitment/natality
3. Climate/Weather
    - Snow conditions (depth, crusting, longevity)
    - Current and historic local precipitation patterns
    - Current and historical seasonal weather patterns
    - Recent and current wind-chill factors (indication of animals energy use)
    - Duration of condition
    - Short- and long-range forecasts
4. Habitat Condition and Availability
    - Water and forage condition (availability, quality, and quantity)
    - Competition (interspecific, intraspecific)
    - Animal use of available forage
    - Suitable and ample forage immediately available and accessible
5. Spatial Considerations
    - Migration/travel corridors
    - Winter range, foraging, calving or breeding
    - Topography (plains vs. mountains)
    - Topographic/geographic limitations (barriers)
    - Presence of thermal cover (e.g., protection from wind)
    - Proportion of range impacted
    - Juxtaposition and density of other activities/disturbances in the vicinity
    - Cumulative impacts
6. Timing
    - When proposed activity would occur in the stipulation period
    - Kind and duration of potentially disruptive activity
    - Likelihood of animals habituating to the proposed activity

A determination will be fully documented in the case file with an appropriate level of environmental review after asking not one, but a series of questions, such as:

- Would the BLM remain in compliance with laws and regulations?
- Is the proposal in conformance with the objectives of the RMP?
- What would be the level of harm to the protected resource, both locally and regionally?

- What would be the economic or public safety concerns if an active operation near completion was shut in to comply with a seasonal closure? (For example: economic, multi-stage fracturing not completed; safety, casing and cementing of fresh water zones not completed.)
- Are the impacts temporary, rather than long term?
- Is the resource being protected rare, or is it relatively common? Is it a special status species?
- Based on existing knowledge of a species and its use of an area, would impacts be confined to single or a small number of individuals, or would there be impacts on local or regional populations?
- Would impacts be allowed under existing law and policy?
- Is offsite mitigation an appropriate option? (For example, where individual or cumulative impacts cannot be effectively mitigated on site?)
- Can the impacts be reduced to an acceptable level through intensive use of environmental Best Management Practices?

The following table lists RMP leasing stipulations and possible exceptions, modifications, and waivers to those stipulations under Alternative D. Table G-1 describes each stipulation, provides the Management Action record number, and the criteria for considering exceptions, modifications, and waivers.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area

Management Action	2038
Protected Resource	Absaroka Front MLP analysis area: Wildlife habitat outside elk crucial winter range
Text of Management Action	Zone 1 -- outside elk crucial winter range are subject to CSU. Oil and gas-related surface disturbances are restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease will not exceed 32 acres. A minimum lease size of 640 noncontiguous acres of federal mineral estate would be applied outside elk crucial winter range. Smaller parcels may be leased only when 640 acres of federal mineral estate are not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in elk crucial winter range.
Stipulation Type	CSU
RMP Acres Affected	24,500 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within Zone 1 outside elk crucial winter range of the Absaroka Front MLP analysis area ((1) Surface occupancy or use will be restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease will not exceed 32 acres; (2) as mapped on the Cody Field Office GIS database; (3) protecting wildlife habitat in Zone 1 of the Absaroka Front MLP analysis area. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of elk. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Modification:** The authorized officer may modify the area subject to the stipulation if an environmental record of review finds that a portion of the area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the elk. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be within elk habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**2039**
Protected Resource	Absaroka Front MLP analysis area: Wildlife habitat inside elk crucial winter range
Text of Management Action	Zones 1 and 3 -- Within elk crucial winter range, oil and gas-related surface disturbances would be restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. A minimum lease size of 1,280 noncontiguous acres of federal mineral estate would be required. Total surface disturbance per lease will not exceed 64 acres. Smaller parcels may be leased only when 1,280 acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in crucial winter range.
Stipulation Type	CSU
RMP Acres Affected	49,950 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within Zones 1 and 3 inside elk crucial winter range of the Absaroka Front MLP analysis area (1) Surface occupancy or use will be restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease will not exceed 64 acres; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting wildlife habitat in elk crucial winter range within Zones 1 and 3 of the Absaroka Front MLP analysis area. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of elk. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Modification:** The authorized officer may modify the area subject to the stipulation if an environmental record of review finds that a portion of the area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the elk. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be within elk habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.
Management Action	**2040**
Protected Resource	Absaroka Front MLP analysis area: Wildlife habitat adjoining USFS and State Lands
Text of Management Action	Zone 2 -- Require a Master Development Plan to minimize impacts to big game crucial winter range or transitional habitat. Co-locate new disturbance where technically feasible. Utilize unitization to minimize surface disturbance in big game winter range.
Stipulation Type	Lease Notice
RMP Acres Affected	4,763 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within Zone 2 of the Absaroka Front MLP analysis area (1) Prior to surface disturbance within Zone 2, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface disturbing activities unless the BLM authorized officer has approved the plan (with conditions, as appropriate).
Management Action	**2042**
Protected Resource	Absaroka Front MLP analysis area: Wildlife habitat
Text of Management Action	Zone 3 -- Apply a CSU to avoid locating new surface disturbance within forest type vegetation in areas identified as habitat for big game crucial winter range.
Stipulation Type	CSU
RMP Acres Affected	26,567 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within Zone 3 of the Absaroka Front MLP analysis area within forest type vegetation in areas identified as habitat for big game crucial winter range (1) Prior to surface disturbance within Zone 3 forest type vegetation, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: Design oil and gas development to avoid or reduce unnecessary disturbances to forest type vegetation. (2) as mapped in Worland Field Office GIS database; (3) to protect forest type vegetation in areas identified as habitat for big game crucial winter range within Zone 3 of the Absaroka Front MLP analysis area. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of big game. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Modification:** The authorized officer may modify the area subject to the stipulation if an environmental record of review finds that a portion of the area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of big game. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be within big game habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.in accordance with the land use plan and/or the regulatory provisions for such changes.
Management Action	**2043**
Protected Resource	Absaroka Front MLP analysis area: Recreation
Text of Management Action	Zone 3 -- Apply a Timing Limitation Stipulation (TLS) for surface disturbing or disruptive activity from September 1-November 15 to maintain recreational settings for hunting within the Absaroka Mountain Foothills SRMA.
Stipulation Type	TLS
RMP Acres Affected	10,584 acres
Stipulation Description	Avoid surface-disturbing and disruptive activities within Absaroka Mountain Foothills SRMA (1) September 1 to November 15; (2) as mapped on the Worland Field Office GIS database; (3) protecting recreational settings.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	Exception: Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resource use, considering health and safety. **Modification:** This stipulation may be modified if a portion of the lease is determined by the BLM authorized officer to not be located within the Absaroka Mountain Foothills SRMA. **Waiver:** This stipulation may be waived if the BLM authorized officer determines that the entire lease is no longer managed for recreational settings for hunting or is not located within the Absaroka Mountain Foothills SRMA.
Management Action	**2045**
Protected Resource	Fifteen Mile MLP analysis area: Recreation, conserve geologic features, LRP soils
Text of Management Action	Within the Fifteen Mile MLP analysis area apply a CSU restriction. Allow no more than 1 surface disturbance per lease, to include 1 well pad and ancillary facilities, to maintain recreational settings, and conserve geologic features, LRP soils, allow no more than 1 surface disturbance per lease Total surface disturbance per lease will not exceed 32 acres. A minimum lease size of 640 noncontiguous acres of federal mineral estate would be applied within the analysis area. Smaller parcels may be leased only when 640 acres of federal mineral estate are not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to control the pace and density of development.
Stipulation Type	CSU
RMP Acres Affected	180,816 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Fifteen Mile MLP analysis area (1) Surface occupancy or use will be restricted to no more than 1 surface disturbance per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease will not exceed 32 acres; (2) as mapped on the Worland Field Office GIS database; (3) protecting recreational setting, LRP soils, and geologic features within the Fifteen Mile MLP Analysis Area. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for geologic features or LRP soils. The BLM can and does grant exceptions if the BLM determines that granting an exception would not adversely impact the resource being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Modification:** The authorized officer may modify the area subject to the stipulation if an environmental record of review finds that a portion of the area is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the resource. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Waiver:** This stipulation may be waived over the entire lease if it is determined that the site is no longer considered in the land use plan to be within LRP soils or geologic features. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**2046**
Protected Resource	Fifteen Mile MLP analysis area: Recreation, conserve geologic features, LRP soils
Text of Management Action	Apply a lease notice to restrict surface disturbance on LRP soils and unique geologic features unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts, which may include, but not be limited to include an Erosion, Revegetation and Restoration Plan. The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: • The disturbed area will be stabilized with no evidence of accelerated erosion features. • The disturbed area shall be managed to ensure soil characteristics approximate an appropriate reference site with regard to erosional features to maintain soil productivity and sustainability. • Slope stability is maintained preventing slope failure and erosion. • Sufficient viable topsoil is maintained for ensuring successful final reclamation. At locations where interim reclamation will be completed, this will be accomplished by respreading all salvaged topsoil over the areas of interim reclamation. • The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation.
Stipulation Type	Lease Notice
RMP Acres Affected	180,816 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Fifteen Mile MLP analysis area (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts, which may include, but not be limited to include an Erosion, Revegetation and Restoration Plan. Prior to surface disturbance on limited reclamation potential areas a site-specific construction, stabilization, and reclamation plan (Plan) must be submitted to the BLM by the applicant as a component of the APD (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The Plan must include designs approved and stamped by a licensed engineer. The operator shall not initiate surface-disturbing activities unless the BLM authorized officer has approved the Plan (with conditions, as appropriate).
Management Action	**2047**
Protected Resource	Fifteen Mile MLP analysis area: Recreation, conserve geologic features, LRP soils
Text of Management Action	Limit off-road vehicular use for Notice of Staking (NOS) level casual use actions within the Fifteen Mile MLP analysis area. Allow off-road motorized (OHV) and mechanized (mountain bike) travel up to 300 feet from established roads in areas with limited travel designations to allow for staking activities, provided that: 1) no resource damage occurs; 2) no new routes are created; and 3) such access is not otherwise prohibited by the BLM authorized officer.
Stipulation Type	Lease Notice
RMP Acres Affected	230,699 acres
Stipulation Description	Limit off-road vehicular use for Notice of Staking (NOS) level casual use actions within the Fifteen Mile MLP analysis area. Allow off-road motorized (OHV) and mechanized (mountain bike) travel up to 300 feet from established roads in areas with limited travel designations to allow for staking activities, provided that: 1) no resource damage occurs; 2) no new routes are created; and 3) such access is not otherwise prohibited by the BLM authorized officer. Casual use within the Fifteen Mile MLP Analysis Area is allowed within 300 feet of established roadways provided that such access is not otherwise prohibited by the BLM authorized officer.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**2049**
Protected Resource	Big Horn Front MLP analysis area: Wildlife migration corridors
Text of Management Action	Prohibit surface-disturbing activities within ½ mile of big game migration corridors within the Big Horn Front MLP analysis area.
Stipulation Type	NSO
RMP Acres Affected	18,698 acres
Stipulation Description	No surface occupancy is permitted (1) within ½ mile of big game migration corridors within the Big Horn Front MLP analysis area; (2) as mapped on the Cody/Worland Field Office GIS database. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Modification:** The authorized officer may modify the area subject to the stipulation or the NSO criteria if an environmental record of review finds that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that that the entire leasehold is greater than ½ mile from big game migration corridors within the Big Horn Front MLP Analysis Area Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.
Management Action	**2050**
Protected Resource	Big Horn Front MLP analysis area: Wildlife habitat inside elk crucial winter range
Text of Management Action	Within elk crucial winter range, oil and gas-related surface disturbances would be restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. A minimum lease size of 1280 noncontiguous acres of federal mineral estate would be required. Total surface disturbance per lease will not exceed 64 acres. Smaller parcels may be leased only when 1280 acres of federal mineral estate is not available and leasing is necessary to remain in compliance with laws, regulations and policy; for example, to protect the federal mineral estate from drainage or to commit the federal mineral estate to unit or communitization agreements. • Allow additional disturbance pending acceptable final reclamation. • Co-locate new disturbance where technically feasible. • Utilize unitization to minimize surface disturbance in crucial winter range.
Stipulation Type	CSU
RMP Acres Affected	81,630 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited inside elk crucial winter range within the Big Horn Front MLP analysis area (1) Surface occupancy or use will be restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease will not exceed 64 acres; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting wildlife habitat in elk crucial winter range the Big Horn Front MLP Analysis Area. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of elk. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Modification:** The authorized officer may modify the area subject to the stipulation if an environmental record of review finds that a portion of the area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the elk. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be within elk habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.
Management Action	**2050**
Protected Resource	Big Horn Front MLP analysis area – Elk winter range
Text of Management Action	Avoid surface-disturbing and disruptive activities within elk winter range from November 15 through April 30.
Stipulation Type	TLS
RMP Acres Affected	113,688 acres
Stipulation Description	Avoid surface-disturbing and disruptive activities within elk winter range (1) from Nov 15 to Apr 30; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting elk winter range. **Exception:** The BLM authorized officer may grant an exception if the operator demonstrates that the crucial winter range areas are not occupied during the period of concern, subject to confirmation by the BLM, in coordination with WGFD. **Modification:** The BLM authorized officer may modify the area subject to the stipulations based upon BLM evaluation in coordination with WGFD to determine that the crucial winter range is not present or boundaries of the subject winter range areas have been refined. The BLM authorized officer may modify the area subject to the stipulations based upon BLM evaluation in coordination with WGFD to determine that the crucial winter range is not present or boundaries of the subject winter range areas have been refined. **Waiver:** The BLM authorized officer may grant a waiver if it is determined that the entire lease area is no longer managed as crucial winter range, in coordination with WGFD.
Management Action	**2051**
Protected Resource	Big Horn Front MLP analysis area: Recreational settings
Text of Management Action	Limit off-road vehicular use for Notice of Staking (NOS) level casual use actions within the Big Horn Front MLP analysis area. Allow off-road motorized (OHV) and mechanized (mountain bike) travel up to 300 feet from established roads in areas with limited travel designations to allow for staking activities, provided that: 1) no resource damage occurs; 2) no new routes are created; and 3) such access is not otherwise prohibited by the BLM authorized officer.
Stipulation Type	Lease Notice
RMP Acres Affected	285,796 acres
Stipulation Description	Limit off-road vehicular use for Notice of Staking (NOS) level casual use actions within the Big Horn Front MLP analysis area. Allow off-road motorized (OHV) and mechanized (mountain bike) travel up to 300 feet from established roads in areas with limited travel designations to allow for staking activities, provided that: 1) no resource damage occurs; 2) no new routes are created; and 3) such access is not otherwise prohibited by the BLM authorized officer. Casual use within the Big Horn Front MLP Analysis Area is allowed within 300 feet of established roadways provided that such access is not otherwise prohibited by the BLM authorized officer.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**4036**
Protected Resource	Water, Riparian/Wetland: Within 500 feet perennial surface water, and riparian/wetland areas
Text of Management Action	Prohibit surface-disturbing activities within 500 feet of surface water and riparian/wetland areas (97,894 acres) except when such activities are necessary and when their impacts can be mitigated.
Stipulation Type	NSO
RMP Acres Affected	120,781 acres
Stipulation Description	No surface occupancy (1) within 500 feet of perennial surface water, riparian/wetland areas, and playas; (2) as mapped on the Cody and Worland Field Office GIS database. **Exception:** The authorized officer may grant an exception if, based upon an evaluation by the BLM, it is determined that the proposal would not adversely affect perennial surface waters, riparian/wetland areas and/or playas. **Modification:** The authorized officer may modify the area subject to the stipulation if, based upon an evaluation by the BLM, it is determined that the proposal is not located within 500 feet of perennial surface waters, riparian/wetland areas and/or playas. **Waiver:** The authorized officer may grant a waiver if it is determined that the entire lease area is not within 500 feet of perennial surface waters, riparian/wetland areas and/or playas. This determination will be based upon an evaluation by the BLM.
Management Action	**4055**
Protected Resource	Water, Riparian/Wetland, Fish and Wildlife
Text of Management Action	Apply a NSO restriction and prohibit surface-disturbing activities within 500 feet and apply a CSU and avoid surface-disturbing activities within ¼ mile of any waters rated by the WGFD as Blue Ribbon or Red Ribbon (trout streams of national or statewide importance).
Stipulation Type	CSU
RMP Acres Affected	7,033 acres
Stipulation Description	Surface occupancy or use is restricted within ¼ mile of waters rated by the WGFD as Class 1 or 2 fisheries. (1) Prior to surface disturbance within ¼ mile of waters rated by the WGFD as Class 1 or 2 fisheries, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface disturbing activities unless the BLM authorized officer has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: • Reserve pits should be designed to prevent possible contamination of soil and groundwater. • Drill pad sites should be designed to disperse storm water runoff onto upland sites using proper erosion and sediment control techniques. • Design road crossing of streams to allow fish passage at all flows. • Design crossings such that they do not destabilize the channel or increase water velocity. (2) as mapped by the WGFD or Worland/Cody Field Office GIS database; (3) to protect designated Blue Ribbon and Red Ribbon fisheries habitat and fish populations. **Exception:** The BLM authorized officer may grant an exception if it is determined that the action is of a scale, sited in a location, or otherwise designed so that the proposed action would not result in a decline in fish abundance or range. **Modification:** The BLM authorized officer may grant a modification if it is determined that a portion of the lease is no longer located within ¼ mile of WGFD-designated Blue or Red Ribbon fisheries. **Waiver:** This stipulation may be waived if the BLM authorized officer determines that the entire leasehold is not located within ¼ mile of WGFD-designated Blue or Red Ribbon fisheries.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**4062**
Protected Resource	Fish and Wildlife: Bighorn River HMP/RAMP tracts and the BLM-administered tracts in Yellowtail WHMA
Text of Management Action	Prohibit surface-disturbing and disruptive activities in the Bighorn River HMP/RAMP tracts and the BLM-administered tracts in Yellowtail WHMA and apply an NSO restriction as appropriate.
Stipulation Type	NSO
RMP Acres Affected	5,835 acres
Stipulation Description	No surface occupancy is permitted (1) within Bighorn River HMP/RAMP tracts and the BLM-administered tracts in Yellowtail WHMA (2) protecting fish and wildlife resources. **Exception:** The BLM authorized officer may grant an exception if, in coordination with the WGFD, it is determined that the action as proposed or conditioned would meet the HMP/RAMP and/or WHMA management objectives. **Modification:** The BLM authorized officer may modify the area subject to the stipulation or surface occupancy criteria if, in coordination with the WGFD, it is determined that a portion of the lease is not located within the Bighorn River HMP/RAMP tracts or BLM-administered tracts in Yellowtail WHMA. **Waiver:** The BLM authorized officer may grant a waiver if, in coordination with the WGFD, it is determined that the entire lease area is no longer located within the Bighorn River HMP/RAMP tracts or BLM-administered tracts in Yellowtail WHMA.
Management Action	**4076**
Protected Resource	Fish and Wildlife: Big game crucial winter range habitat outside of Oil and Gas Management Areas
Text of Management Action	Avoid surface-disturbing and disruptive activities within big game crucial winter range (1,638,732 acres) from November 15 through April 30.
Stipulation Type	TLS
RMP Acres Affected	1,638,732 acres
Stipulation Description	No surface use is allowed during the following time periods. This stipulation does not apply to operation and maintenance of production facilities. Timing Limitation Stipulation (TLS) (1) Nov 15 to Apr 30; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting big game on crucial winter range. **Exception:** The BLM authorized officer may grant an exception if the operator demonstrates that the crucial winter range areas are not occupied during the period of concern, subject to confirmation by the BLM, in coordination with WGFD. **Modification:** The BLM authorized officer may modify the area subject to the stipulations based upon BLM evaluation in coordination with WGFD to determine that the crucial winter range is not present or boundaries of the subject winter range areas have been refined. **Waiver:** The BLM authorized officer may grant a waiver if it is determined that the entire lease area is no longer managed as crucial winter range, in coordination with WGFD.
Management Action	**4077**
Protected Resource	Fish and Wildlife: Federal mineral estate within the Absaroka Front Management Area
Text of Management Action	On federal mineral estate within the Absaroka Front Management Area, apply a mix of CSU/TLS/NSO stipulations.
Stipulation Type	TLS
RMP Acres Affected	4,857 acres
Stipulation Description	No surface occupancy (1) within overlapping migration corridors and big game crucial winter range in the Absaroka Front Management Area (2) as mapped on the Worland/Cody Field Office GIS

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	database. **Exception:** The BLM authorized officer may grant an exception if the operator demonstrates that the crucial winter range areas are not occupied during the period of concern, subject to confirmation by the BLM, in coordination with WGFD. **Modification:** The BLM authorized officer may modify the area subject to the stipulations based upon BLM evaluation in coordination with WGFD to determine that the crucial winter range is not present or boundaries of the subject winter range areas have been refined, or within the Absaroka Front Management Area. **Waiver:** The BLM authorized officer may grant a waiver if it is determined that the entire lease area is no longer managed as crucial winter range, in coordination with WGFD, or within the Absaroka Front Management Area.
Management Action	**4077**
Protected Resource	Fish and Wildlife: Federal mineral estate within the Absaroka Front Management Area
Text of Management Action	On federal mineral estate within the Absaroka Front Management Area, apply a mix of CSU/TLS/NSO stipulations.
Stipulation Type	CSU
RMP Acres Affected	111,410 acres
Stipulation Description	Surface occupancy or use is restricted within the Absaroka Front Management Area. (1) Prior to surface disturbance within big game crucial habitat, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface disturbing activities unless the BLM authorized officer has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: • Design oil and gas development to avoid or reduce unnecessary disturbances, wildlife conflicts, and habitat impacts. • Plan the pattern and rate of development to avoid the most important habitats and generally reduce the extent and severity of impacts. • Cluster drill pads, roads and facilities in specific, "low-impact" areas, if geologically feasible. • Consider "liquid gathering systems" (LGS) to eliminate surface storage tanks and reduce truck trips for removal of liquids. • To the extent practicable, place infrastructure within or near previously disturbed locations. • Minimize infrastructure development and operational activity during life of field by using consolidation (e.g., "unitized") development techniques. (2) as mapped in Worland/Cody Field Office GIS database; (3) to protect big game crucial habitat. **Exception:** An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be fully mitigated or there are not practical alternatives. **Modification:** The authorized officer may modify the boundaries of the stipulation area if (1) a portion of the area is not being used as protected range by the identified species, (2) habitat outside of stipulation boundaries is being used and needs to be protected, or (3) the migration patterns have changed causing a difference in the season of use. **Waiver:** This stipulation may be waived, if the authorized officer determines that the entire leasehold can be occupied without adversely affecting the resources.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**4077**
Protected Resource	Fish and Wildlife: Federal mineral estate within the Absaroka Front Management Area
Text of Management Action	On federal mineral estate within the Absaroka Front Management Area, apply a mix of CSU/TLS/NSO stipulations.
Stipulation Type	NSO
RMP Acres Affected	41,177 acres
Stipulation Description	No surface occupancy is permitted (1) within the Absaroka Front Management Area (2) protecting overlapping migration corridors and big game crucial winter range. **Exception:** The BLM authorized officer may grant an exception if, in coordination with the WGFD, it is determined that the action as proposed or conditioned would meet wildlife management objectives. **Modification:** The BLM authorized officer may modify the area subject to the stipulation or surface occupancy criteria if, in coordination with the WGFD, it is determined that a portion of the lease is not located within migration corridors or overlapping big game crucial winter range. **Waiver:** The BLM authorized officer may grant a waiver if, in coordination with the WGFD, it is determined that the entire lease area is no longer located within migration corridors or overlapping big game crucial winter range.
Management Action	**4113**
Protected Resource	Special Status Species
Text of Management Action	Control surface-disturbing activities to avoid or mitigate adverse effects on about 1,300 BLM-administered surface acres of active prairie dog colonies within the Meeteetse complex. This requirement will remain in effect until completion of a site-specific activity plan being prepared to manage ferrets in this area. The restriction will then be reassessed for its continued appropriateness. This restriction applies to such things as mineral leasing, geophysical exploration (except casual use), and construction activities.
Stipulation Type	CSU
RMP Acres Affected	1,300 acres
Stipulation Description	Surface occupancy or use is restricted within the Meeteetse prairie dog complex. (1) Prior to surface disturbance within the Meeteetse prairie dog complex, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface disturbing activities unless the BLM authorized officer has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: • Verify the presence or absence of prairie dogs within the colony boundary. • New access roads should avoid intersecting a prairie dog colony or bisecting two adjacent colonies. • For multiple –well programs, if geologically and technically feasible, drill from the same pad using directional drilling technologies. • Salvage topsoil from all facilities and re-apply during interim and final reclamation. Native seed mixes will be required to re-establish short grass prairie vegetation during reclamation. (2) as mapped by the WGFD or Worland/Cody Field Office GIS database; (3) to retain habitat characteristics within the Meeteetse prairie dog complex for black-footed ferret reintroduction. **Exception:** The BLM authorized officer may grant an exception if it is determined that the action is of a scale, sited in a location, or otherwise designed so that the proposed action would not impair the function or utility of the site for reoccupation by black-footed ferret. **Modification:** The BLM authorized officer may modify the area subject to the stipulation or surface occupancy criteria if, after consultation with the USFWS, it is determined that a portion of the NSO

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	area is nonessential for possible reintroduction of black-footed ferret, or is determined not to be located within the Meeteetse prairie dog complex. **Waiver:** The BLM authorized officer may grant a waiver if it is determined by the BLM, in consultation with the USFWS, that the entire lease area is nonessential for possible reintroduction of black-footed ferret, or it is determined the entire lease area is not located within the Meeteetse prairie dog complex.
Management Action	**4117**
Protected Resource	Special Status Species: Within 0.6-mile radius of the perimeter greater sage-grouse leks within PHMAs
Text of Management Action	Surface occupancy and surface-disturbing activities would be prohibited on or within 0.6-mile radius of the perimeter of occupied sage-grouse leks.
Stipulation Type	NSO
RMP Acres Affected	120,019 acres
Stipulation Description	No surface occupancy is permitted (1) within 0.6-mile radius of the perimeter of occupied greater sage-grouse leks inside PHMAs (2) protection of greater sage-grouse leks within PHMAs. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Modification:** The authorized officer may modify the area subject to the stipulation or the NSO criteria if an environmental record of review finds that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be within a Greater Sage-Grouse designated PHMAs or connectivity area, or Greater Sage-Grouse are no longer a BLM sensitive or special status species and are not listed by the U.S. Fish and Wildlife Service as threatened or endangered under the Endangered Species Act. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)
Management Action	**4117**
Protected Resource	Special Status Species: Within ¼-mile radius of the perimeter of greater sage-grouse leks outside of PHMAs
Text of Management Action	Apply a NSO stipulation to prohibit or restrict surface-disturbing activities or surface occupancy within ¼-mile radius of the perimeter of occupied sage-grouse leks.
Stipulation Type	NSO
RMP Acres Affected	4,077 acres
Stipulation Description	No surface occupancy is permitted (1) within ¼-mile radius of the perimeter of occupied greater sage-grouse leks outside PHMA (2) protection of greater sage-grouse leks outside PHMAs. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Modification:** The authorized officer may modify the area subject to the stipulation or the NSO criteria if an environmental record of review finds that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be within a Greater Sage-Grouse designated PHMAs or connectivity area, or Greater Sage-Grouse are no longer a BLM sensitive or special status species and are not listed by the U.S. Fish and Wildlife Service as threatened or endangered under the Endangered Species Act. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)
Management Action	**4118**
Protected Resource	Special Status Species: Within 0.6-mile radius of the perimeter greater sage-grouse leks within PHMAs
Text of Management Action	Restrict disruptive activity within 0.6-mile radius of the perimeter of occupied sage-grouse leks from March 15 to June 30.
Stipulation Type	TLS
RMP Acres Affected	All PHMAs – 1,446,042 acres
Stipulation Description	Avoid disruptive activities within PHMAs (1) March 1 to June 30 within 0.6-mile radius of the perimeter of occupied sage-grouse leks; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting greater sage-grouse leks within PHMAs from disruptive activities. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not affect reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success. Actions designed to enhance the long-term utility or availability of suitable Greater Sage-Grouse habitat may be exempted from this timing limitation. The BLM can and does grant exceptions to seasonal restrictions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Modification:** The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater Sage-Grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the described lands are no longer considered in the land use plan to be within a Greater Sage-Grouse designated PHMAs, or are incapable of serving the long-

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	term requirements of Greater Sage-Grouse nesting habitat and that these ranges no longer warrant consideration as components of Greater Sage-Grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)
Management Action	**4118**
Protected Resource	Special Status Species: Greater sage-grouse nesting and early brood-rearing habitats inside PHMAs
Text of Management Action	Apply a TLS to prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within PHMAs from March 15 to June 30.
Stipulation Type	TLS
RMP Acres Affected	All PHMAs – 1,446,042 acres
Stipulation Description	Prohibit or restrict surface-disturbing and/or disruptive activities (1) March 1 to June 30; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting sage-grouse nesting and early brood-rearing habitat within PHMAs. **Exception:** An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated or it is determined the habitat is not being used during the TLS period of concern for any given year. Additionally this restriction will not apply to maintenance and operation of existing facilities. Sage-grouse specific exception criteria for application of greater or lesser restrictions to short or long-term activities. Exception evaluation factors may include, but are not limited to, condition of the habitat, presence of sage-grouse or their sign, presence of other activities in the area, importance for migration or connectivity, duration and timing of proposed activity, local topography, severity and forecast of weather, beneficial aspects of the project for sage-grouse, including possible reclamation activities, and cover and forage availability. **Modification:** The authorized officer may modify the boundaries in the stipulation area if it is determined that the actual habitat suitability for nesting/early brood-rearing is greater or less than the identified boundary. Timeframes may be modified based on studies documenting local periods of actual use. **Waiver:** This stipulation may be waived, if after consultation with the WGFD, it is determined that the described lands are incapable of serving the long-term requirements of sage-grouse nesting habitat and these ranges no longer warrant consideration as components of sage-grouse nesting habitat.
Management Action	**4118**
Protected Resource	Special Status Species: Within ¼ mile of greater sage-grouse leks outside of PHMAs
Text of Management Action	Apply a TLS to restrict disruptive activity within ¼ mile of occupied sage-grouse leks from March 15 to June 30.
Stipulation Type	TLS
RMP Acres Affected	59,456 acres
Stipulation Description	Prohibit or restrict disruptive activities outside PHMAs (1) within ¼ mile of greater sage-grouse leks outside of PHMAs from March 1 to June 30; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting sage-grouse nesting and early brood-rearing habitat outside PHMAs. **Exception:** An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated or it is determined the habitat is not being used during the TLS period of concern for any given year. Additionally this restriction will not apply to maintenance and operation of existing facilities. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) Sage-grouse specific exception criteria for application of greater or lesser restrictions to short or long-term activities. Exception evaluation factors may include, but are not limited to, condition of

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	the habitat, presence of sage-grouse or their sign, presence of other activities in the area, importance for migration or connectivity, duration and timing of proposed activity, local topography, severity and forecast of weather, beneficial aspects of the project for sage-grouse, including possible reclamation activities, and cover and forage availability. **Modification:** The authorized officer may modify the boundaries in the stipulation area if it is determined that the actual habitat suitability for nesting/early brood-rearing is greater or less than the identified boundary. Timeframes may be modified based on studies documenting local periods of actual use. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Waiver:** This stipulation may be waived, if after consultation with the Wyoming Game and Fish Department, it is determined that the described lands are incapable of serving the long-term requirements of sage-grouse nesting habitat and these ranges no longer warrant consideration as components of sage-grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)
Management Action	**4118**
Protected Resource	Special Status Species: Greater sage-grouse nesting and early brood-rearing habitat outside PHMAs
Text of Management Action	Apply a TLS to prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within 2 miles of the lek or lek perimeter of any occupied lek from March 15 to June 30.
Stipulation Type	TLS
RMP Acres Affected	303,329 acres
Stipulation Description	Prohibit or restrict surface-disturbing and/or disruptive activities in sage-grouse nesting and early brood-rearing habitat within 2 miles of the lek or lek perimeter of any occupied lek (1) from March 1 to June 30; (2) as mapped on the Worland/Cody Field Office GIS database; (3) Greater sage-grouse nesting and early brood-rearing habitat outside PHMAs. **Exception:** An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be adequately mitigated or it is determined the habitat is not being used during the TLS period of concern for any given year. Additionally this restriction will not apply to maintenance and operation of existing facilities. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) Sage-grouse specific exception criteria for application of greater or lesser restrictions to short or long-term activities. Exception evaluation factors may include, but are not limited to, condition of the habitat, presence of sage-grouse or their sign, presence of other activities in the area, importance for migration or connectivity, duration and timing of proposed activity, local topography, severity and forecast of weather, beneficial aspects of the project for sage-grouse, including possible reclamation activities, and cover and forage availability. **Modification:** The authorized officer may modify the boundaries in the stipulation area if it is determined that the actual habitat suitability for nesting/early brood-rearing is greater or less than the identified boundary. Timeframes may be modified based on studies documenting local periods of actual use. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Waiver:** This stipulation may be waived, if after consultation with the Wyoming Game and Fish Department, it is determined that the described lands are incapable of serving the long-term requirements of sage-grouse nesting habitat and these ranges no longer warrant consideration as components of sage-grouse nesting habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**4119**
Protected Resource	Special Status Species: Mapped greater sage-grouse winter habitats/concentration areas
Text of Management Action	Apply a TLS to prohibit or restrict surface-disturbing and disruptive activities in mapped sage-grouse winter habitats/concentration areas from December 1 to March 14.
Stipulation Type	TLS
RMP Acres Affected	167,774 acres
Stipulation Description	Prohibit or restrict surface-disturbing and/or disruptive activities within sage-grouse winter concentration areas (1) from December 1 to March 14; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting Mapped greater sage-grouse winter habitats/concentration areas. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function and suitability of the winter concentration area, or it is determined that the winter concentration area is not occupied by concentrated populations of Greater Sage- Grouse during the period of concern. Actions designed to enhance the long-term utility or availability of suitable Greater Sage-Grouse habitat may be exempted from this timing limitation. The BLM can and does grant exceptions to seasonal restrictions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Modification:** The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater Sage-Grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) **Waiver:** This stipulation may be waived over the entire lease if, in coordination with the State wildlife agency, it is determined that the described lands are incapable of serving the long-term requirements of Greater Sage-Grouse winter habitat and that these ranges no longer warrant consideration as components of Greater Sage-Grouse winter habitat. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)
Management Action	**4120**
Protected Resource	Special Status Species: Density Disturbance within PHMAs
Text of Management Action	In greater sage-grouse PHMAs, limit the density of disturbances to an average of one oil and gas or mining facility per 640 acres. The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat. Utilize the most current greater sage-grouse density disturbance process or other state and/or federal agreed upon process for compliance evaluations. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the Disturbance Density Calculation Tool (DDCT) area using the DDCT process.
Stipulation Type	CSU
RMP Acres Affected	All PHMAs – 1,446,042 acres
Stipulation Description	Surface occupancy or use will be restricted to (1) no more than an average of one disturbance facility per 640 acres using the DDCT, and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT; (2) as calculated using the DDCT; (3) To protect Greater Sage-Grouse designated PHMAs

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-Grouse designated PHMAs. The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases. **Exception:** The authorized officer may grant an exception if an environmental record of review determines that, the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life history, or behavioral needs of Greater Sage-Grouse. An exception to the stated limits may be granted when offsite mitigation is determined to provide an overall beneficial effect to Greater Sage-Grouse habitat and populations. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Bureau of Land Management Manuals 1624 and 3101.) **Modification:** The authorized officer may modify the area subject to the stipulation or surface occupancy criteria if an environmental record of review finds that a portion of the CSU area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Bureau of Land Management Manuals 1624 and 3101.) **Waiver:** The authorized officer may grant a waiver if it is determined by the BLM, in coordination with the State wildlife agency, it is determined that the site is no longer considered in the land use plan to be within a Greater Sage-Grouse designated PHMAs or Greater Sage-Grouse are no longer a BLM sensitive or special status species and are not listed by the U.S. Fish and Wildlife Service as threatened or endangered under the Endangered Species Act. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see Bureau of Land Management Manuals 1624 and 3101.)
Management Action	**4123**
Protected Resource	Special Status Species: Nesting Raptors
Text of Management Action	To protect nesting raptors, apply a TLS on 126,241 acres to prohibit surface-disturbing and disruptive activities within: • ¼ mile of active raptor nests and ½ mile of active golden eagle, bald eagle, northern goshawk, merlin, and prairie and peregrine falcon nests during specific species nesting period or until young birds have fledged. See Appendix K for species nesting periods. • 1 mile of active ferruginous hawk nests from March 1 to July 31 or until young birds have fledged.
Stipulation Type	TLS
RMP Acres Affected	113,826 acres
Stipulation Description	No surface use is allowed within ¼ mile of active raptor nests and ½ mile of active golden eagle, bald eagle, northern goshawk, merlin, and prairie and peregrine falcon nests and 1 mile of active ferruginous hawk nests during specific species nesting period or until young birds have fledged. This stipulation does not apply to operation and maintenance of production facilities. Timing Limitation Stipulation (1) during the following time periods: • American Kestrel April 1 – August 15

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	• Bald Eagle January 1 – August 15 • Boreal Owl February 1 – July 31 • Burrowing Owl April 1 – September 15 • Common Barn Owl February 1 – September 15 • Cooper's Hawk March 15 – August 31 • Eastern Screech-owl March 1 – August 15 • Ferruginous Hawk March 15 – July 31 • Golden Eagle January 15 – July 31 • Great Gray Owl March 15 – August 31 • Great Horned Owl December 1 – September 31 • Long-eared Owl February 1 – August 15 • Merlin April 1 – August 15 • Northern Goshawk April 1 – August 15 • Northern Harrier April 1 – August 15 • Northern Pygmy-Owl April 1 – August 1 • Northern Saw-whet Owl March 1 – August 31 • Osprey April 1 – August 31 • Peregrine Falcon March 1 – August 15 • Prairie Falcon March 1 – August 15 • Red-tailed Hawk February 1 – August 15 • Sharp-shinned Hawk March 15 – August 31 • Short-eared Owl March15 – August 1 • Swainson's Hawk April 1 – August 31 • Western Screech-owl March 1 – August 15 • All other raptors February 1 – July 31 (2) as mapped on the Worland/Cody Field Office GIS database or as determined by field evaluation; (3) protecting active raptor nests. **Exception:** The BLM authorized officer may grant an exception if it is determined that the raptor nest(s) are not active or the proposed action is of a scale, sited in a location, or otherwise designed so that the proposed action would not disturb (be likely to cause: physical injury; a decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior) nesting raptors of conservation concern. The determination may include consultation with the WGFD or USFWS. **Modification:** The BLM authorized officer may modify the area subject to the stipulations based upon a BLM evaluation in coordination with WGFD and/or USFWS, as necessary. The stipulation may be modified based on negative or positive monitoring results; or if it is determined that the action will not impair the function or the suitability of the habitat, or cause nest abandonment. **Waiver:** The stipulation may be waived if the BLM authorized officer determines that the entire lease area does not include seasonal buffer zones for nests of raptor species of conservation concern. This determination shall be based upon field studies of the area by a qualified representative and subject to confirmation from BLM, in coordination with the WGFD and/or USFWS, as necessary.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**4123**
Protected Resource	Special Status Species: ¼ mile from raptor nest sites
Text of Management Action	To protect the actual nest site, apply a year-round CSU stipulation within ¼ mile of all raptor nests (47,651 acres).
Stipulation Type	CSU
RMP Acres Affected	57,897 acres
Stipulation Description	Surface occupancy or use within ¼ mile of raptor nest sites will be restricted. (1) Prior to surface disturbance within ¼ mile of raptor nests a mitigation plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface disturbing activities unless the BLM authorized officer has approved the plan or approved it with conditions. The plan must demonstrate to the BLM authorized officer's satisfaction that nesting raptors of conservation concern would not be agitated or bothered to a degree that causes or is likely to cause: • physical injury; • a decrease in productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or • nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior, or preclude nest reoccupation; (2) as mapped on the Worland/Cody Field Office GIS database or determined by BLM field evaluation; (3) protecting raptor nest sites. **Exception:** The BLM authorized officer may grant an exception if a staff review determines that the proposed action is of a scale, sited in a location, or otherwise designed so that the proposed action would not result in a failure to meet the performance standards above. The determination may include coordination with the WGFD and/or USFWS. **Modification:** A modification may be granted if the BLM authorized officer determines that portions of the leasehold can be occupied without adversely affecting the nest site or suitable nesting habitat, based on topography, species, season of use, and other pertinent factors. The determination may include coordination with the WGFD and/or USFWS. **Waiver:** The stipulation may be waived if the BLM authorized officer determines that the entire lease area is not within ¼ mile of a raptor nest or suitable nesting habitat. This determination shall be based upon a field evaluation of the area by a qualified representative and subject to confirmation from the BLM. Confirmation may include coordination with the WGFD and/or USFWS.
Management Action	**4124 and 7087**
Protected Resource	Special Status Species: Chapman Bench Management Area
Text of Management Action	Manage a portion of the Chapman Bench area as the Chapman Bench Management Area (3,425 acres of BLM-administered surface ownership): • manage for the retention and success of the mountain plover, long-billed curlew, and other sensitive species habitat • apply a NSO restriction
Stipulation Type	NSO
RMP Acres Affected	3,425 acres
Stipulation Description	No surface occupancy or use is allowed (1) within the Chapman Bench Management Area as mapped on the Cody Field Office GIS database; (2) protecting mountain plover, long-billed curlew, and other sensitive species habitat. **Exception:** The BLM authorized officer may grant an exception if it is determined that the action, as proposed or conditioned, would not impair the function or utility of sensitive species habitats, in

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	coordination with the WGFD. **Modification:** The BLM authorized officer may modify the area subject to the stipulation or surface occupancy criteria if after coordination with the WGFD is the BLM determines that the NSO area is not located in habitat for sensitive species. **Waiver:** The BLM authorized officer may grant a waiver if it is determined by the BLM, in coordination with the WGFD, that the lease area is not located within the Chapman Bench Management Area.
Management Action	**4127**
Protected Resource	Special Status Species: Sage Creek Prairie Dog Town
Text of Management Action	Implement conservation measures outlined in the Biological Evaluation for black-tailed prairie dogs in the Sage Creek Prairie Dog Town. Apply an NSO restriction on the Sage Creek Prairie Dog Town.
Stipulation Type	NSO
RMP Acres Affected	182 acres
Stipulation Description	No surface occupancy is permitted within the Sage Creek Prairie Dog Town (1) as mapped on the Cody Field Office GIS database; (2) protection of prairie dog habitat. **Exception:** The BLM authorized officer may grant an exception if it is determined that the action, as proposed or conditioned, would not impair the function or utility of sensitive species habitats, in coordination with the WGFD. **Modification:** The BLM authorized officer may modify the area subject to the stipulation or surface occupancy criteria if after coordination with the WGFD is the BLM determines that the NSO area is not located in habitat for sensitive species. **Waiver:** The BLM authorized officer may grant a waiver if it is determined by the BLM, in coordination with the WGFD, that the lease area is not located within complexes are suitable for black-footed ferret reintroduction.
Management Action	**4133**
Protected Resource	Surface Water: Riparian habitat supporting special status fish species
Text of Management Action	Prohibit surface-disturbing activities within 500 feet and avoid surface-disturbing activities within ¼ mile of perennial surface water and riparian/wetland areas except when their impacts can be mitigated to an acceptable level.
Stipulation Type	CSU
RMP Acres Affected	277,744 acres
Stipulation Description	Surface occupancy or use within ¼ mile of perennial surface water, and riparian/wetland areas will be restricted where determined to support special status fish species. (1) Prior to surface disturbance within ¼ mile of waters of the state, perennial surface water, and riparian/wetland areas where determined to support special status fish species, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface disturbing activities unless the BLM authorized officer has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: • Prevent contamination of soil and groundwater. • Upland sites are protected from storm water runoff using proper erosion and sediment control techniques. • Stabilization of channel crossings. (2) as mapped on the Worland/Cody Field Office GIS database; (3) to protect waters of the state, perennial surface water, and riparian/wetland areas. **Exception:** An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action can be fully mitigated or there are not

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	practical alternatives. **Modification:** Consider modifications if (1) there are no practical alternatives, (2) impacts can be fully mitigated, and (3) the action is designed to enhance the protected resource(s). **Waiver:** This stipulation may be waived, if the authorized officer determines that the entire leasehold can be occupied without adversely affecting riparian resources.
Management Action	**4153**
Protected Resource	Wild Horses: McCullough Peaks and Fifteenmile HMAs foaling season
Text of Management Action	Avoid and discourage organized special recreation permits using domestic horses in the McCullough Peaks and Fifteenmile HMAs.
Stipulation Type	TLS
RMP Acres Affected	180,371 acres
Stipulation Description	No surface use is allowed (1) Feb 1 to July 31; (2) within the McCullough Peaks and Fifteenmile HMAs as mapped on the Worland/Cody Field Office GIS database; (3) protecting McCullough Peaks and Fifteenmile HMAs foaling season. **Exception:** The BLM authorized officer may grant an exception the BLM determines the area is not likely to be occupied during the period of concern and the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated. **Modification:** The BLM authorized officer may modify the area subject to the stipulations based upon BLM determination that suitable foaling range is not present or boundaries of the HMA have changed. **Waiver:** The BLM authorized officer may grant a waiver if it is determined that the entire lease area is no longer within the HMA, or is not located within suitable foaling range.
Management Action	**5014**
Protected Resource	Cultural Resources: Legend Rock Petroglyph Site
Text of Management Action	Apply a NSO restriction on the Legend Rock Petroglyph Site.
Stipulation Type	NSO
RMP Acres Affected	783 acres
Stipulation Description	No surface occupancy or use is permitted allowed on within the designated Legend Rock Petroglyph Site. No Surface Occupancy (NSO) (1) within the designated Legend Rock Petroglyph site as mapped on the Worland Field Office GIS database; (2) for the protection of cultural resources. **Exception:** The BLM authorized officer may grant an exception if, after consultation with Indian tribes and SHPO, it is determined that the proposed action will result in a no adverse effect determination to the sacred, spiritual, and/or traditional nature of the property(s). **Modification:** This stipulation may be modified by the BLM authorized officer if, in consultation with Indian tribes and SHPO, the site is no longer considered eligible for NRHP or if, in consultation with Indian tribes and SHPO, it is determined that the identified property's sacred, spiritual, and/or traditional values have been downgraded and/or the tribes have reduced the previous avoidance distance around the site. **Waiver:** The BLM authorized officer may grant a waiver if it is determined, in consultation with Indian tribes and SHPO, that the identified site is no longer considered sacred, spiritual, and/or traditional.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**5021**
Protected Resource	Cultural Resources: Foreground of important cultural sites (defined in Glossary) up to 3 miles or the visual horizon
Text of Management Action	Avoid surface-disturbing activities and protect the foreground of important cultural sites (defined in Glossary) up to 3 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the site. Use BMPs (Appendix L) to avoid or mitigate adverse effects.
Stipulation Type	CSU
RMP Acres Affected	25,733 acres
Stipulation Description	(1) Surface occupancy or use will be restricted to no more than 1 location per lease, to include 1 well pad and ancillary facilities. Total surface disturbance per lease will not exceed 32 acres; (2) as mapped on the Cody Field Office GIS database; (3) protecting wildlife habitat in Zone 1 of the Absaroka Front MLP analysis area. **Exception:** The BLM authorized officer may grant an exception if, after consultation with Indian tribes and/or SHPO, it is determined that the proposed action will result in a no adverse effect determination to the sacred, spiritual, and/or traditional nature of the property(s). **Modification:** This stipulation may be modified by the BLM authorized officer if, in consultation with Indian tribes and SHPO, the site is no longer considered eligible for NRHP or if, in consultation with Indian tribes and/or SHPO, it is determined that the identified property's sacred, spiritual, and/or traditional values have been downgraded and/or the tribes have reduced the previous avoidance distance around the site. **Waiver:** The BLM authorized officer may grant a waiver if it is determined, in consultation with Indian tribes and/or SHPO, that the identified site is no longer considered sacred, spiritual, and/or traditional.
Management Action	**5049**
Protected Resource	VRM: Class II
Text of Management Action	Allow surface-disturbing activities in areas managed as VRM Class II only if the level of change to the landscape from the activities are low, and will not attract the attention of the casual observer, or the project can be mitigated to meet these objectives.
Stipulation Type	CSU
RMP Acres Affected	1,163,380 acres
Stipulation Description	Controlled Surface Use (CSU) --Surface occupancy or use will be restricted within Class I and/or Class II Visual Resource Management VRM) areas. (1) Prior to surface disturbance within Visual Resource Management Class I and/or II areas, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface disturbing activities unless the BLM authorized officer has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: • A visual contrast rating must demonstrate that VRM Class I and/or II objectives will be met. • Where required by the BLM authorized officer, a visual simulation must be prepared and must demonstrate that VRM Class I and/or II objectives will be met through practices such as siting of permanent facilities. • Where present and feasible, existing surface disturbances shall be utilized; new surface disturbances shall be minimized to the extent practicable. • All permanent above-ground facilities (such as production tanks or other production facilities) not having specific coloration requirements for safety must be painted or designed using a BLM-approved color.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	(2) as mapped in the Worland/Cody Field Office GIS database; (3) protecting Class II Visual Resource Management Areas. **Exception:** The BLM authorized officer may grant an exception if it is demonstrated through a BLM-approved visual simulation and contrast rating worksheet that the project or identified mitigation will meet or exceed VRM Class I or II objectives. This restriction does not apply to temporary structures such as drilling rigs. **Modification:** The BLM authorized officer may modify the area subject to the stipulation if it is demonstrated that VRM Class I or II objectives have been modified through appropriate RMP planning procedures, or if a portion of the lease is not located within a VRM Class II area. **Waiver:** The BLM authorized officer may grant a waiver if it is determined that the entire leasehold is no longer managed for VRM Class I or II objectives based on planning, or if the entire leasehold is not located within a Class I or II area.
Management Action	**6067**
Protected Resource	Recreational Resources: Campgrounds, trailheads, day use areas, and similar recreation sites
Text of Management Action	Apply a NSO restriction at the time of lease offering on the following: • Fishing and hunting access areas (8,034 acres) • Five Springs Falls Campground (approximately 372 acres) • The Cody Archery Range (374 acres) • Lovell Rod and Gun Club shooting range (139 acres) • Areas within ¼ mile of campgrounds, trailheads, day use areas, and similar recreational sites
Stipulation Type	NSO
RMP Acres Affected	Fishing and hunting access areas (8,034 acres) Five Springs Falls Campground (approximately 372 acres) The Cody Archery Range (374 acres) R&PP lease the Lovell Rod and Gun Club shooting range (139 acres)
Stipulation Description	No surface occupancy or use is permitted (1) on developed recreation sites (2) for the protection of designated campgrounds, trailheads, day use areas, and similar recreation sites. **Exception:** An exception to this stipulation may be granted by the BLM authorized officer if the BLM determines that the function and utility of the recreational resources are not adversely affected. **Modification:** The BLM authorized officer may modify the stipulation if the boundaries of recreational sites are changed or a portion of the lease area is determined not to be located within a designated recreational site. **Waiver:** This BLM authorized officer may waive this stipulation if it is determined that the entire leasehold no longer contains developed recreation areas.
Management Action	**6077**
Protected Resource	Scenic and Recreational Resources: Absaroka Mountain Foothills SRMA
Text of Management Action	Apply a CSU stipulation on the Absaroka Mountain Foothills SRMA and Absaroka ERMA.
Stipulation Type	CSU
RMP Acres Affected	71,705 acres
Stipulation Description	Surface occupancy or use will be restricted within the Absaroka Mountain Foothills SRMA and Absaroka ERMA (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Scenic and Recreational

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6087**
Protected Resource	Scenic and Recreational Resources: Areas within the Bighorn River SRMA and Bighorn River ERMA
Text of Management Action	Apply an NSO restriction on lands within the Bighorn River SRMA and the Bighorn River ERMA.
Stipulation Type	NSO
RMP Acres Affected	3,976 acres
Stipulation Description	No surface occupancy is permitted (1) on lands within the Bighorn River SRMA and the Bighorn River ERMA (2) protecting the Bighorn River SRMA and the Bighorn River ERMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.
Management Action	**6109**
Protected Resource	Scenic and Recreational Resources: Tatman Mountain RMZ
Text of Management Action	Apply a CSU stipulation on the Tatman Mountain RMZ.
Stipulation Type	CSU
RMP Acres Affected	49,393 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Tatman Mountain RMZ (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Scenic and Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**6127**
Protected Resource	Scenic and Recreational Resources: Canyons RMZ
Text of Management Action	Apply a CSU stipulation on the Canyons RMZ.
Stipulation Type	CSU
RMP Acres Affected	3,679 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Canyons RMZ (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Scenic and Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6148**
Protected Resource	Scenic and Recreational Resources: Brokenback/Logging Road RMZ
Text of Management Action	Apply a CSU stipulation on the Brokenback/Logging Road RMZ.
Stipulation Type	CSU
RMP Acres Affected	49,328 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Brokenback/Logging Road RMZ (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Scenic and Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6159**
Protected Resource	Scenic and Recreational Resources: Middle Fork of the Powder River SRMA
Text of Management Action	Apply a CSU stipulation on the Middle Fork of the Powder River SRMA. Review mineral leases on a case-by-case basis and apply mitigation through activity level planning in the Southern Bighorns ERMA.
Stipulation Type	CSU
RMP Acres Affected	13,368 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Middle Fork of the Powder River SRMA (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts;

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Scenic and Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6170**
Protected Resource	Scenic and Recreational Resources: Canyon Creek SRMA
Text of Management Action	Apply a CSU stipulation on the Canyon Creek SRMA.
Stipulation Type	CSU
RMP Acres Affected	3,679 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Canyon Creek SRMA (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Scenic and Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6189**
Protected Resource	Scenic and Recreational Resources: Within ¼ mile of campgrounds, trailheads, day use areas, river access sites, and similar recreational sites in The Rivers SRMA
Text of Management Action	Apply an NSO restriction on areas within ¼ mile of campgrounds, trailheads, day use areas, river access sites, and similar recreational sites within The Rivers SRMA.
Stipulation Type	NSO
RMP Acres Affected	197 acres
Stipulation Description	No surface occupancy is permitted (1) Within ¼ mile of campgrounds, trailheads, day use areas, river access sites, and similar recreational sites in The Rivers SRMA (2) for protection of developed recreation sites. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**6200**
Protected Resource	Scenic and Recreational Resources: McCullough Peaks SRMA
Text of Management Action	Apply a NSO restriction on 41,653 acres within the McCullough Peaks SRMA.
Stipulation Type	NSO
RMP Acres Affected	65,552 acres
Stipulation Description	No surface occupancy is permitted (1) within the McCullough Peaks SRMA (2) for the protection of Scenic and Recreational Resources. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6208**
Protected Resource	Recreational Resources: Basin Gardens Play Area RMZ
Text of Management Action	Apply a CSU stipulation on the Basin Gardens Play Area SRMA.
Stipulation Type	CSU
RMP Acres Affected	4,426 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Basin Gardens Play Area RMZ (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**6227**
Protected Resource	Recreational Resources: Horse Pasture SRMA.
Text of Management Action	Apply a CSU stipulation on the Horse Pasture SRMA.
Stipulation Type	CSU
RMP Acres Affected	144 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Horse Pasture SRMA (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Worland Field Office GIS database; (3) protecting Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6237**
Protected Resource	Scenic and Recreational Resources: Beck Lake SRMA
Text of Management Action	Apply a CSU stipulation on the Beck Lake SRMA.
Stipulation Type	CSU
RMP Acres Affected	6,475 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Beck Lake SRMA (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA. (2) as mapped on the Cody Field Office GIS database; (3) protecting Scenic and Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**6245**
Protected Resource	Scenic and Recreational Resources: Newton Lake Ridge SRMA
Text of Management Action	The Newton Lake Ridge SRMA is open to oil and gas leasing with a CSU restriction.
Stipulation Type	CSU
RMP Acres Affected	1,949 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Newton Lake Ridge SRMA (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate to the authorized officer's satisfaction that the proposed action is consistent with the prescribed management for the SRMA.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	(2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting Scenic and Recreational Resources and ensuring the recreational opportunities and setting of the SRMA. **Exception:** Consider exceptions if exploration and development would not impair identified scenic and primitive or semi primitive recreational resources. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**7007**
Protected Resource	Special Designations (Paleontological Resources): Fossil concentration area in the Big Cedar Ridge ACEC
Text of Management Action	Apply an NSO restriction on the 264-acre fossil concentration area in the Big Cedar Ridge ACEC.
Stipulation Type	NSO
RMP Acres Affected	264 acres
Stipulation Description	No surface occupancy is permitted (1) on the 264-acre fossil concentration area in the Big Cedar Ridge ACEC (2) protection of paleontological resources. **Exception:** An exception to this restriction or stipulation may be granted by the authorized officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** This stipulation may be waived, if the authorized officer determines that the entire leasehold no longer contains designated ACECs.
Management Action	**7021**
Protected Resource	Special Designations (Paleontological Resources): Sundance Formation of the Red Gulch Dinosaur Tracksite ACEC
Text of Management Action	Apply an NSO restriction for mineral leasing, exploration, and development on BLM-administered lands in the Sundance Formation of the Red Gulch Dinosaur Tracksite ACEC.
Stipulation Type	NSO
RMP Acres Affected	1,798 acres
Stipulation Description	No surface occupancy is permitted (1) within Sundance Formation of the Red Gulch Dinosaur Tracksite ACEC (2) protection of paleontological resources. **Exception:** An exception to this restriction or stipulation may be granted by the authorized officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** This stipulation may be waived, if the authorized officer determines that the entire leasehold no longer contains designated ACECs.
Management Action	**7029**
Protected Resource	Special Designations (Geologic Resources): Center of the Sheep Mountain Anticline ACEC
Text of Management Action	Apply an NSO restriction on the center of the Sheep Mountain Anticline.
Stipulation Type	NSO
RMP Acres Affected	9,034 acres
Stipulation Description	No surface occupancy is permitted (1) within the center of the Sheep Mountain Anticline ACEC (2) protection of geologic resources.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	Exception: An exception to this restriction or stipulation may be granted by the authorized officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** This stipulation may be waived, if the authorized officer determines that the entire leasehold no longer contains designated ACECs.
Management Action	**7029**
Protected Resource	Special Designations (Geologic Resources): Northern and southern portions of the Sheep Mountain Anticline ACEC
Text of Management Action	Apply a CSU on the northern portion and the southern portion of the Sheep Mountain Anticline ACEC.
Stipulation Type	CSU
RMP Acres Affected	2,227 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the Northern and southern portion of the Sheep Mountain Anticline ACEC (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting Special Designations (Geologic Resources). **Exception:** An exception to this restriction or stipulation may be granted by the authorized officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** This stipulation may be waived, if the authorized officer determines that the entire leasehold no longer contains designated ACECs.
Management Action	**7154**
Protected Resource	Special Designations (Geologic; Paleontological): Paleocene, Eocene Thermal Maximum ACEC
Text of Management Action	Apply an NSO restriction on the PETM ACEC. Grant exceptions on a case-by-case basis.
Stipulation Type	NSO
RMP Acres Affected	14,908 acres
Stipulation Description	No surface occupancy is permitted (1) within the PETM ACEC (2) protection of geologic and paleontological resources. **Exception:** An exception to this restriction or stipulation may be granted by the authorized officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** This stipulation may be waived, if the authorized officer determines that the entire leasehold no longer contains designated ACECs.

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

Management Action	**7296**
Protected Resource	Special Designations (Cultural Resources): Within the viewshed from the Heart Mountain Relocation Camp National Historic Landmark toward Heart Mountain
Text of Management Action	Apply a CSU stipulation and BMPs (Appendix L) to avoid or mitigate adverse effects within the viewshed from the Heart Mountain Relocation Camp National Historic Landmark toward Heart Mountain.
Stipulation Type	CSU
RMP Acres Affected	7,365 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within the viewshed of the Heart Mountain Relocation Camp National Historic Landmark (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting the viewshed from the Heart Mountain Relocation Camp National Historic Landmark toward Heart Mountain. **Exception:** An exception to this restriction or stipulation may be granted by the authorized officer, if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated. **Modification:** The stipulated area may be modified by the authorized officer if the boundaries are changed. **Waiver:** A waiver may be granted if the restriction violates the leaseholder/operator lease rights.
Management Action	**7299**
Protected Resource	Special Designations (Scenic and Cultural Resources): Up to 3 miles from the Nez Perce (Neeme-poo) NHT
Text of Management Action	Protect the foreground of National Historic Trails (defined in Glossary) up to 3 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail. Use BMPs (Appendix L) to avoid or mitigate adverse effects.
Stipulation Type	CSU
RMP Acres Affected	25,733 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited within 3 miles from the Nez Perce (Neeme-poo) NHT or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate proposed infrastructure is either not visible or will result in a weak contrast rating. (2) as mapped on the Cody Field Office GIS database; (3) protecting Special Designations (Scenic and Cultural Resources) the Nez Perce (Neeme-poo) NHT **Exception:** The authorized officer may consider a lease stipulation exception within the National Trails Management Corridor if 1) an action is at least 3 miles from a National Trail, a significant National Trail historical or recreational site, or Trail-related recreational activities; or, 2) all components and effects of the action are in compliance with the RMP-designated VRM standard in consultation with appropriate federal agency. The proposal must be capable of attaining a no adverse-affect determination in consultation with SHPO. **Modification:** The authorized officer may modify the area subject to the stipulation or surface occupancy criteria if it is determined by the BLM, after consultation with the appropriate federal and/or agency that a portion of the NSO area does not contribute, as determined by Section 106, to the trails' nature and purpose or their setting or if the proposed action can be developed in a way that meets the management objectives for the NHTs. This determination shall be based upon field evaluation of the area by a qualified archaeologist/historian and subject to confirmation by the BLM. **Waiver:** The authorized officer may grant a waiver if it is determined, in consultation with the

Table G-1. Oil and Gas Lease Stipulations – Bighorn Basin Planning Area (Continued)

	appropriate federal and/or state agency, that the area is no longer considered to contribute to the trails' nature and purpose or setting or if the proposed action can be developed in a way that meets the management objectives for the NHTs. This determination shall be based upon field evaluation of the area by a qualified archaeologist/historian and subject to confirmation by the BLM.
Management Action	**7303**
Protected Resource	Special Designations (Scenic and Cultural Resources): Up to 2 miles from Other Trails
Text of Management Action	Protect the foreground of Historic Trails (defined in glossary) up to 2 miles or the visual horizon whichever is closer (the SCZ) where setting is an important aspect of the integrity for the trail, and use BMPs (Appendix L) to avoid or mitigate adverse effects.
Stipulation Type	CSU
RMP Acres Affected	414,586 acres
Stipulation Description	Surface occupancy or use will be restricted or prohibited up to 2 miles where setting is an important aspect of the integrity for the trail. (1) unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; The Plan must demonstrate proposed infrastructure is either not visible or will result in a weak contrast rating. (2) as mapped on the Worland/Cody Field Office GIS database; (3) protecting other historic trails. **Exception:** The authorized officer may grant an exception if surveys determine that other historic trail remnants are not present or it is determined that the section of trail is sufficiently compromised that the action will not result in an adverse effect to the trail. **Modification:** If surveys determine that a portion of the lease area does not contain contributing trail segments, then the stipulation may be modified. This determination shall be based upon field evaluation of the area by a qualified archaeologist/historian and subject to confirmation by the BLM. **Waiver:** The authorized officer may grant a waiver if surveys determine that the entire lease area does not contain contributing trail segments, then the stipulation may be waived. This determination shall be based upon field evaluation of the area by a qualified archaeologist/historian and subject to confirmation by the BLM.

ACEC	Area of Critical Environmental Concern
APD	Application for Permit to Drill
BLM	Bureau of Land Management
BMP	Best Management Practice
CSU	Controlled Surface Use
dBA	Decibels with an A-weighted scale
ERMA	Extensive Recreation Management Area
GIS	Geographic Information System
HMA	Herd Management Area
HMP	Habitat Management Plan
LRP	Limited Reclamation Potential
MLP	Master Leasing Plan
NHT	National Historic Trail
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
PETM	Paleocene, Eocene Thermal Maximum
PHMAs	Priority Habitat Management Areas
RAMP	Recreation Area Management Plan
RMZ	Recreation Management Zone
SCZ	Setting Consideration Zone
SHPO	State Historic Preservation Office
SRMA	Special Recreation Management Area
SSURGO	Soil Survey Geographic
TLS	Timing Limitation Stipulation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management
WGFD	Wyoming Game and Fish Department
WHMA	Wildlife Habitat Management Area

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Appendix H

Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities

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APPENDIX H

WYOMING BUREAU OF LAND MANAGEMENT MITIGATION GUIDELINES FOR SURFACE-DISTURBING AND DISRUPTIVE ACTIVITIES

1.0 INTRODUCTION

Wyoming Mitigation Guidelines are a compilation of practices employed by Bureau of Land Management (BLM) to mitigate impacts from surface disturbance. They apply to activities such as, but not limited to, road or pipeline construction, range improvements, and permitted recreation activities. The guidelines are designed to protect resources such as soils and vegetation, wildlife habitat, and cultural or historic properties. The guidelines are presented as an appendix of this Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) for easy reference as they apply to many resources and derive from many laws. All BLM RMPs have included these guidelines as appendices. The guidelines are not land use decisions; rather they are examples of mitigation measures that could be applied, as appropriate, based on site-specific National Environmental Policy Act (NEPA) analysis for individual proposals. Comment on the use and application of specific mitigation measures can be made during the NEPA process for individual proposals. Because mitigation measures change or are modified, based on new information, the guidelines are updated periodically for all field offices in Wyoming.

These guidelines are primarily for the purpose of attaining statewide consistency in how requirements are determined for avoiding and mitigating environmental impacts and resource and land use conflicts. Consistency in this sense does not mean that identical requirements would be applied for all similar types of land use activities that may cause similar types of impacts. Nor does it mean that the requirements or guidelines for a single land use activity would be identical in all areas.

The EIS for the RMP does not decide or dictate the exact wording or inclusion of these guidelines. Rather, the guidelines are used in the RMP EIS process as a tool to help develop the RMP alternatives and to provide a baseline for comparative impact analysis in arriving at RMP decisions. These guidelines will be used in the same manner in analyzing activity plans and other site-specific proposals. These guidelines and their wording are matters of policy. As such, specific wording is subject to change primarily through administrative review, not through the RMP EIS process. Any further changes that may be made in the continuing refinement of these guidelines and any development of program-specific standard stipulations will be handled in another forum, including appropriate public involvement and input.

2.0 PURPOSE

The purpose of the "Wyoming BLM Mitigation Guidelines" is to inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered public lands. These guidelines have been written in a format that will allow for the addition of specific or specialized mitigation following the submission of a detailed plan of development or other project proposal, and an environmental analysis.

Those resource activities or programs currently without a standardized set of permit or operation stipulations can use the mitigation guidelines as stipulations or as conditions of approval, or as a baseline for developing specific stipulations for a given activity or program.

Because use of the mitigation guidelines was integrated into the RMP EIS process and will be integrated into the site-specific environmental analysis process, the application of stipulations or mitigation requirements derived through the guidelines will facilitate consistency with planning decisions at plan implementation.

3.0 MITIGATION GUIDELINES

3.1 Surface Disturbance Mitigation Guideline

Surface disturbance will be controlled or prohibited in the following areas or conditions. For Federal oil and gas lease operations, under 43 CFR 3101.1-2 and the terms of the lease (BLM Form 3100-11), the authorized officer may require reasonable measures to minimize adverse impacts to other resource values, land uses, and users not addressed in lease stipulations at the time operations are proposed. Such reasonable measures may include, but are not limited to, modification of siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. At a minimum, measures shall be deemed consistent with lease rights granted provided they do not: require relocation of proposed operations by more than 200 meters; require that operations be sited off the leasehold; or prohibit new surface disturbing operations for a period in excess of 60 days in any lease year.

- Slopes in excess of 25 percent.
- Within important scenic areas (Class I and II Visual Resource Management Areas).
- Within 500 feet of surface water and/or riparian areas.
- Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.
- Within 500 feet of Interstate highways and 200 feet of other existing rights-of-way (i.e., U.S. and State highways, roads, railroads, pipelines, power lines).
- Within ¼-mile of occupied dwellings.

Guidance

The intent of the surface disturbance mitigation guideline is to inform interested parties (potential lessees, permittees, or operators) that when one or more of the above conditions exist, surface-disturbing activities will be prohibited unless or until a permittee or the designated representative and the surface management agency arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development.

Specific criteria (e.g., 500 feet from water) have been established based upon the best information available. However, geographical areas and time periods must be delineated at the field level.

3.2 Wildlife Mitigation Guideline

A. To protect important big game winter habitat, activities or surface use will not be allowed from November 15 to April 30 within certain areas encompassed by the authorization.

   Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

   Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the authorized officer.

B. To protect important raptor and/or sage and sharp-tailed grouse nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within certain areas encompassed by the authorization. The same criteria apply to defined raptor and game bird winter concentration areas from November 15 to April 30.

   Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

   Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the authorized officer.

C. No activities or surface use will be allowed on that portion of the authorization area identified within (legal description) for the purpose of protecting (e.g., sage/sharp-tailed grouse breeding grounds, and/or other species/activities) habitat.

   Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the authorized officer.

D. Portions of the authorized use area legally described as (legal description), are known or suspected to be essential habitat for (name) which is a threatened or endangered species. Prior to conducting any onsite activities, the lessee/permittee will be required to conduct inventories or studies in accordance with BLM and United States Fish and Wildlife Service guidelines to verify the presence or absence of this species. In the event that (name) occurrence is identified, the lessee/permittee will be required to modify operational plans to include the protection requirements of this species and its habitat (e.g., seasonal use restrictions, occupancy limitations, facility design modifications).

Guidance

The Wildlife Mitigation Guideline is intended to provide two basic types of protection: seasonal restriction and prohibition of activities or surface use (2c). Item 2d is specific to situations involving threatened or endangered species. Legal descriptions will ultimately be required and should be measurable and legally definable. There are no minimum subdivision requirements at this time. The area delineated can and should be defined as necessary, based upon current biological data, prior to the time of processing an application and issuing the use authorization. The legal description must eventually become a part of the condition for approval of the permit, plan of development, and/or other use authorization.

The seasonal restriction section identifies three example groups of species and delineates three similar timeframe restrictions. The big game species including elk, moose, deer, pronghorn, and bighorn sheep, all require protection of crucial winter range between November 15 and April 30. Elk and bighorn sheep also require protection from disturbance from May 1 to June 30, when they typically occupy distinct

calving and lambing areas. Raptors include eagles, accipiters, falcons (peregrine, prairie, and merlin), buteos (ferruginous and Swainson's hawks), osprey, and burrowing owls. The raptors and sage and sharp-tailed grouse require nesting protection between February 1 and July 31. The same birds often require protection from disturbance from November 15 through April 30 while they occupy winter concentration areas.

Item 2c, the prohibition of activity or surface use, is intended for protection of specific wildlife habitat areas or values within the use area that cannot be protected by using seasonal restrictions. These areas or values must be factors that limit life-cycle activities (e.g., sage-grouse strutting grounds, known threatened and endangered species habitat).

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

3.3 Cultural Resource Mitigation Guideline

When a proposed land use has potential for affecting the characteristics which qualify a cultural property for the National Register of Historic Places (NRHP), mitigation will be considered. In accordance with Section 106 of the National Historic Preservation Act, procedures specified in 36 Code of Federal Regulation (CFR) 800 will be used in consultation with the Wyoming State Historic Preservation Officer and the Advisory Council on Historic Preservation in arriving at determinations regarding the need and type of mitigation to be required.

Guidance

The preferred strategy for treating potential adverse effects on cultural properties is "avoidance." If avoidance involves project relocation, the new project area may also require cultural resources survey. If avoidance is imprudent or unfeasible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative measures.

Reports documenting results of cultural resources survey, evaluation, and the establishment of mitigation alternatives (if necessary) shall be written according to standards contained in BLM Manuals, the cultural resource permit stipulations, and in other policy issued by the BLM. These reports must provide sufficient information for Section 106 consultation. Reports shall be reviewed for adequacy by the appropriate BLM cultural resource specialist. If cultural properties on, or eligible for, the NRHP are located within these areas of potential impact and cannot be avoided, the authorized officer shall begin the Section 106 consultation process in accordance with the procedures contained in 36 CFR 800.

Mitigation measures shall be implemented according to the mitigation plan approved by the BLM authorized officer. Such plans are usually prepared by the land use applicant according to BLM specifications. Mitigation plans will be reviewed as part of Section 106 consultation for NRHP eligible or listed properties. The extent and nature of recommended mitigation shall be commensurate with the significance of the cultural resource involved and the anticipated extent of damage. Reasonable costs for mitigation will be borne by the land use applicant. Mitigation must be cost effective and realistic. It must consider project requirements and limitations, input from concerned parties, and be BLM approved or BLM formulated.

Mitigation of paleontological and natural history sites will be treated on a case-by-case basis. Factors such as site significance, economics, safety, and project urgency must be taken into account when making a decision to mitigate. Authority to protect (through mitigation) such values is provided for in FLPMA, Section 102(a)(8). When avoidance is not possible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative protection measures.

3.4 Special Resource Mitigation Guideline

To protect (resource value), activities or surface use will not be allowed (i.e., within a specific distance of the resource value or between date to date) in (legal description).

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the authorized officer.

Example Resource Categories (Select or identify category and specific resource value):

a. Recreation areas
b. Special natural history or paleontological features
c. Special management areas
d. Sections of major rivers
e. Prior existing rights-of-way
f. Occupied dwellings
g. Other (specify)

Guidance

The *Special Resource Mitigation Guideline* is intended for use only in site-specific situations where one of the first three general mitigation guidelines will not adequately address the concern. The resource value, location, and specific restrictions must be clearly identified. A detailed plan addressing specific mitigation and special restrictions will be required prior to disturbance or development and will become a condition for approval of the permit, plan of development, or other use authorization.

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

3.5 No Surface Occupancy Guideline

No Surface Occupancy (NSO) will be allowed on the following described lands (legal description) because of (resource value).

Example Resource Categories (Select or identify category and specific resource value):

a. Recreation areas (e.g., campgrounds, historic trails, national monuments)
b. Major reservoirs/dams
c. Special management area (e.g., known threatened or endangered species habitat, areas suitable for consideration for wild and scenic rivers designation)
d. Other (specify)

Guidance

The *No Surface Occupancy Mitigation Guideline* is intended for use only when other mitigation is determined insufficient to adequately protect the public interest and is the only alternative to "no development" or "no leasing." The legal description and resource value of concern must be identified and be tied to an NSO land use planning decision.

Waiver of, or exception(s) to, the NSO requirement will be subject to the same test used to initially justify its imposition. If, upon evaluation of a site-specific proposal, it is found that less restrictive mitigation would adequately protect the public interest or value of concern, then a waiver or exception to the NSO requirement is possible. The record must show that because conditions or uses have changed, less restrictive requirements will protect the public interest. An environmental analysis must be conducted and documented (e.g., environmental assessment, environmental impact statement, etc., as necessary) in order to provide the basis for a waiver or exception to an NSO planning decision. Modification of the NSO requirement will pertain only to refinement or correction of the location(s) to which it applied. If the waiver, exception, or modification is found to be consistent with the intent of the planning decision, it may be granted. If found inconsistent with the intent of the planning decision, a plan amendment would be required before the waiver, exception, or modification could be granted.

When considering the "no development" or "no leasing" option, a rigorous test must be met and fully documented in the record. This test must be based upon stringent standards described in the land use planning document. Since rejection of all development rights is more severe than the most restrictive mitigation requirement, the record must show that consideration was given to development subject to reasonable mitigation, including "no surface occupancy." The record must also show that other mitigation was determined to be insufficient to adequately protect the public interest. A "no development" or "no leasing" decision should not be made solely because it appears that conventional methods of development would be unfeasible, especially where an NSO restriction may be acceptable to a potential permittee. In such cases, the potential permittee should have the opportunity to decide whether or not to go ahead with the proposal (or accept the use authorization), recognizing that an NSO restriction is involved.

3.6 Regional Mitigation Guideline

For information on Regional Mitigation, please refer to Section 2.3.6 of this RMP.

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Appendix I

Standard Oil and Gas Stipulations

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APPENDIX I

STANDARD OIL AND GAS STIPULATIONS

1.0 MULTIPLE MINERAL DEVELOPMENT STIPULATION

1.1 Standard Lease Stipulation No. 1: Cultural Resources

This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders. The BLM will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., State Historic Preservation Officer and tribal consultation) under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

1.2 Standard Lease Stipulation No. 2: Endangered Species Act Section 7 Consultation

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 United States Code (U.S.C.) § 1531 et seq., including completion of any required procedure for conference or consultation.

1.3 Standard Lease Stipulation No. 3: Multiple Mineral Development

Operations will not be approved that, in the opinion of the authorized officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

1.4 Lease Notice 1

Under Regulation 43 Code of Federal Regulations (CFR) 3101.1 2 and terms of the lease (BLM Form 3100 11), the authorized officer may require reasonable measures to minimize adverse impacts to other resource values, land uses, and users not addressed in lease stipulations at the time operations are proposed. Such reasonable measures may include, but are not limited to, modification of siting or design of facilities, timing of operations, and specification of interim and final reclamation measures, which may require relocating proposed operations up to 200 meters, but not off the leasehold, and prohibiting surface-disturbing activities for up to 60 days.

The lands within this lease may include areas not specifically addressed by lease stipulations that may contain special values, may be needed for special purposes, or may require special attention to prevent damage to surface and/or other resources. Possible special areas are identified below. Any surface use or occupancy within such special areas will be strictly controlled or, if absolutely necessary, prohibited. Appropriate modifications to imposed restrictions will be made for the maintenance and operation of producing wells.

1. Slopes in excess of 25 percent.
2. Within 500 feet of surface water and/or riparian areas.
3. Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.
4. Within 500 feet of Interstate highways and 200 feet of other existing rights-of-way (i.e., United States and State highways, roads, railroads, pipelines, power lines).
5. Within ¼ mile of occupied dwellings.
6. Material sites.

Guidance

The intent of this notice is to inform interested parties (potential lessees, permittees, operators) that when one or more of the above conditions exist, surface-disturbing activities will be prohibited unless or until the permittee or the designated representative and the surface management agency arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development and become a condition for approval when authorizing the action. Specific threshold criteria (e.g., 500 feet from water) have been established based upon the best information available. However, geographical areas and time periods of concern must be delineated at the field level (i.e., “surface water and/or riparian areas” may include both intermittent and ephemeral water sources or may be limited to perennial surface water). The referenced oil and gas leases on these lands are hereby made subject to the stipulation that the exploration or drilling activities will not interfere materially with the use of the area as a materials site/free use permit. At the time operations on the above lands are commenced, notification will be made to the appropriate agency. The name of the appropriate agency may be obtained from the proper BLM Field Office.

1.5 Lease Notice 2

Background

The BLM, by including National Historic Trails (NHTs) within its National Landscape Conservation System, has recognized these trails as national treasures. The BLM's responsibility is to review the strategy for management, protection, and preservation of these trails. The NHTs in Wyoming, which include the Oregon, California, Mormon Pioneer, and Pony Express Trails, as well as the Nez Perce Trail, were designated by Congress through the National Trails System Act (Public Law (Pub. L.) 90-543; 16 U.S.C. 1241-1251) as amended through Pub. L. 106-509 dated November 13, 2000.

Protection of the NHTs is normally considered under the National Historic Preservation Act (Pub. L. 89-665; 16 U.S.C. 470 et seq.) as amended through 1992 and the National Trails System Act. Additionally, Executive Order 13195, "Trails for America in the 21st Century," signed January 18, 2001, states in Section 1: "Federal agencies will...protect, connect, promote, and assist trails of all types throughout the United States (U.S.). This will be accomplished by…(b) Protecting the trail corridors associated with national scenic trails and the high priority potential sites and segments of national historic trails to the degrees necessary to ensure that the values for which each trail was established remain intact." Therefore, the BLM will be considering all impacts and intrusions to the NHTs, their associated historic landscapes, and all associated features, such as trail traces, grave sites, historic encampments, inscriptions, natural features frequently commented on by emigrants in journals, letters and diaries, or any other feature contributing to the historic significance of the trails. Additional NHTs will likely be designated amending the National Trails System Act. When these amendments occur, this notice will apply to those newly designated NHTs as well.

Strategy

The BLM will proceed in this objective by conducting a viewshed analysis on either side of the designated centerline of the NHTs in Wyoming for the purpose of identifying and evaluating potential impacts to the trails, their associated historic landscapes, and their associated historic features. Subject to the viewshed analysis and archeological inventory, reasonable mitigation measures may be applied. These may include, but are not limited to, modification of siting or design of facilities to camouflage or otherwise hide the proposed operations within the viewshed. Additionally, specification of interim and final reclamation measures may require relocating the proposed operations within the leasehold. Surface-disturbing activities will be analyzed in accordance with the National Environmental Policy Act (NEPA) of 1969 (Pub. L. 91-190; 42 U.S.C. 4321-4347) as amended through Pub. L. 94-52, July 3, 1975 and Pub. L. 94-83, August 9, 1975, and the National Historic Preservation Act, supra, to determine if any design, siting, timing, or reclamation requirements are necessary). This strategy is necessary until the BLM determines that, based on the results of the completed viewshed analysis and archeological inventory, the existing land use plans (Resource Management Plans [RMP]) have to be amended.

The use of this lease notice is a predecisional action, necessary until final decisions regarding surface-disturbing restrictions are made. Final decisions regarding surface-disturbing restrictions will take place with full public disclosure and public involvement over the next several years if BLM determines that it is necessary to amend existing land use plans.

Guidance

The intent of this notice is to inform interested parties (potential lessees, permittees, operators) that when any oil and gas lease contains remnants of NHTs, or is located within the viewshed of a NHTs' designated centerline, surface-disturbing activities will require the lessee, permittee, operator or their designated representative, and the surface management agency to arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development and become a condition for approval when authorizing the action.

1.6 Lease Notice 3

Greater Sage-Grouse Habitat: The lease may in part, or in total, contain important greater sage-grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on the greater sage-grouse populations and habitat quality. Such measures shall be developed during the Application for Permit to Drill (APD) on-site and environmental review process and will be consistent with the lease rights granted.

1.7 Attachment to Each Lease

Notice to Lessee

Provisions of the Mineral Leasing Act (MLA) of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976, affect an entity's qualifications to obtain an oil and gas lease. Section 2(a)(2)(A) of the MLA, 30 U.S.C. 201 (a)(2)(A), requires that any entity that holds and has held a federal coal lease for 10 years beginning on or after August 4, 1976, and who is not producing coal in commercial quantities from each such lease, cannot qualify for the issuance of any other lease granted under the MLA. Compliance by coal lessees with Section 2(a)(2)(A) is explained in 43 CFR 3472.

In accordance with the terms of this oil and gas lease, with respect to compliance by the initial lessee with qualifications concerning federal coal lease holdings, all assignees and transferees are hereby notified that this oil and gas lease is subject to cancellation if: (1) the initial lessee as assignor or as transferor has falsely certified compliance with Section 2(a)(2)(A), or (2) because of a denial or disapproval by a State Office of a pending coal action, i.e., arms-length assignment, relinquishment, or logical mining unit, the initial lessee as assignor or as transferor is no longer in compliance with Section 2(a)(2)(A). The assignee, sublessee or transferee does not qualify as a bona fide purchaser and, thus, has no rights to bona fide purchaser protection in the event of cancellation of this lease due to noncompliance with Section 2(a)(2)(A). Information regarding assignor, sublessor or transferor compliance with Section 2(a)(2)(A) is contained in the lease case file as well as in other BLM records available through the State Office issuing this lease.

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Appendix J

Air Resources Management Plan

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APPENDIX J

AIR RESOURCES MANAGEMENT PLAN

1.0 INTRODUCTION

1.1 Background

1.1.1 Preparation of the Analysis of the Management Situation in 2008 disclosed monitoring data within and adjacent to the Planning Area is limited. Concern arose over the need to establish background concentrations and to have monitoring in place prior to increased development.

1.1.2 The need for establishing background concentrations was not based on concern over existing air quality, but rather to provide adequate monitoring to characterize changes over time. Table J-1 is an overview of the applicable primary WAAQS and NAAQS and baseline representative maximum pollutant concentrations measured in and at sites near the Planning Area. These representative concentrations can be compared with the applicable WAAQS and NAAQS to indicate the status of recent air quality conditions within the Planning Area relative to the standards.

The examination of these data indicates that the current air quality for criteria pollutants in the Planning Area is considered good overall. Based upon measurements taken at the North Absaroka IMPROVE site (Figure J-1) and the Cloud Peak IMPROVE site (Figure J-2), visibility in the Planning Area is considered excellent.

1.1.3 To address the monitoring data limitation at the land use planning level, the BLM and cooperating agencies developed Management Action 1002 to establish a monitoring network to provide additional data for describing background concentrations.

1.1.4 The BLM established a monitoring site approximately 25 miles north of Worland in Big Horn County, known as the Basin site. The purpose of this station is to provide a general indicator of existing air quality and long term trends in air quality but is not intended for NAAQS compliance.

1.1.5 The emissions projected in the emissions calculations in Appendix U of the Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) have potential to negatively impact visibility and air quality in Bridger, Fitzpatrick, North Absaroka, and Washakie Wilderness Areas and Yellowstone National Park depending upon the temporal and spatial distribution of development. This emission inventory was compiled for the Planning Area to determine the relative magnitude of total air pollutant emissions to compare emissions and associated impacts between the alternatives. The estimated levels of emissions for each alternative are summarized in Table J-2. Projected emissions are similar to those of the base year, 2008, as shown in Table J-2 and Table J-3. The emission inventory also revealed that emissions would primarily result from mineral development and production.

Table J-1. Applicable National and State Primary Air Quality Standards for Criteria Pollutants and Baseline Representative Concentrations for the Planning Area

Pollutant	Averaging Time	NAAQS			WAAQS			Representative Concentrations		
		(ppm)	*(ppb)*	*(µg/m³)*	*(ppm)*	*(ppb)*	*(µg/m³)*	*(ppm)*	*(ppb)*	*(µg/m³)*
Carbon Monoxide	1 hour[1]	35	35,000	40,000	35	35,000	40,000	1.7	1,730	1,979
	8 hour[1]	9	9,000	10,000	9	9,000	10,000	0.8	814	931
Nitrogen Dioxide	1 hour [2]	0.10	100	189	0.10	100	189	0.014	14	26.4
	Annual[3] (Arithmetic Mean)	0.053	53	100	0.053	53	100	0.00168	1.68	2.9
Ozone	8 hour[4]	0.075	75	147	0.075	75	147	0.062	62	121
PM_{10}	24 hour[5]	N/A	N/A	150	N/A	N/A	150	N/A	N/A	78
	Annual[6]	N/A	N/A	N/A	N/A	N/A	50	N/A	N/A	11
$PM_{2.5}$	24 hour[7]	N/A	N/A	35	N/A	N/A	35	N/A	N/A	5.0
	Annual[8]	N/A	N/A	12	N/A	N/A	15	N/A	N/A	1.8
Sulfur Dioxide[10]	1 hour[9]	0.075	75	197	0.075	75	197	0.033	33	86

[1]Not to be exceeded more than once per year. Data collected at Yellowstone National Park during 2005.
[2]To attain this standard, the 3-year average of the 98th percentile of 1-hour concentrations at each monitor within an area must not exceed 100 ppb. Thunder Basin data, 2009.
[3]Thunder Basin annual average for 2009.
[4]To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 75 ppb. Measured fourth highest concentration for 2009 for the Thunder Basin site.
[5]Not to be exceeded more than once per year on average over 3 years. Maximum 24-hour average for 2009 at Cody SLAMS site.
[6]Annual average for 2009 for Cody SLAMS site.
[7]To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor in an area must not exceed 35 µg/m³. Maximum 24-hour average for 2009 for the North Absaroka IMPROVE site.
[8]To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 12.0 µg/m³. Annual average for 2009 for the North Absaroka site.
[9]To attain this standard, the 3-year average of the 98th percentile of 1-hour concentrations at each monitor within an area must not exceed 75 ppb.
[10]The SO_2 value is from the Wyoming DEQ Casper monitor, located in Natrona County and is the 3-year average of the 98th percentile of 1-hour concentrations measured for 2011, 2012, and 2013. Although not located in the Bighorn Basin, this is the closest monitor with available recent data.

µg/m³	micrograms per cubic meter	ppb	parts per billion
N/A	Not Applicable	ppm	parts per million
NAAQS	National Ambient Air Quality Standards	SLAMS	State and Local Air Monitoring Site
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter	WAAQS	Wyoming Ambient Air Quality Standards
PM_{10}	particulate matter less than 10 microns in diameter		

Figure J-1. Visibility – Standard Visual Range (SVR, miles) for the North Absaroka, Wyoming, IMPROVE Site

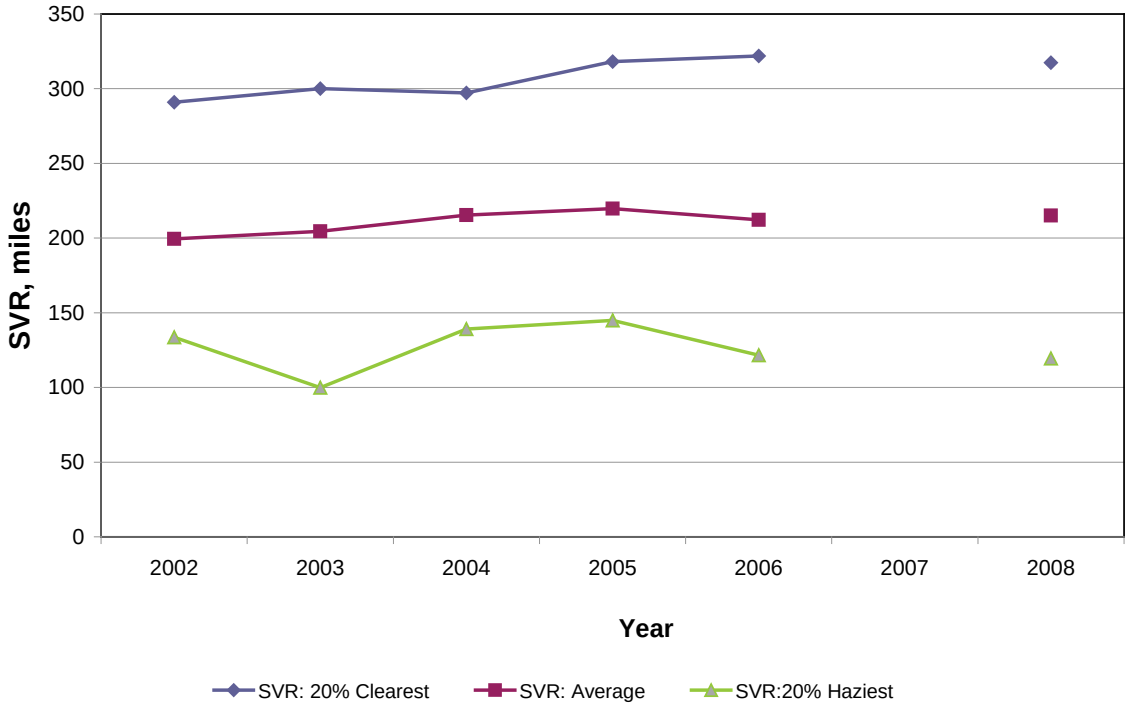

Figure J-2. Visibility – Standard Visual Range (SVR, miles) for the Cloud Peak, Wyoming, IMPROVE Site

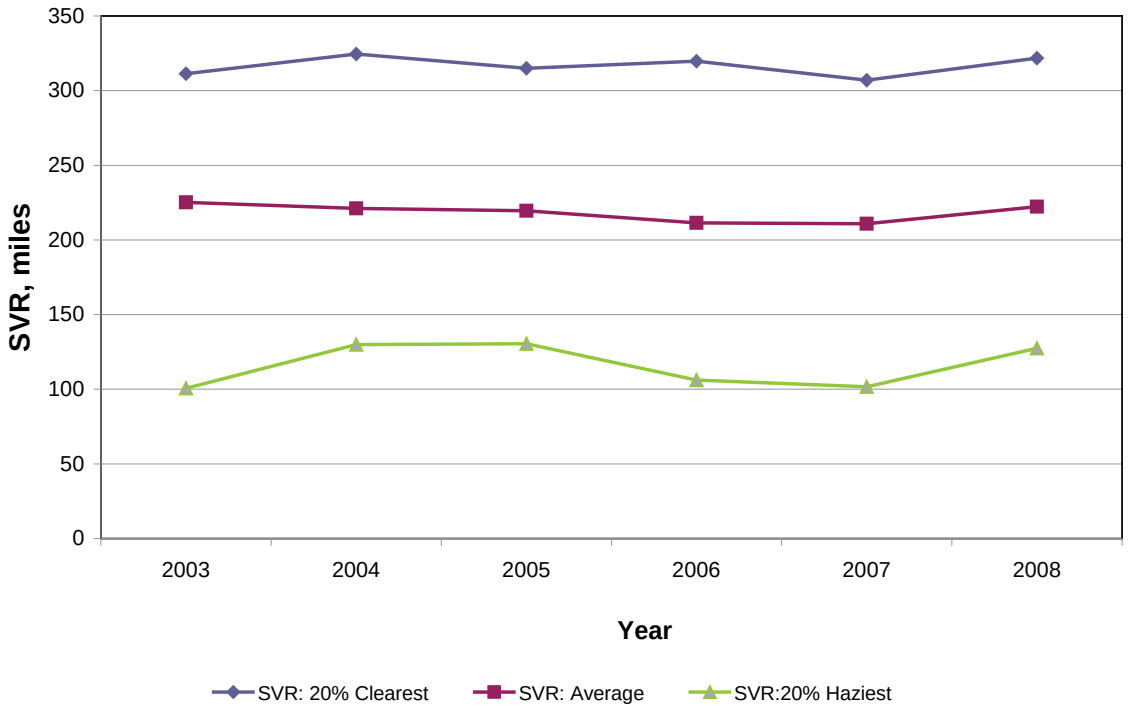

Table J-2. Total Annual Emissions Summary for BLM Activities within the Bighorn Basin Planning Area

Summary Year	Emissions (tons per year)						
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAP
Base Year (2008) Total	3,860	673	724	28	4,303	1,837	98
Alternative A							
2018 Total	4,137	707	746	30	4,470	1,683	97
2027 Total	3,995	682	755	30	4,243	1,405	97
Alternative B							
2018 Total	3,716	587	536	19	3,510	1,560	82
2027 Total	3,571	563	543	20	3,303	1,265	80
Alternative C							
2018 Total	4,742	910	831	44	6,293	1,802	110
2027 Total	4,598	886	839	45	6,079	1,536	111
Alternative D Preferred Alternative							
2018 Total	4,056	697	709	29	4,458	1,627	89
2027 Total	3,973	679	744	30	4,234	1,390	95
Alternative E							
2018 Total	3,553	536	558	19	3,429	1,606	89
2027 Total	3,393	511	540	19	3,213	1,260	79
Alternative F							
2018 Total	4,069	700	735	30	4,466	1,677	96
2027 Total	3,909	671	684	29	4,206	1,189	69

BLM Bureau of Land Management
CO carbon monoxide
HAP hazardous air pollutant
NO_x nitrogen oxides
$PM_{2.5}$ particulate matter less than 2.5 microns in diameter
PM_{10} particulate matter less than 10 microns in diameter
SO_x sulfur oxides
VOC volatile organic compound

Table J-3. Percent Change in Emissions Compared to Base Year 2008

Summary Year	Percent Change in Emissions (tons per year)						
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAP
Alternative A							
2018 Total	7%	5%	3%	6%	4%	-8%	7%
Alternative B							
2018 Total	-4%	-13%	-26%	-32%	-18%	-15%	-16%
Alternative C							
2018 Total	23%	35%	15%	58%	46%	-2%	13%
Alternative D (Preferred Alternative)							
2018 Total	5%	4%	-2%	4%	4%	-11%	5%
Alternative E							
2018 Total	-8%	-20%	-23%	-33%	-20%	-13%	-8%
Alternative F							
2018 Total	5%	4%	2%	5%	4%	-9%	-1%

CO carbon monoxide
HAP hazardous air pollutant
NO_x nitrogen oxides
$PM_{2.5}$ particulate matter less than 2.5 microns in diameter
PM_{10} particulate matter less than 10 microns in diameter
SO_x sulfur oxides
VOC volatile organic compound

1.1.6 In June 2011, Memorandum of Understanding among the U.S. Department of Agriculture, U.S. Department of Interior and U.S. Environmental Protection Agency Regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions Through the National Environmental Policy Act Process (MOU) was signed. This MOU outlines how to protect air quality and air quality related values, such as visibility and Class I areas, while allowing for oil and gas development on federally managed lands.

1.1.7 The Environmental Protection Agency's (EPA) comments on the Draft Resource Management Plan (RMP) and Draft Environmental Impact Statement (EIS), included "the EPA believes that the 'level of concern' that would warrant modeling under Management Action 1005 (contained in the Draft RMP) has already been reached." This concern is based on the level of emissions from existing activity disclosed in the Draft EIS and the proximity of proposed leasing areas to five Federal Class I areas, including Bridger, Fitzpatrick, North Absaroka, and Washakie Wilderness Areas and Yellowstone National Park.

Emissions from future activities have potential to negatively impact visibility and air quality in the Class I areas depending upon the temporal and spatial distribution of development.

1.2 Purpose

1.2.1 The purpose of this Air Resources Management Plan (ARMP) is to further clarify Physical Resources – Air Quality goals, objectives, and management actions set forth in Table 2-9 of the Final EIS. This ARMP describes air resources management; authorization of activities that have the potential to adversely impact air resources within the Planning Area; acknowledges areas where data is incomplete or difficult to obtain; sets a plan to obtain additional information; and outlines specific informational requirements and mitigation measures that may apply to projects that have the potential to generate air emissions and adversely affect air resources in the Planning Area.

1.2.2 This ARMP may be modified as necessary to comply with law, regulation, and policy and to address new information and changing circumstances. Amendment of the RMP is necessary to change the goals, objectives or management actions set forth in Table 2-9 while change to implementation, including this ARMP, may be made without Amending the RMP.

1.3 Characterization of Air Resources in the Environmental Impact Statement

1.3.1 Emissions Inventory for Land Use Planning

1.3.1.1 An air emissions inventory was compiled for the Planning Area to determine the relative magnitude of total air pollutant emissions and to compare emissions between alternatives. This emissions inventory is summarized in Appendix U. Emissions were calculated using assumptions about the likelihood of potential future activities occurring under each alternative which are found in Appendix T. As a result, the compiled air emissions inventory represents a comparison of emissions of air pollutants based on best available but speculative information for future development projections.

1.3.1.2 The emissions inventory is valuable for contrasting the impact of land use allocations on air resources among alternatives and useful for identifying those activities that are likely to be major contributors of emissions.

1.3.1.3 The air emissions inventory supports two major conclusions: 1) there is not a substantial difference in total air emissions among alternatives (Table 4-2), and 2) oil and gas development activities and mining are major contributors to air emissions.

1.3.2 Class I Areas

1.3.2.1 Class I areas in or near the Planning Area are Yellowstone National Park, North Absaroka Wilderness Area, Washakie Wilderness Area, Fitzpatrick Wilderness Area, and Bridger Wilderness Area. Visibility estimates for the North Absaroka site (Western boundary of the Planning Area) and the Cloud Peak site (eastern boundary of the planning area) are shown in Figures 3-12 and 3-13 of the Final EIS, respectively. The data from these two monitoring locations indicate excellent visibility.

2.0 AIR RESOURCES MANAGEMENT PLAN

2.1 Resource Inventory and Characterization

2.1.1 A characterization of air quality conditions in Class I areas in the vicinity of the planning area will be conducted to measure progress towards meeting the Air Quality goals and objectives (Table 2-9). BLM will conduct this characterization in partnership with federal and state agencies with responsibility for managing air quality in Class I areas, including DEQ, EPA, Forest Service and NPS, as soon as possible subject to funding and staffing levels.

2.1.1.1 This Class I area characterization will consist of two separate parts. Part I will be compilation of existing air quality data on the Class I area as provided and analyzed by partnering agencies. Part II will consist of a regional modeling analysis to characterize air quality in the Class I areas listed in Section 1.1.5. This modeling would be conducted either 1) as part of a specific development project air impact analysis being conducted by BLM for a NEPA analysis or 2) as part of an interagency regional modeling analysis that includes the Planning Area. With this modeling, the BLM could effectively predict direct Big Horn Basin emissions impacts to nearby Class I areas. Information from other modeling efforts and monitoring data will also be used to inform the Class I characterization. Details of this modeling are presented in Section 2.4 *Modeling*.

2.1.1.2 Until such time as both parts of the Class I characterization are completed Applications for Permit to Drill (APDs), field development proposals, and mining plans of operation, will include an emissions inventory. The emissions inventory will quantify emissions of regulated air pollutants from all sources related to the proposed project, emissions impacting Class I areas, including fugitive emissions and greenhouse gas emissions, estimated for each year for the life of the project. Additional information on permitting and emission inventories is provided in Section 2.2 *Permitting* and Section 2.5 *Mitigation*.

2.1.1.3 Based upon the findings of the Class I characterization, and as provided for by law and consistent with lease rights and obligations, BLM will ensure implementation of reasonable mitigation, control measures and design features through appropriate mechanisms, which may include lease stipulations and conditions of approval, notices to lessees, and permit terms and conditions (see Section 2.2 *Permitting* and 2.5 *Mitigation*)

2.2 Permitting

2.2.1 The BLM has the authority and responsibility under the Federal Land Policy and Management Act to manage public lands in a manner that will protect the quality of air and atmospheric values. Therefore, BLM may manage the pace, place, density, and intensity of leasing and development to meet air quality goals.

2.2.2 The BLM will, prior to authorization, consider the magnitude of potential air emissions from the project or activity, existing air quality conditions, proximity to Class I areas, and issues identified during project scoping to identify pollutants of concern and to determine the appropriate level of air analysis to be conducted for the project.

2.2.3 The BLM will require an emissions inventory, as set forth in the MOU. The MOU states "As early as possible in its planning process, the Lead Agency will identify the reasonably

foreseeable number of oil or gas wells that can be expressed as a range, expected to be located within the planning area. Existing reasonably foreseeable development scenarios can be used to identify the number of wells." The BLM may require an emissions inventory for mineral development projects (such as mining operations and individual applications for permit to drill) and may require project specific air quality modeling (see Management Action 1006) depending on project characteristics, proximity to a federally mandated Class I area, sensitive Class II area, or population center, location within a non-attainment or maintenance area, meteorological or geographic conditions, existing air quality conditions, magnitude of existing development in the area, or issues identified during project scoping. The emissions inventory will quantify emissions of regulated air pollutants from all sources related to the proposed project, emissions impacting Class I areas, including fugitive emissions and greenhouse gas emissions, estimated for each year for the life of the project. BLM will use this estimated emissions inventory to identify pollutants of concern and to determine the appropriate level of air analysis to be conducted for the proposed project. This information will inform monitoring (see Section 2.3 *Monitoring*), modeling (see Section 2.4 *Modeling*) and mitigation (see Section 2.5 *Mitigation*).

2.2.4 The BLM has the responsibility to implement the decisions of the RMP in a manner that protects air quality. BLM also must recognize valid and existing leasing rights. The BLM can require specific actions and measures necessary to protect air quality in response to adverse impacts at the project permitting stage (Management Action 1003).

2.2.4.1 BLM will consider applying mitigation to emissions sources not otherwise regulated by WDEQ for mineral development projects where an air quality impact analysis determines there are or will likely be future impacts above acceptable levels, including impacts to Class I areas. Mitigation may include reduction in the pace or scale of development.

2.2.5 Until such time as both phases of the Class I area characterization are completed, the BLM will require the following in addition to those items listed above:

2.2.5.1 The proponent of a project will be required to minimize air pollutant emissions by complying with all applicable state and federal regulations (including application of best available control technology) and may be required to apply mitigation such as best management practices, and other control technologies or strategies identified by the BLM or WDEQ in accordance with delegated regulatory authority.

2.2.5.2 The proponent of a mineral development project that has the potential to emit any regulated air pollutant will be required to provide a detailed description of operator committed measures to reduce project related air pollutant emissions including greenhouse gases and fugitive dust. Project proponents for oil and gas development projects should refer to Table J-4 as a reference for potential mitigation technologies and strategies. The list is not intended to preclude the use of other effective air pollution control technologies that may be proposed. Details of the mitigation measure would be submitted by the applicant and enforced as a condition of the BLM-issued authorization.

2.2.5.3 The BLM may require the proponent of other projects to comply with 2.2.5.1 and 2.2.5.2 depending on project characteristics, proximity to a federally mandated Class I area, sensitive Class II area, or population centers, location within a non-attainment or maintenance area, meteorological or geographic conditions, existing air quality conditions, magnitude of existing development in the area, or issues identified during project scoping.

2.3 Monitoring

2.3.1 As part of a comprehensive air management plan for the Planning Area, BLM will work cooperatively with federal and state agencies with responsibility for managing air resources to determine, characterize, and track air resource conditions. (Management Action 1004)

2.3.2 The BLM may require project proponents to conduct air monitoring. The requirement for monitoring will be based on the absence of existing monitoring; existing air quality conditions; magnitude of potential air emissions from the project or activity; magnitude of existing emission sources in the area; proximity to a federally mandated Class I area, sensitive Class II area, or population center; location within a non-attainment or maintenance area; meteorological or geographic conditions; project duration; or issues identified during project scoping. The project proponent will be responsible for siting, installing, operating, and maintaining any required air monitoring.

2.3.4 The BLM will support and participate in regional monitoring efforts to meet Management Action 1002 which reads as follows:

"Define a criteria pollutant and air quality related values monitoring strategy and cooperatively establish a monitoring network by creating a method for siting air quality monitors in order to provide additional data for describing background concentrations."

2.4 Modeling

2.4.1 Air dispersion and photochemical grid models are useful tools for predicting project specific impacts to air quality, predicting the potential effectiveness of control measures and strategies, and for predicting trends in regional concentrations of some air pollutants.

2.4.2 BLM may require project proponents to conduct air quality modeling based on the absence of sufficient data to ensure compliance with laws regulations or to determine the effectiveness of mitigation options. The requirement for modeling will follow the MOU and will be based on existing air quality conditions; magnitude of potential air emissions from the project or activity; magnitude of existing emission sources in the area; proximity to a federally mandated Class I area, sensitive Class II area, an area expected to exceed a NAAQS or PSD increment or population center; location within a non-attainment or maintenance area; meteorological or geographic conditions; project duration; or issues identified during project scoping (Management Action 1006).

2.4.3 BLM will support and participate in regional modeling efforts through multi-state and/or multi-agency organizations such as Western Governors' Association – Western Regional Air Partnership (WRAP), the Federal Leadership Forum (FLF), and WDEQ's Ozone Technical Forum (OTF). If results from an interagency, regional modeling study are used to evaluate impacts within the Big Horn Basin, BLM will ensure that direct emissions from BLM's management actions within the region are included in the study. This model would predict direct Big Horn Basin emissions impacts to nearby Class I areas and would satisfy the Air Resources Management Plan Class I Characterization part II as set forth in Section 2.1.1.1, above.

2.5 Mitigation

2.5.1 Many of the activities that BLM authorizes, permits, or allows generate air pollutant emissions that have the potential to adversely impact air quality. The primary mechanism to reduce air quality impacts is to reduce emissions (mitigation).

2.5.2 BLM will require additional air emission control measures and strategies within its regulatory authority and in consultation with federal and state agencies with responsibility for managing air resources if proposed or committed measures are insufficient to achieve air quality goals (Goal PR: 1 and Goal PR: 2) and objectives (PR:1.1, PR:1.2, PR:2.1, PR2.2) and Management Action 1003.

2.5.3 The proponent of a project will be required to minimize air pollutant emissions by complying with all applicable state and federal regulations (including application of best available control technology) and may be required to apply mitigation including but not limited to best management practices, and other control technologies or strategies identified by the BLM or WDEQ in accordance with delegated regulatory authority (Management Action 1003).

2.5.4 The proponent of a project will demonstrate regard for air resources and will demonstrate consideration of measures to reduce emissions to achieve Management Action 1003. A project proponent will be required to identify operator-committed measures in its proposal. Example, mitigation strategies for oil and gas development activities are presented in Table J-4.

2.5.5 Development and implementation of appropriate protection measures is most effective at the project approval stage, because the proposed action has been defined in terms of temporal and spatial characteristics as well as development processes and procedures. This better defined information allows more precise identification of impacts to air quality which results in more specific impact analysis, and identification of effective mitigation. As part of the project approval process, the BLM will identify project-specific measures in response to identified impacts to air resources.

2.6 Contingency Plans

2.6.1 The BLM may require project proponents to submit a contingency plan that provides a strategy for reduction in emissions should observed effects or modeled impacts show state or federal standards or applicable thresholds for air quality related values may be exceeded. Specific operations and pollutants to be addressed in the contingency plan will be determined by BLM on a case-by-case basis taking into account existing air quality and pollutants emitted by the project. This is to ensure conformance with air quality goals and objectives.

2.6.2 If observed effects or modeled impacts show state or federal regulatory standards or applicable thresholds for air quality related values may be exceeded, BLM may require mitigation measures to comply with such standards. Mitigation may include management of the pace, place, density and intensity of development or require smaller emission projects to demonstrate compliance with standards or applicable thresholds through quantitative air quality analysis. This is to ensure conformance with the air quality goals and objectives in Table 2-9.

Table J-4. Sample Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Control Strategies for Drilling and Compression			
Directional Drilling.	Reduces construction related emissions (dust and vehicle and construction equipment emissions). Decreases surface disturbance and vegetation impacts (dust and CO2 and nitrogen flux). Reduces habitat fragmentation.	Could result in higher air impacts in one area with longer sustained drilling times.	Depends on geological strata.
Improved engine technology (Tier 2 or better) for diesel drill rig engines.	Reduced NO_x, PM, CO, and VOC emissions.		Dependent on availability of technology from engine manufacturers.
Selective Catalytic Reduction (SCR) for drill rig engines and/or compressors.	NO_x emissions reduction, potential decreased formation of visibility impairing compounds and ozone. NO_x control efficiency of 95% achieved on drill rig engines. NO_x emission rate of 0.1 g/hp-hr achieved for compressors.	Potential NH3 emissions and formation of visibility impairing ammonium sulfate. Regeneration/disposal of catalyst can produce hazardous waste.	Not applicable to 2-stroke engines.

Table J-4. Sample Emission Reduction Strategies for Oil and Gas Development (Continued)

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Non-selective catalytic reduction (NSCR) for drill rig engines and/or compressors.	NO_x emissions reduction, potential decreased formation of visibility impairing compounds, and ozone. NO_x control efficiency of 80-90% achieved for drill rig engines. NO_x emission rate of 0.7 g/hp-hr achieved for compressor engines greater than 100 hp.	Regeneration/disposal of catalysts can produce hazardous waste.	Not applicable to lean burn or 2-stroke engines.
Natural Gas fired drill rig engines.	NO_x emissions reduction, potential decreased formation of visibility impairing compounds, and ozone.		Requires onsite processing of field gas.
Electrification of compressors.	Decreased emissions at the source. Transfers emissions to more efficiently controlled source (EGU).	Displaces emissions to electric generating unit (EGU).	Depends on availability of power and transmission lines.
Improved engine technology (Tier 2 or better) for all mobile and non-road diesel engines.	Reduced NO_x, PM, CO, and VOC emissions.		Dependent on availability of technology from engine manufacturers.
Green (a.k.a. closed loop or flareless) completions.	Reduction in VOC and CH4 emissions. Reduces or eliminate flaring and venting and associated emissions. Reduces or eliminates open pits and associated evaporative emissions. Increased recovery of gas to pipeline rather than atmosphere.	Temporary increase in truck traffic and associated emissions.	Need adequate pressure and flow. Need onsite infrastructure (tanks/dehydrator). Availability of sales line. Green completion permits required by WY BACT in some areas.
Green workovers	Same as above.	Same as above.	Same as above.
Minimize/eliminate venting and/or use closed loop process where possible during "blow downs".	Same as above.		Best Management Practices required by WY BACT.
Reclaim/remediate existing open pits, no new open pits.	Reduces VOC and GHG emissions. Reduces potential for soil and water contamination. Reduces odors.	May increase truck traffic and associated emissions.	Requires tank and/or pipeline infrastructure.
Electrification of wellhead compression/pumping.	Reduces local emissions of fossil fuel combustion and transfers to more easily controlled source.	Displaces emissions to electric generating unit (EGU).	Depends on availability of power and transmission lines.
Wind (or other renewable) generated power for compressors.	Low or no emissions.	May require construction of infrastructure. Visual impacts. Potential wildlife impacts.	Depends on availability of power and transmission lines.

Table J-4. Sample Emission Reduction Strategies for Oil and Gas Development (Continued)

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Control Strategies Utilizing Centralized Systems			
Centralization (or consolidation) of gas processing facilities (separation, dehydration, sweetening, etc.).	Reduces vehicle miles traveled (truck traffic) and associated emissions. Reduced VOC and GHG emissions from individual dehy/separator units.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure.
Liquids Gathering systems (for condensate and produced water).	Reduces vehicle miles traveled and associated emissions. Reduced VOC and GHG emissions from tanks, truck loading/unloading, and multiple production facilities.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure.
Water and/or fracturing liquids delivery system.	Reduced long term truck traffic and associated emissions.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure. Not feasible for some terrain.
Control Strategies for Tanks, Separators, and Dehydrators			
Eliminate use of open top tanks.	Reduced VOC and GHG emissions.		Required by WY BACT for produced water tanks in some areas.
Capture and control of flashing emissions from all storage tanks and separation vessels with vapor recovery and/or thermal combustion units.	Reduces VOC and GHG emissions.	Pressure build up on older tanks can lead to uncontrolled rupture.	98% VOC control if ≥ 10 TPY required statewide by WY BACT.
Capture and control of produced water tank emissions.	Reduces VOC and GHG emissions.		98% VOC control and no open top tanks required by WY DEQ in some areas.
Capture and control of dehydration equipment emissions with condensors, vapor recovery, and/or thermal combustion.	Reduces VOC, HAP, and GHG emissions.		Still vent condensors required and 98% VOC control if ≥ 8 TPY required statewide and in CDA by WY BACT. All dehy emissions controlled at 98% in JPAD (no 8 TPY threshold).
Control Strategies for Misc. Fugitive VOC Emissions			
Install and maintain low VOC emitting seals, valves, hatches on production equipment.	Reduces VOC and GHG emissions.		
Initiate an equipment leak detection and repair program (including use of FLIR cameras, grab samples, organic vapor detection devices, visual inspection, etc.).	Reduction in VOC and GHG emissions.		

Table J-4. Sample Emission Reduction Strategies for Oil and Gas Development (Continued)

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Install or convert gas operated pneumatic devices to electric, solar, or instrument (or compressed) air driven devices/controllers.	Reduces VOC and GHG emissions.	Electric or compressed air driven operations can displace or increase combustion emissions.	
Use "low" or "no bleed" gas operated pneumatic devices/controllers.	Reduces VOC and GHG emissions.		or closed loop required statewide by WY BACT.
Use closed loop system or thermal combustion for gas operated pneumatic pump emissions.	Reduces VOC and GHG emissions.		Required statewide by WY BACT (98% VOC control or closed loop).
Install or convert gas operated pneumatic pumps to electric, solar, or instrument (or compressed) air driven pumps.	Reduces VOC and GHG emissions.	Electric or compressed air driven operations can displace or increase combustion emissions.	Required statewide by WY BACT if no thermal combustion used.
Install vapor recovery on truck loading/unloading operations at tanks.	Reduces emissions of VOC and GHG emissions.	Pressure build up on older tanks can lead to uncontrolled rupture.	WY BACT analysis required if VOC ≥ 8 TPY or HAP≥ 5 TPY.
Control Strategies for Fugitive Dust and Vehicle Emissions			
Unpaved surface treatments including watering, chemical suppressants, and gravel.	20% - 80% control of fugitive dust (particulates) from vehicle traffic.	Potential impacts to water and vegetation from runoff of suppressants.	
Use remote telemetry and automation of wellhead equipment.	Reduces vehicle traffic and associated emissions.		
Speed limit control and enforcement on unpaved roads.	Reduction of fugitive dust emissions.		
Reduce commuter vehicle trips through car pools, commuter vans or buses, innovative work schedules, or work camps.	Reduced combustion emissions, reduced fugitive dust emissions, reduced ozone formation, reduced impacts to visibility.		
Miscellaneous Control Strategies			
Use of ultra-low sulfur diesel in engines, compressors, construction equipment, etc.	Reduces emissions of particulates and sulfates.		Fuel not readily available in some areas.
Reduce unnecessary vehicle idling.	Reduced combustion emissions, reduced ozone formation, reduced impacts to visibility, reduced fuel consumption.		
Reduced pace of (phased) development.	Peak emissions of all pollutants reduced.	Emissions generated at a lower rate but for a longer period. LOP, duration of impacts is longer.	May not be economically viable or feasible if multiple mineral interests.

Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix K

Biological Resources

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APPENDIX K

BIOLOGICAL RESOURCES

This appendix contains information on biological resources intended to augment the discussions in Volume 1 of the Bighorn Basin Resource Management Plan (RMP) revision and Environmental Impact Statement (EIS). Included in this appendix is information on Special Status Species (raptor nesting periods [Table K-1]), Wildlife (Wyoming Game and Fish Department [WGFD] Herd Unit maps [Figures K-1 through K-7]), and a species list (Table K-2) showing the scientific names for the species discussed in the document.

1.0 RAPTOR NESTING PERIOD

Many raptors are sensitive to disturbance during the breeding and nesting season. Such disturbance may result in take. The United States Fish and Wildlife Service recommend spatial and seasonal buffer zones to avoid or minimize disturbance and the risk of take. The spatial buffers vary by alternative; however, the seasonal restrictions remain constant among the alternatives, as outlined in the table below. These seasonal restrictions may be modified on a site-specific or project-specific basis based on field observations and local conditions.

Table K-1. Seasonal Restrictions

Common Name	Period of Seasonal Restriction
American Kestrel	April 1 – August 15
Bald Eagle	January 1 – August 15
Boreal Owl	February 1 – July 31
Burrowing Owl	April 1 – September 15
Common Barn Owl	February 1 – September 15
Cooper's Hawk	March 15 – August 31
Eastern Screech-owl	March 1 – August 15
Ferruginous Hawk	March 15 – July 31
Golden Eagle	January 15 – July 31
Great Gray Owl	March 15 – August 31
Great Horned Owl	December 1 – September 30
Long-eared Owl	February 1 – August 15
Merlin	April 1 – August 15
Northern Goshawk	April 1 – August 15
Northern Harrier	April 1 – August 15
Northern Pygmy-Owl	April 1 – August 1
Northern Saw-whet Owl	March 1 – August 31
Osprey	April 1 – August 31
Peregrine Falcon	March 1 – August 15
Prairie Falcon	March 1 – August 15
Red-tailed Hawk	February 1 – August 15
Sharp-shinned Hawk	March 15 – August 31
Short-eared Owl	March 15 – August 1
Swainson's Hawk	April 1 – August 31
Western Screech-owl	March 1 – August 15

2.0 HERD UNITS

Big game species in the Planning Area include pronghorn (antelope), deer (mule deer and white-tailed deer), elk, moose, bighorn sheep, and mountain goat. Boundaries of the herd unit areas are established to encompass all the seasonal ranges and habitats or special life-function areas (e.g., calving and lambing areas) utilized by a more or less discreet population or herd. Because there will always be some interchange of animals between adjacent populations, and portions of populations change important use patterns over time, these boundaries are well defined, but not permanent. They do, however, represent the best available data and identify population units consistent with the most recent biological and climatic conditions. Chapter 3, *Wildlife* provides information about the relative size and amount of BLM-administered lands in Planning Area big game herd units. Figures K-1 through K-7 show the WGFD herd units. Specific information about population trends is available through the WGFD via the agency's Job Completion Reports.

Figure K-1. Wildlife Herd Units – Antelope

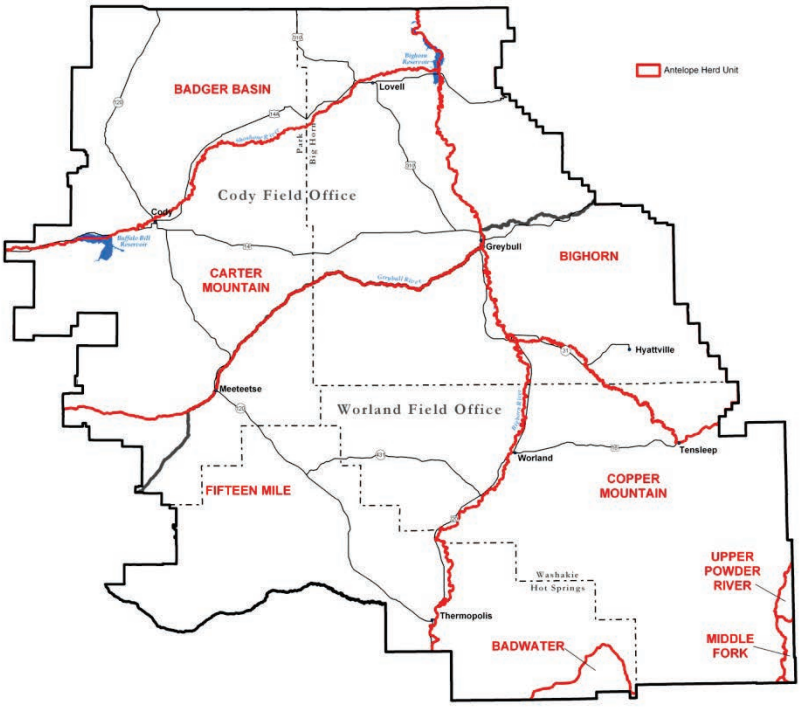


Figure K-2. Wildlife Herd Units – Bighorn Sheep

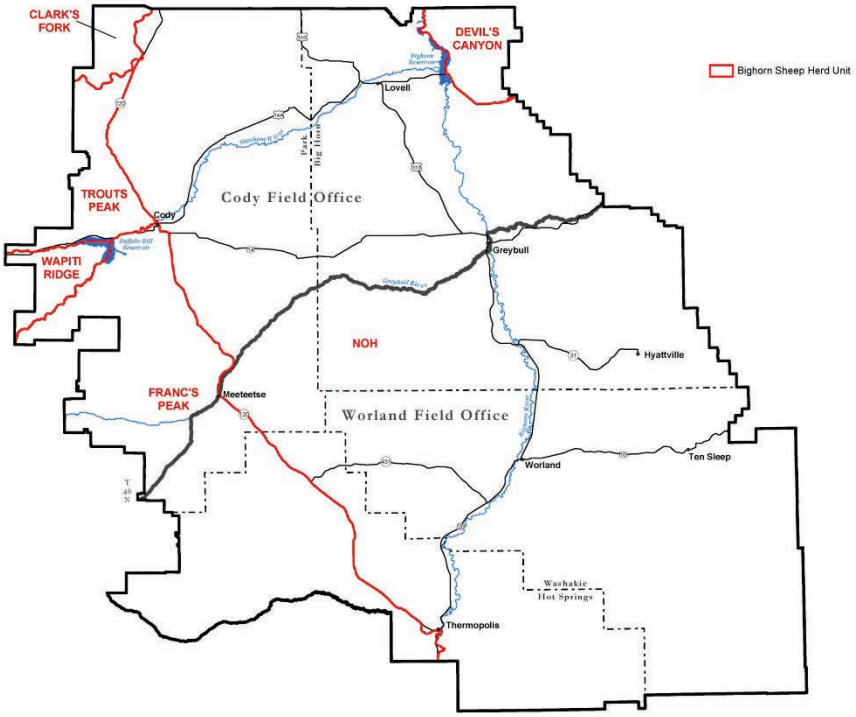


Figure K-3. Wildlife Herd Units – Elk

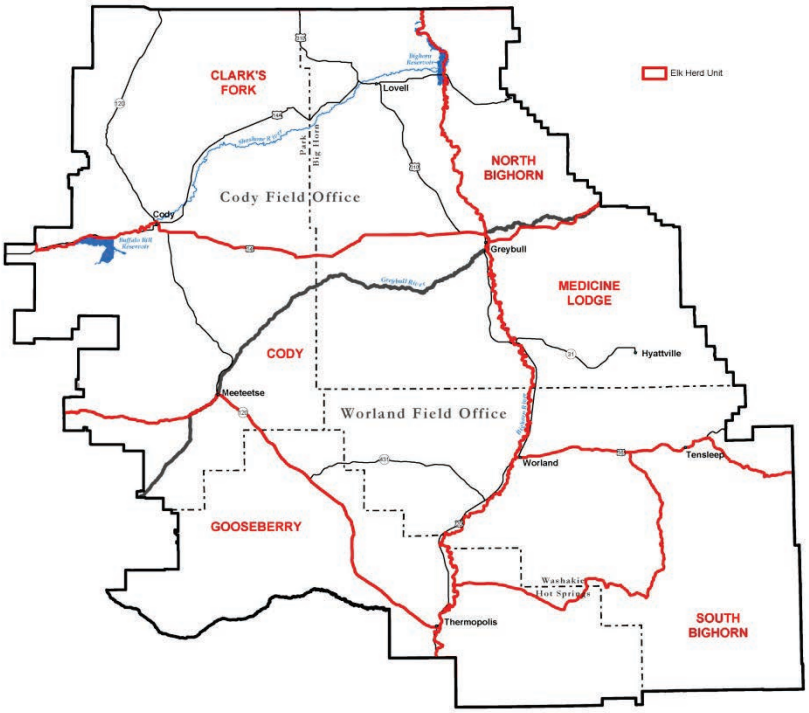


Figure K-4. Wildlife Herd Units – Moose

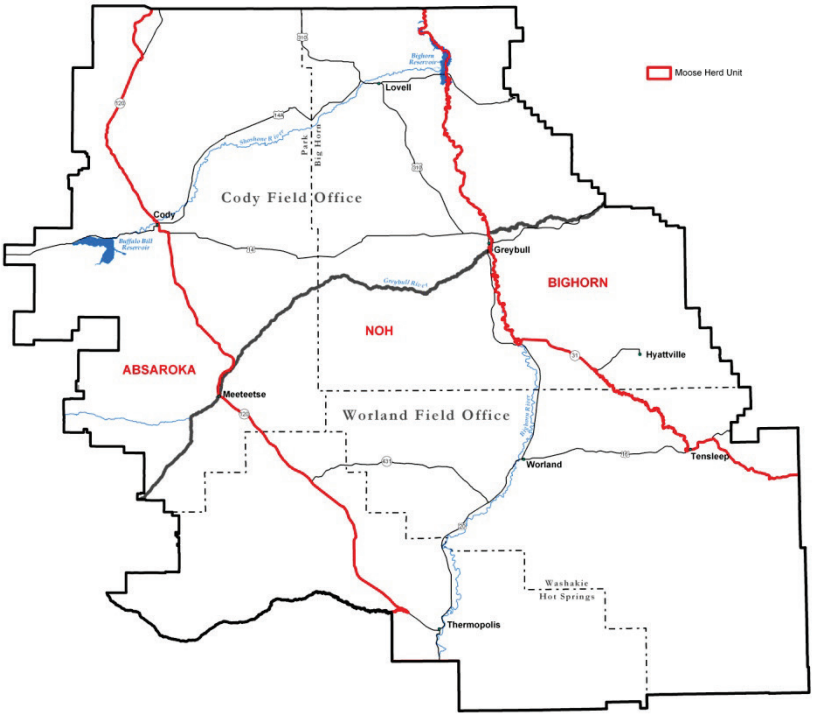


Figure K-5. Wildlife Herd Units – Mountain Goat

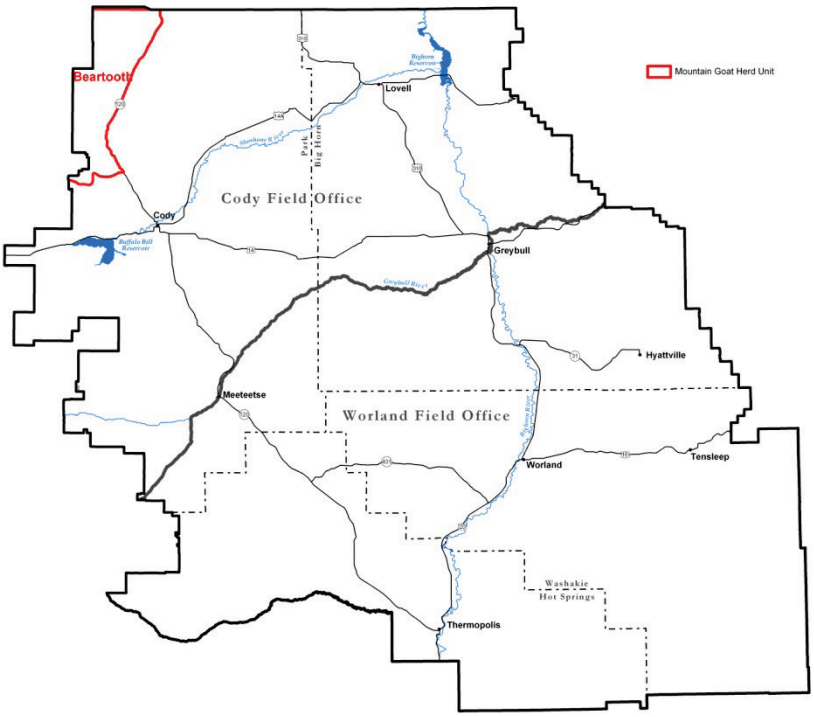


Figure K-6. Wildlife Herd Units – Mule Deer

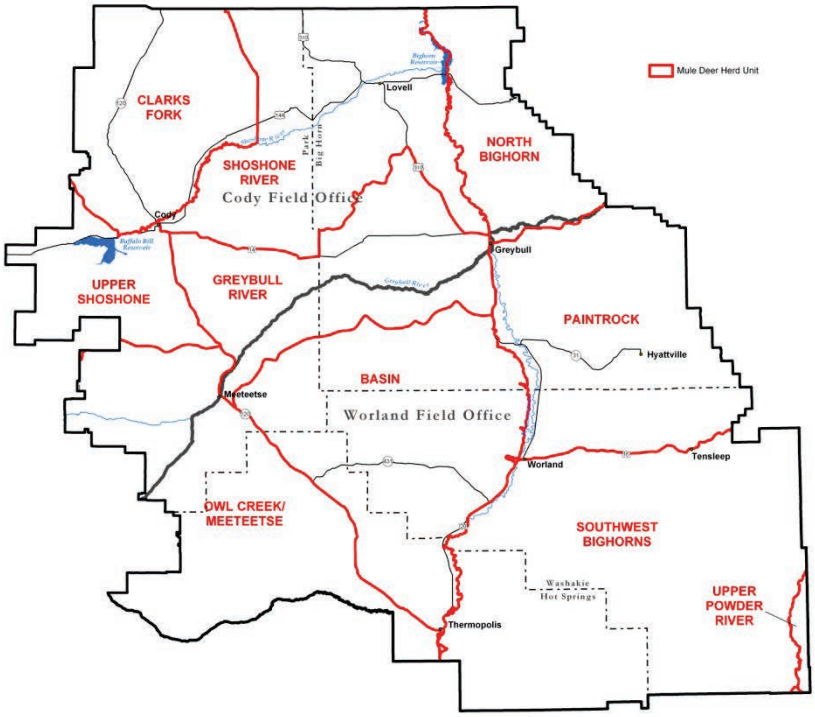
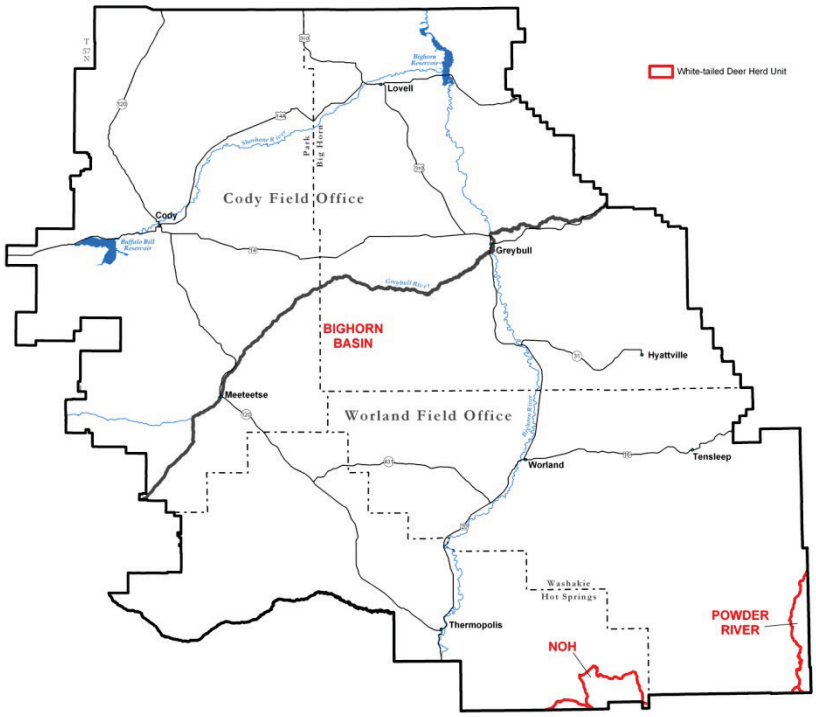


Figure K-7. Wildlife Herd Units – White-tailed Deer



3.0 SPECIES LIST

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement

Common Name	Scientific Name
Plants	
Absaroka beardtongue	*Penstemon absarokensis*
Absinth wormwood	*Artemisia absinthium*
Alder	*Alnus spp.*
Alfalfa	*Medicago sativa*
Alkali bulrush	*Scirpus maritimus*
Alkali cordgrass	*Spartina gracilis*
Alkali grass	*Puccinellia spp.*
Alkali sacaton	*Sporobolus airoides*
Alpine poppy	*Papaver pygmaeum*
Annual yellow sweet clover	*Melilotus indicus*
Antelope bitterbrush	*Purshia tridentata*
Aspen	*Populus tremuloides*
Aster	*Aster alpinus*
Baltic rush	*Juncus balticus*
Basin big sagebrush	*Artemisia tridentata ssp. tridentata*
Basin wildrye	*Leymus cinereus*
Beardtongue penstemon	*Penstemon spp.*
Beyrich threeawn	*Aristida beyrichiana*
Big bluegrass	*Poa secunda*
Big horn fleabane	*Erigeron allocotus*
Big sagebrush	*Artemisia tridentata*
Bigseed dodder	*Cuscuta indecora var. neuropetala*
Big-tooth maple	*Acer grandidentatum*
Birch	*Betula spp.*
Biscuitroot	*Lomatium spp.*
Bitterbrush	*Purshia spp.*
Black elderberry	*Sambucus nigra*
Black greasewood	*Sarcobatus vermiculatus*
Black henbane	*Hyoscyamus niger*
Black sagebrush	*Artemisia nova*
Blowout penstemon	*Penstemon haydenii*
Blue elderberry	*Sambucus nigra ssp. cerulea*
Blue grama	*Bouteloua gracilis*
Blue spruce	*Picea pungens*
Bluebell	*Mertensia spp.*
Bluebunch wheatgrass	*Pseudoroegneria spicata*
Bottlebrush squirreltail	*Elymus elymoides*
Box elder	*Acer negundo*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Broadleaved twayblade	*Listera convallarioides*
Buckwheat	*Polygonaceae spp.*
Buffalo grass	*Buchloe dactyloides*
Buffalobur	*Solanum rostratum*
Bulrush	*Scirpus spp.*
Canada thistle	*Cirsium arvense*
Cary's beardtongue	*Penstemon caryi*
Cattail	*Typha spp.*
Chamisso cottongrass	*Eriophorum chamissonis*
Cheatgrass	*Bromus tectorum*
Chokecherry	*Prunus virginiana*
Cocklebur	*Xanthium spp.*
Coil beaked lousewort	*Pedicularis contorta var. ctenophora*
Colombia needlegrass	*Achnatherum nelsonii ssp. nelsonii*
Columbine	*Aquilegia spp.*
Common burdock	*Arctium minus (Hill) Bernh.*
Common crupina	*Crupina vulgaris*
Common mullein	*Verbascum thapsus*
Common St. Johnswort	*Hypericum perforatum*
Common tansy	*Tanacetum vulgare*
Common threesquare	*Schoenoplectus pungens*
Composite dropseed	*Sporobolus compositus*
Corn	*Zea mays*
Cottonwood	*Populus spp.*
Curl-leaf mountain mahogany	*Cercocarpus ledifolius*
Curly dock	*Rumex crispus*
Currant	*Ribes spp.*
Cusick's alkali grass	*Puccinellia cusickii*
Dalmatian toadflax	*Linaria genistifolia ssp. dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Distaff thistle	*Carthamus baeticus*
Douglas' knotweed	*Polygonum douglasii*
Douglas-fir	*Pseudotsuga menziesii*
Dubois milkvetch	*Astragalus gilviflorus var. purpureus*
Dwarf raspberry	*Rubus arcticus ssp. acaulis*
Dwarf woolly-heads	*Psilocarphus brevissimus*
Dyer's woad	*Isatis tinctoria*
Eastern cottonwood	*Populus deltoides*
Englemann spruce	*Picea engelmannii*
English Bluebell	*Hyacinthoides spp.*
Evert's water parsnip	*Cymopterus evertii*
False agoseris	*Agoseris glauca var. laciniata*
Field bindweed	*Convolvulus arvensis*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Field pussytoes	*Antennaria neglecta*
Four-winged saltbush	*Atriplex canescens*
Fragile rockbrake	*Cryptogramma stelleri*
Gardner's saltbush	*Atriplex garnderi*
Globemallow	*Sphaeralcea spp.*
Goats rue	*Galega officinalis*
Gorse	*Ulex spp.*
Greasewood	*Sarcobatus vermiculatus*
Green ash	*Fraxinus pennsylvanica*
Green needlegrass	*Nasella viridula*
Green spleenwort	*Asplenium trichomanes-ramosum*
Hairy prince's-plume	*Stanleya tomentosa var. tomentosa*
Hairy tranquil goldenweed	*Pyrrocoma clementis var. villosa*
Hairy whitetop	*Cardaria pubescens*
Halogeton	*Halogeton glomeratus*
Hapeman's coolwort	*Sullivantia hapemanii var. hapemanii*
Hawthorne	*Crataegus spp.*
Herbaceous seepweed	*Suaeda maritima*
Hoary cress	*Cardaria draba*
Houndstongue	*Cynoglossum offinale*
Hulled rush	*Juncus triglumis*
Hyattville milkvetch	*Astragalus jejunus var. articulatus*
Iberian starthistle	*Centaurea iberica*
Ice grass	*Phippsia algida*
Idaho fescue	*Festuca idahoensis*
Indian paintbrush	*Castilleja spp.*
Indian ricegrass	*Achnatherum hynenoides*
Inland saltgrass	*Distichlis spicata*
Italian thistle	*Carduus pycnocephalus*
Japanese brome	*Bromus japonicus*
Juniper	*Juniperus spp.*
Kentucky bluegrass	*Poa pratensis*
King spike fescue	*Leucopoa kingii*
Knotweed	*Polygonum spp.*
Kotzebuei's grass-of-parnassus	*Parnassia kotzebuei*
Lance-leaved moonwort	*Botrychium lanceolatum var. lanceolatum*
Large bur-reed	*Sparganium eurycarpum*
Large yellow lady-slipper	*Cypripedium parviflorum*
Large-leaved pondweed	*Potomogeton amplifolius*
Larkspur	*Delphinium spp.*
Leafy spurge	*Euphorbia esula*
Leafy thistle	*Cirsium foliosum*
Limber pine	*Pinus flexilis*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Locoweed	*Oxytropis spp.*
Lodgepole pine	*Pinus contorta*
Longleaf arnica	*Arnica lonchophylla*
Lupine	*Lupinus spp.*
Meadow parsnip	*Thaspium spp.*
Medusahead	*Taeniatherum caput-medusae*
Milkvetch	*Astragalus spp.*
Mingan moonwort	*Botrychium minganense*
Mistletoe	*Arceuthobium spp.*
Moschatel	*Adoxa moschatellina*
Mountain big sagebrush	*Artemisia tridentate var. vaseyana*
Mountain deathcamus	*Zigadenus elegans*
Mountain lady-slipper	*Cypripedium montanum*
Mountain mahogany	*Cercocarpus montanus*
Musk thistle	*Carduus nutans*
Mutton bluegrass	*Poa fendleriana*
Nebraska sedge	*Carex nebrascensis*
Needle-and-thread	*Hesperostipa comata*
Nuttall's saltbush	*Atriplex nuttallii*
Orange hawkweed	*Hieracium aurantiacum*
Ox-eye daisy	*Leucanthemum vulgare or Chrysanthemum leucanthemum*
Perennial pepperweed (giant whitetop)	*Lepidium latifolium*
Perennial sowthistle	*Sonchus arvensis*
Persistent sepal yellowcress	*Rorippa calycina*
Phlox	*Phlox spp.*
Plains pricklypear	*Opuntia polyacantha*
Plains rough fescue	*Festuca hallii*
Plumeless thistle	*Carduus acanthoides*
Poison hemlock	*Conium maculatum*
Ponderosa pine	*Pinus ponderosa*
Porter's sagebrush	*Artemisia porteri*
Prairie cordgrass	*Spartina Pectinata*
Prairie junegrass	*Koelaria macrantha*
Pricklypear cactus	*Opuntia spp.*
Puncturevine	*Tribulus terrestris*
Purple loosestrife	*Lythrum salicaria*
Purple starthistle	*Centaurea calcitrapa*
Puzzling moonwort	*Botrychium paradoxum*
Quackgrass	*Elymus repens*
Quaking aspen	*Populus tremuloides*
Rabbitbrush	*Chrysothamnus spp.*
Ragwort	*Packera spp.*
Rattlesnake fern	*Botrychium virginianum*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Red cottongrass	*Eriophorum ressuloum*
Redstem storks bill	*Erodium cicutarium*
Rocky Mountain juniper	*Juniperus scopulorum*
Rocky Mountain maple	*Acer glabrum*
Rocky Mountain twinpod	*Physaria saximontana var. dentata*
Rough cocklebur	*Xanthium strumarium*
Rubber rabbitbrush	*Ericameria nauseosa ssp. nauseosa var. nauseosa*
Rush skeletonweed	*Chondrilla juncea*
Rushes	*Juncaceae*
Russian knapweed	*Acroptilon repens*
Russian olive	*Elaeagnus angustifolia*
Saltbush	*Atriplex spp.*
Saltcedar	*Tamarix spp.*
Saltgrass	*Distichlis spicata*
Sand dropseed	*Sporbolus cryptandrus*
Sandberg's bluegrass	*Poa secunda*
Sandwort	*Arenaria spp.*
Sartwell's sedge	*Carex sartwellii var. sartwellii*
Scarlet globemallow	*Sphaeralcea coccinea*
Scotch thistle	*Onopordum acanthium*
Sea blight	*Suaeda maritime*
Sedges	*Cyperaceae*
Serviceberry	*Amerlanchier alnifolia*
Shadscale	*Atriplex confertifolia*
Shadscale saltbush	*Atriplex confertifolia*
Sheathed musineon	*Musineon vaginatum*
Sheep fescue	*Festuca ovina*
Shortleaved sedge	*Carex misandra*
Shoshonea	*Shoshonea pulvinata*
Showy milkweed	*Asclepias speciosa*
Shrubby cinquefoil	*Dasiphora fruticosa*
Silver sagebrush	*Artemisia canescens*
Single-head pussytoes	*Antennaria monocephala*
Skeletonleaf bur ragweed	*Ambrosia tomentosa*
Skunkbush sumac	*Rhus trilobata*
Slender bulrush	*Schoenoplectus heterochaetus*
Slim-pod Venus' looking glass	*Triodanis leptocarpa*
Snowberry	*Symphoricarpos spp.*
Spikerush	*Eleocharis spp.*
Spiny hopsage	*Grayia spinosa*
Spiny phlox	*Phlox hoodsii*
Spotted knapweed	*Centaurea stoebe ssp. micranthos*
Subalpine fir	*Abies lasiocarpa*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Sugar beet	*Beta vulgaris*
Sulfur flower buckwheat	*Eriogonum umbellatum*
Sunbright	*Phemeranthus parviflorus*
Tall larkspur	*Delphinium exaltatum*
Tamarisk	*Tamarix spp.*
Teal lovegrass	*Eragrostis hypnoides*
Threadleaf sedge	*Carex filifolia*
Three-flower rush	*Juncus triglumis var. triglumis*
Threetip sagebrush	*Artemisia tripartita*
Tyrol knapweed	*Centaurea nigrescens*
Upward-lobe moonwort	*Botrychium ascendens*
Utah juniper	*Juniperus osteosperma*
Ute ladies'-tresses	*Spiranthes diluvialis*
Verrucosum purslane	*Susvium verrucasum*
Violet	*Viola spp.*
Water birch	*Betula occidentalis*
Watson goosefoot	*Chenopodium watsonii*
Wax currant	*Ribes cereum*
Western wheatgrass	*Pascopyrum smithii*
Wheatgrass	*Agropyron spp.*
White arctic whitlow-grass	*Draba fladnixensis var. pattersonii*
Whitebark pine	*Pinus albicaulis*
Whitetop	*Cardaria draba*
Wild barley	*Hordeum spp.*
Wild buckwheat	*Eriogonum spp.*
Wild licorice	*Glycyrrhiaz lepidota*
Wild plum	*Prunus americana*
William's wafer-parsnip	*Cymopterus williamsii*
Willow	*Salix spp.*
Winterfat	*Krascheninnikovia lanata*
Wire grass	*Sporobolus junceaus*
Wood's rose	*Rosa woodsii*
Woodland horsetail	*Equisetum sylvaticum*
Woolly twinpod	*Physaria lanata*
Wyoming big sagebrush	*Artemisia tridentata var. wyomingensis*
Yarrow	*Achillea millefolium*
Yellow rabbitbrush	*Chrysothamnus viscidiflorus*
Yellow sweet clover	*Melilotus officinalis*
Yellow toadflax	*Linaria vulgaris*
Zephyr windflower	*Anemone narcissiflora spp. zephyra*
Fungi	
Blister rust	*Cronartium ribicola*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Fish	
Bear River cutthroat	*Oncorhynchus clarki utah*
Black bullhead	*Ameirus melas*
Black crappie	*Pomoxis nigromaculatus*
Brassy minnow	*Hybognathus hankinsoni*
Brook Stickleback	*Culaea inconstans*
Brook trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Burbot	*Lota lota*
Catfish	*Ictalurus spp.*
Channel catfish	*Ictalurus punctatus*
Common carp	*Cyprinus carpio*
Creek cub	*Semotilus atromaculatus*
Cutthroat trout	*Oncorhynchus clarki*
Emerald shiner	*Notropis atherinoides*
Fathead minnow	*Pimephales promelas*
Flathead chub	*Platygobio gracilis*
Golden shiner	*Notemigonus crysoleucas*
Grayling	*Thymallus thymallus*
Green sunfish	*Lepomus cyanellus*
Lake chub	*Couesius plumbeus*
Lake trout	*Salvelinus namaycush*
Largemouth bass	*Micropterus salmoides*
Longnose dace	*Rhinichthys cataractae*
Longnose sucker	*Catostomus catostomus*
Mountain sucker	*Catostomus platyrhynchus*
Mountain whitefish	*Prosopium williamsoni*
Pallid Sturgeon	*Scaphirhynchus albus*
Plains killifish	*Fundulus zebrinus*
Plains minnow	*Hybognathus placitus*
Plains topminnow	*Fundulus sciadicus*
Rainbow trout	*Oncorhynchus mykiss*
Rainbow-cutthroat hydrid	*Salmo gairdneri – Oncorhynchus clarki hybrid*
River carpsucker	*Carpiodes carpio*
Rock Bass	*Ambloplites rupestris*
Sand shiner	*Notropis stramineus*
Sauger	*Sander canadensis*
Shorthead redhorse	*Moxostoma macrolepidotum*
Shovelnose sturgeon	*Scaphirhynchus platorynchus*
Smallmouth bass	*Micropterus dolomieu*
Snake River cutthroat	*Oncorhynchus clarki spp.*
Stonecat	*Noturus flavus*
Sturgeon chub	*Macrhybopsis gelida*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Walleye	*Sander vitreus*
Western silvery minnow	*Hybognathus argyritis*
White sucker	*Catostomus commersoni*
Yellow perch	*Perca flavescens*
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*
Wildlife	
Alfalfa weevil	*Hypera postica Gyllenhal*
American kestrel	*Falco sparverius*
American marten	*Martes americana*
Badger	*Taxidea taxus*
Baird's sparrow	*Ammodramus bairdii*
Bald eagle	*Haliaeetus leucocephalus*
Beaver	*Castor canadensisis*
Beet leafhopper	*Circulifer tenellus*
Bighorn Mountain pika	*Ochotona princeps obscura*
Bighorn Mountain snowshoe hare	*Lepus americanus seclusus*
Bighorn sheep	*Ovis canadensis*
Black bear	*Ursus americanus*
Blackbilled cuckoo	*Coccyzus erythropthalmus*
Black-footed ferret	*Mustela nigripes*
Black-tailed prairie dog	*Cynomys ludovicianus*
Blue grouse	*Dendragapus obscurus*
Blue heron	*Ardea herodias*
Bobcat	*Lynx rufus*
Boreal chorus frog	*Pseudacris triseriata*
Boreal owl	*Aegolius funereus*
Brewer's sparrow	*Spizella breweri*
Bull snake	*Pituophis catenifer*
Burrowing owl	*Speotyto cunicularia*
Calliope hummingbird	*Stellula calliope*
Canada lynx	*Lynx canadensis*
Chukar partridge	*Alectoris chukar*
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Cooper's hawk	*Accipiter cooperii*
Coot	*Fulica spp.*
Cormorant	*Phalacrocorax spp.*
Cottontail rabbit	*Sylvilagus spp.*
Cougar (Mountain lion)	*Puma concolor*
Coyote	*Canis latrans*
Crane	*Grus spp.*
Eastern racer	*Coluber constrictor*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Elk	*Cervus elaphus*
Ferruginous hawk	*Buteo regalis*
Fisher	*Martes pennanti*
Fox squirrel	*Sciurus niger*
Fringed myotis	*Myotis thysanodes*
Garter snake	*Thamnophis sirtalis*
Golden eagle	*Aquila chrysaetos*
Gopher	*Gopherus spp.*
Gopher snake	*Pituophis catenifer*
Goshawk	*Accipiter gentilis*
Gray partridge	*Perdix perdix*
Gray squirrel	*Sciurus carolinensis*
Gray wolf	*Canis lupus*
Great Basin spadefoot toad	*Spea intermontana*
Great gray owl	*Strix nebulosa*
Great horned owl	*Bubo virginianus*
Greater sage-grouse	*Centrocercus urophasianus*
Grizzly bear	*Ursus arctos horribilis*
Ground squirrel	*Spermophilus spp.*
Hayden's shrew	*Sorex haydeni*
Hispid pocket mouse	*Chaetodipus hispidus*
Hoary bat	*Lasiurus cinereus*
Horse	*Equus caballus*
Hungarian partridge	*Perdix perdix*
Jackrabbit	*Lepus spp.*
Kestrel	*Falco spp.*
Leopard frog	*Rana pipiens*
Loggerheaded shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Long-eared myotis	*Myotis evotis*
Long-eared owl	*Asio otus*
Marten	*Martes spp.*
Merlin	*Falco columbarius*
Mink	*Mustela vison*
Moose	*Alces alces*
Mountain goat	*Oreamnos americanus*
Mountain plover	*Charadrius montanus*
Mourning dove	*Zenaida macroura*
Mule deer	*Odocoileus hermionus*
Muskrat	*Ondata zibethicus*
North American wolverine	*Gulo gulo luscus*
Northern goshawk	*Accipiter gentilis*
Northern harrier	*Circus cyaneus*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Northern leopard frog	*Rana pipiens*
Osprey	*Pandion haliaetus*
Partridge	*Perdix spp.; or Bonasa umbellus*
Peregrine falcon	*Falco peregrinus*
Pheasant	*Phasianus colchicus*
Piping plover	*Charadrius melodus*
Plains gartersnake	*Thamnophis radix*
Plains harvest mouse	*Reithrodontomys montanus*
Plains pocket gopher	*Geomys bursarius*
Plains rattlesnake	*Crotalus viridis*
Porcupine	*Erethizon dorsatum*
Prairie falcon	*Falco mexicanus*
Prairie rattlesnake	*Crotalus viridis*
Pronghorn	*Antilocapra americana*
Pygmy nuthatch	*Sitta pygmaea*
Pygmy rabbit	*Brachylagus idahoensis*
Raccoon	*Procyon lotor*
Rail	*family Rallidae*
Red fox	*Vulpes vulpes*
Red squirrel	*Tamiasciurus hudsonicus*
Red-tailed hawk	*Buteo jamaicensis*
Ring-necked pheasant	*Phasianus colchicus*
Rough-legged hawk	*Buteo lagopus*
Ruffed grouse	*Bonasa umbellus*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Sagebrush lizard	*Sceloporus graciosus*
Sagebrush vole	*Lemmiscus curtatus*
Sandhill crane	*Grus canadensis*
Sharp-shinned hawk	*Accipiter striatus*
Short-eared owl	*Asio flammeus*
Snipe	*Gallinago spp.*
Snowshoe hare	*Lepus americanus*
Spotted bat	*Euderma maculatum*
Spotted frog	*Rana luteiventris*
Spotted skunk	*Spilogale gracilis*
Striped skunk	*Mephitis mephitis*
Swainson’s hawk	*Buteo swainsoni*
Swift fox	*Vulpes velox*
Terrestrial gartersnake	*Thamnophis elegans*
Three-toed woodpecker	*Picoides dorsalis*
Tiger salamander	*Ambystoma tigrinum mavortium*
Townsend’s big-eared bat	*Corynorhinus townsendii*

Table K-2. Common and Scientific Names of Plant and Wildlife Species Identified in the Environmental Impact Statement (Continued)

Common Name	Scientific Name
Trumpeter swan	*Cygnus buccinator*
Turkey	*Meleagris gallopavo*
Turkey vulture	*Cathartes aura*
Virginia's warbler	*Vermivora virginiae*
Vole	*Microtus spp.*
Water vole	*Arvicola amphibius*
Weasel	*Mustela spp.*
Western burrowing owl	*Athene cunicularia hypugea*
White-faced ibis	*Plegadis chihi*
White-tailed deer	*Odocoileus virginianus*
White-tailed jackrabbit	*Lepus townsendii*
White-tailed prairie dog	*Cynomys leucurus*
Wild turkey	*Meleagris gallopavo*
Williamson's sapsucker	*Sphyrapicus thyroideus*
Woodhouse's toad	*Bufo woodhousii*
Wyoming ground squirrel	*Spermophilus elegans*
Yellow-billed cuckoo	*Coccyzum americanus*
Yuma myotis	*Myotis yumanensis*
Invertebrates	
Asian clam	*Corbicula fluminea*
Bark beetle	*Dendroctonus ponderosae*
Crayfish	*Various*
Didymo	*Didymosphenia geminata*
Grasshopper	*Suborder Caelifera; order Orthoptera*
Mormon cricket	*Anabrus simplex*
Mosquito	*Anopheles spp.*
Mountain pine beetle	*Dendroctonus ponderosae*
Mussel	*Various*
New Zealand mud snail	*Potamopyrgus antipodarum*
Quagga mussel	*Dreissena rostriformis bugensis*
Zebra mussel	*Dreissena polymorpha*

Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix L

Required Design Features and Best Management Practices

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APPENDIX L

REQUIRED DESIGN FEATURES AND BEST MANAGEMENT PRACTICES

Required Design Features (RDFs) are required for certain activities in greater sage-grouse habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the National Environmental Policy Act (NEPA) analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;
- An alternative RDF is determined to provide equal or better protection for greater sage-grouse or its habitat; or
- A specific RDF will provide no additional protection to greater sage-grouse or its habitat.

Adverse environmental impacts associated with development can be avoided, reduced, or mitigated through the project's design and implementation. In order to provide regulatory certainty that the measures will be incorporated, they must be required of every project. The National Technical Team (NTT) report identified management actions and practices that would reduce adverse impacts to greater sage-grouse if mandated to development throughout Core Area (Priority Habitat Management Areas). Some of these practices are incorporated in Alternative D as being universally appropriate. The ones that could be analyzed on a planning area-wide basis have been made a part of the management actions and in this appendix as RDFs.

Other environmental protection measures could not be analyzed in a resource area-wide Environmental Impact Statement (EIS) because their appropriateness depends upon site-specific issues such as proximity to the boundary of Priority Habitat Management Areas or non-crucial habitat or engineering or physical limitations such as an oil and gas producing zone being too close to the surface to be recoverable through directional drilling. These best management practices (BMPs) are required to be considered in a site-specific project's design to reduce, prevent, or avoid adverse environmental or social impacts. These practices are analyzed to help ensure that development is conducted in an environmentally responsible manner. Some BMPs are as simple as choosing a paint color that helps oil and natural gas equipment blend with the natural surroundings, making development less visible. Other BMPs may reduce the amount of vegetation lost to development, improve the speed of re-growth of desirable vegetation, or may reduce the amount of wildlife disturbance in important habitats. Public land users are encouraged to review these practices, incorporate them where appropriate, or develop better methods for achieving the same goal. However, the Bureau of Land Management (BLM) may also require their incorporation into the design features of the project as a Condition of Approval (COA). A design feature should only be considered as a potential beneficial impact under the NEPA when it is part of a BLM authorization as a COA. If the practice is only voluntary or suggested, the BLM lacks the authority to require its implementation, so the project should be analyzed as if the practice will not

occur. The BLM authorization will make clear whether the BMP is mandatory (attached as a COA) or merely encouraged.

NEPA analysis that concludes that BMPs should not be attached as mandatory COAs needs to clearly explain why with relation to site-specific factors. The purpose of this section is not to select certain practices or designs and require that only those be used. It is not possible to evaluate all the known practices and make determinations as to which are best, particularly without a specific project in a specific location. BMPs should be matched and adapted to meet the site-specific requirements of the management action, project and local environment. No one management practice is best suited to every site or situation, or will remain the most optimal practice over time. BMPs must be adaptive and monitored regularly to evaluate effectiveness. As discussed more fully in the Special Status Species-Wildlife section, protections for the greater sage-grouse are an important focal point in the preparation of the Resource Management Plan (RMP). Accordingly, a special section of BMPs identifies management that should be considered in greater sage-grouse priority habitat. It is expected that these BMPs will change over time as monitoring and further study develop improved greater sage-grouse protections.

1.0 REQUIRED DESIGN FEATURES

The following design approaches are required for all projects unless the proponent establishes that due to site limitations or engineering considerations, the design approaches are infeasible. Economic considerations such as increased costs do not render a design infeasible. The following measures would be applied as RDFs for all solid minerals. They would also apply to locatable minerals subject to valid existing rights and consistent with applicable law.

1.1 Greater Sage-Grouse Protection Required Design Features for All Projects

The following measures, and others as they are identified, will be required for all BLM-authorized development. As appropriate, they may be required as part of the design of the project or as a mandatory COA. The following required design features are found in the Sage-Grouse National Technical Team report (Sage-grouse NTT 2011) titled "A Report on National Greater Sage-Grouse Conservation Measures".

General

1. Evaluate and take advantage of opportunities to remove or modify existing power lines within priority sage-grouse habitat areas. When possible, require perch deterrents on existing or new overhead facilities. Encourage installation of perch deterrents on existing facilities.
2. Where existing leases or rights-of-way (ROWs) have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features and restoring the habitat.
3. Locate man camps outside priority sage-grouse habitats.
4. Work cooperatively with permittees, leasees, and other landowners to develop grazing management strategies that integrate both public and private lands into single management units.

5. Coordinate BMPs and vegetative objectives with the Natural Resources Conservation Service (NRCS) for consistent application across jurisdictions where the BLM and NRCS have the greatest opportunities to benefit greater sage-grouse, particularly as it applies to the NRCS's National Sage-Grouse Initiative: (http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/farmbill/initiatives/and cid=steldevb1027671).
6. When conducting NEPA analysis for water developments or other rangeland improvements address the direct and indirect effects to sage-grouse populations and habitat.
7. Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to priority sage-grouse habitats to determine if they should be restored to sagebrush or habitat of higher quality for sage-grouse. If these seedings are part of an Allotment Management Plan/Conservation Plan or if they provide value in conserving or enhancing the rest of the priority habitats, then no restoration would be necessary. Assess the compatibility of these seedings for sage-grouse habitat or as a component of a grazing system during land health assessments. For example, some introduced grass seedings are an integral part of a livestock management plan and reduce grazing pressure in important sagebrush habitats, or serve as a strategic fuels management area.
8. Where the federal government owns the surface, and the mineral estate is in non-federal ownership, apply appropriate BMPs to surface development.

Roads

1. Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
2. Locate roads to avoid important areas and habitats.
3. Coordinate road construction and use among Federal fluid mineral lessees and ROW or Surface Use Agreement (SUA) holders.
4. Construct road crossings of ephemeral, intermittent, and perennial streams to minimize impacts to the riparian habitat, such as by crossing at right angles to ephemeral drainages and stream crossings.
5. Establish slow speed limits on BLM and Forest Service system-administered roads or design roads for slower vehicle speeds to reduce sage-grouse mortality.
6. Establish trip restrictions or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition).
7. Do not issue ROWs or SUAs to counties on energy development roads, unless for a temporary use consistent with all other terms and conditions including this document.
8. Restrict vehicle traffic to only authorized users on newly constructed routes (using signage, gates, etc.)
9. Apply dust abatement on roads, well pads, and other surface disturbances.
10. Close and rehabilitate duplicate roads by restoring original landform and establishing a desirable plant community.
11. Do not issue ROWs to counties on newly constructed energy development roads, unless for a temporary use consistent with all other terms and conditions included in this document.

Operations

1. Site and/or minimize linear ROWs or SUAs to reduce disturbance and fragmentation of sagebrush habitats.
2. Place new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors.
3. Bury power lines to the extent technically feasible.
4. Collocate powerlines, flowlines, and small pipelines under or immediately adjacent to existing roads/transportation corridors.
5. Cover all fluid-containing pits and open tanks with netting (maximum 1.5-inch mesh size) regardless of size to reduce sage-grouse mortality.
6. Equip tanks and other above ground facilities with structures or devices that discourage nesting and perching of raptors and corvids.
7. Control the spread and effects of invasive non-native plant species, including treating weeds prior to surface disturbance and washing vehicles and equipment at designated wash stations when constructing in areas with weed infestations.
8. Require sage-grouse-safe fences.
9. Clean up refuse.
10. Locate mining camps outside of priority sage-grouse habitats.
11. Fit transmission towers with anti-perch devices.
12. Construct sage-grouse-safe fences around sumps.
13. Cluster disturbances, operations (hydraulic fracture stimulation, liquids gathering, etc.), and facilities.
14. Use directional and horizontal drilling to the extent feasible as a means to reduce surface disturbance in relation to the number of wells.
15. Place infrastructure in already disturbed locations where the habitat has not been fully restored.
16. Apply a phased development approach with concurrent reclamation.
17. Place liquid gathering facilities outside priority areas. To reduce truck traffic and perching and nesting sites for ravens and raptors do not place tanks at well locations within priority habitat areas.
18. Pipelines must be under or immediately adjacent to the road.
19. Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use.
20. Restrict the construction of tall facilities, distribution powerlines, and fences to the minimum number and amount needed.
21. Design or site permanent structures to minimize impacts to sage-grouse, with emphasis on locating and operating facilities that create movement (e.g., pump jacks) or attract frequent human use and vehicular traffic (e.g., fluid storage tanks) in a manner that will minimize disturbance of sage-grouse or interference with habitat use.

22. Use only closed-loop systems for drilling operations, with no reserve pits.
23. Consider using oak (or other material) mats for drilling activities where topography permits to reduce vegetation disturbance and for temporary roads between closely-spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.

West Nile

1. Restrict impoundment construction to reduce or eliminate threats from West Nile Virus (WNv).
2. Increase the size of freshwater ponds to accommodate a greater volume of water than is discharged. This will result in un-vegetated and muddy shorelines that breeding *Cx. tarsalis* avoid. This modification may reduce *Cx. tarsalis* habitat but could create larval habitat for *Culicoides sonorensis*, a vector of blue tongue disease, and should be used sparingly. Steep shorelines should be used in combination with this technique whenever possible.
3. Build steep shorelines to reduce shallow water (greater than 60 centimeters [cm]) and aquatic vegetation around the perimeter of impoundments. Construction of steep shorelines also will create more permanent ponds that are a deterrent to colonizing mosquito species like *Cx. tarsalis* which prefer newly flooded sites with high primary productivity.
4. Maintain water levels below that of rooted vegetation for a muddy shoreline that is unfavorable habitat for mosquito larvae. Rooted vegetation includes both aquatic and upland vegetative types. Avoid flooding terrestrial vegetation in flat terrain or low lying areas. Aquatic habitats with a vegetated inflow and outflow separated by open water produce 5 to 10 fold fewer *Culex* mosquitoes than completely vegetated wetlands. Wetlands with open water also had significantly fewer stage III and IV instars which may be attributed to increased predator abundances in open water habitats.
5. Construct dams or impoundments that restrict down slope seepage or overflow by digging ponds in flat areas rather than damming natural draws for effluent water storage, or lining constructed ponds in areas where seepage is anticipated.
6. Line channels where discharge water flows into ponds with crushed rock, or use a horizontal pipe to discharge inflow directly into existing open water, thus precluding shallow surface inflow and accumulation of sediment that promotes aquatic vegetation.
7. Line the overflow spillway with crushed rock, and construct the spillway with steep sides to preclude the accumulation of shallow water and vegetation.
8. Fence pond sites to restrict access by livestock and other wild ungulates that trample and disturb shorelines, enrich sediments with manure and create hoof print pockets of water that are attractive to breeding mosquitoes.
9. Manage artificial water impoundments for the prevention and/or spread of WNv where the virus poses a threat to sage-grouse. This may include but is not limited to: (a) the use of larvicides and adulticides to treat waterbodies; (b) overbuilding ponds to create non-vegetated, muddy shorelines; (c) building steep shorelines to reduce shallow water and emergent aquatic vegetation; (d) maintaining the water level below rooted vegetation; (e) avoiding flooding terrestrial vegetation in flat terrain or low lying areas; (f) constructing dams or impoundments that restrict seepage or overflow; (g) lining the channel where discharge water flows into the pond with crushed rock, or use a horizontal pipe to discharge inflow directly into existing open water; (h) lining the overflow spillway with crushed rock and construct the spillway with steep

sides to preclude the accumulation of shallow water and vegetation; and (i) restricting access of ponds to livestock and wildlife.

10. Field Offices should consider alternate means to manage produced waters that could present additional vectors for WNv. Such remedies may include re-injection under an approved Underground Injection Control permit, transfer to single/centralized facility, etc.
11. Policy Statement 7 regarding WNv does not apply to naturally occurring waters.
12. Design impoundments for wildlife and/or livestock use to reduce the potential to produce vectors for WNv where the virus may pose a threat to sage-grouse.
13. Manage water impoundments to prevent the spread of WNv where analysis shows the virus poses a threat to sage-grouse and may result in negative impacts to other species of concern.
14. Remove or re-inject produced water to reduce habitat for mosquitoes that vector WNv. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat:
    - Overbuild size of ponds for muddy and non-vegetated shorelines.
    - Build steep shorelines to decrease vegetation and increase wave actions.
    - Avoid flooding terrestrial vegetation in flat terrain or low lying areas.
    - Construct dams or impoundments that restrict down slope seepage or overflow.
    - Line the channel where discharge water flows into the pond with crushed rock.
    - Construct spillway with steep sides and line it with crushed rock.
15. Treat waters with larvicides to reduce mosquito production where water occurs on the surface.
16. Restrict pit and impoundment construction to reduce or eliminate threats from WNv.

Noise

1. Limit noise to less than 10 decibels above ambient measures (20 to 24 decibels) at sunrise at the perimeter of a lek during active lek season.
2. Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.
3. Locate new compressor stations outside priority habitats and design them to reduce noise that may be directed towards priority habitat.
4. Require sage-grouse safe fences.

Reclamation

1. Include objectives for ensuring habitat restoration to meet sage-grouse habitat needs in reclamation practices/sites. Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve sage-grouse habitat needs.
2. Maximize the area of interim reclamation on long-term access roads and well pads, including reshaping, topsoiling, and revegetating cut-and-fill slopes.
3. Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.

4. Implement irrigation during interim or final reclamation for sites where establishment of seedlings has been shown or is expected to be difficult due to dry conditions. Utilize mulching techniques to expedite reclamation.
5. Use mulching, soil amendments, and/or erosion blankets to expedite reclamation and to protect soils.
6. Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve sage-grouse habitat needs.
7. Minimize surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal sage-grouse habitats. Apply these measures during project level planning.
8. When conducting NEPA analysis for wild horse and burro management activities, water developments or other rangeland improvements for wild horses in priority sage-grouse habitat, address (and apply conservation measures as appropriate) the direct and indirect effects to sage-grouse populations and habitat.
9. During activity level planning, where appropriate, designate routes with current administrative/agency purpose or need to administrative access only.
10. Identify and work with partners to increase native seed availability and work with plant material centers to develop new plant materials, especially the forbs needed to restore sage-grouse habitat.
11. Consider potential changes in climate when proposing seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed.
12. Use Ecological Site Descriptions (ESDs) or other protocols could be used (e.g., TEUI or LSI) to identify the understory species and sagebrush subspecies needed to restore desirable habitat conditions.

Vegetation Treatments/Fire and Fuels Management

1. During vegetation management project design, consider the utility of using livestock to strategically reduce fine fuels, and implement grazing management that will accomplish this objective. Consult with ecologists to minimize impacts to native perennial grasses.
2. Provide to personnel planning vegetation treatments information on sage-grouse biology, habitat requirements, and identification of areas utilized locally.
3. Use vegetation treatment prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable plant species and reduce risk of hydrophobicity.
4. Ensure proposed sagebrush treatments are planned with interdisciplinary input from BLM/Forest Service and /or state wildlife agency biologist and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.
5. Ensure that treatments are configured in a manner (e.g., strips) that promotes use by sage-grouse.
6. Where appropriate, incorporate roads and natural fuels breaks into fuels break design.
7. Power-wash all vehicles and equipment involved in vegetation treatment activities prior to entering the area to minimize the introduction of undesirable and/or invasive plant species.

8. Design vegetation treatments in areas of high wildfire frequency to facilitate firefighter and public safety, reduce the risk of extreme fire behavior; and to reduce the risk and rate of fire spread to sage-grouse habitats.
9. Restore prior perennial grass/shrub plant communities infested with non-native invasive species to a species composition characterized by perennial grasses, forbs, and shrubs as outlined in ESDs.
10. Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
11. Reduce the risk of vehicle or human-caused wildfires and the spread of invasive species into sage-grouse habitats could be minimized by planting perennial vegetation (e.g., green-strips) paralleling road ROWs (this BMP could be applied to BLM linear ROW authorizations).
12. Strategically place and maintain pre-treated strips/areas (e.g., mowing, herbicide application, and strictly managed grazed strips) to aid in controlling wildfire should wildfire occur near sage-grouse key habitats or important restoration areas (such as where investments in restoration have already been made).
13. Design vegetation treatments in sage-grouse habitats to strategically reduce wildfire threats in the greatest area. This may involve spatially arranging new vegetation treatments with past treatments, vegetation with fire-resistant serial stages, natural barriers, and roads in order to constrain fire spread and growth. This may require vegetation treatments to be implemented in a more linear versus block design.
14. Design post Emergency Stabilization and Rehabilitation (ES&R) and Burned Area Emergency Response management to ensure long term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse and burro, and travel management, etc., to achieve and maintain the desired condition of ES&R and Burned Area Emergency Response projects to benefit sage-grouse. Include sage-grouse habitat parameters as defined by Connelly et al., Hagen et al., or if available, State Sage-Grouse Conservation plans and appropriate local information in habitat restoration objectives. Make maintaining these objectives within priority sage-grouse habitat areas a high restoration priority.
15. Make re-establishment of sagebrush and desirable understory plant cover (relative to ecological site potential) a high priority for restoration efforts. Write specific vegetation objectives to reestablish sage-brush cover and desirable understory cover.
16. Where applicable, design fuels treatment objective to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patters which most benefit sage-grouse habitat.
17. Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally.
18. Use fire prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of hydrophobicity).
19. Ensure proposed sagebrush treatments are planned with interdisciplinary input from BLM, Forest Service and/or state wildlife agency biologist and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.

20. Where appropriate, ensure that treatments are configured in a manner (e.g., strips) that promotes use by sage-grouse.
21. Where applicable, incorporate roads and natural fuel breaks into fuel break design.
22. Power-wash all firefighting vehicles, including engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread.
23. Design vegetation treatment in areas of high frequency to facilitate firefighting safety, reduce the risk of extreme fire behavior; and to reduce the risk and rate of fire spread to sage-grouse key habitats and restoration habitats.
24. Give priority for implementing specific sage-grouse habitat restoration projects in areas infested with undesirable annual grasses first to sites which are adjacent to or surrounded by sage-grouse key habitats. Areas infested with undesirable annual grasses are second priority for restoration when the sites not adjacent to key habitat, but within two miles of key habitat. The third priority for areas infested with undesirable annual grasses habitat restoration projects are sites beyond two miles of key habitat. The intent is to focus restoration outward from existing, intact habitat.
25. As funding and logistics permit, restore areas infested with undesirable annual grasses to a species composition characterized by perennial grasses, forbs, and shrubs.
26. Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
27. Remove standing and encroaching trees within at least 100 meters of occupied sage-grouse leks and other habitats (e.g., nesting, wintering, and brood rearing) to reduce the availability of perch sites for avian predators, as appropriate, and resources permit.
28. Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.
29. Develop state-specific sage-grouse reference information and resource materials containing maps, a list of resource advisors, contact information, local guidance, and other relevant information.
30. Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.
31. Assign a sage-grouse resource advisor to all extended attack fires in or near priority sage-grouse habitat areas. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals.
32. On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.
33. During periods of multiple fires, ensure line officers are involved in setting priorities.
34. Locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas, and heli-bases) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas, grasslands, near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover.

35. Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.
36. Minimize burnout operations in key sage-grouse habitats by constructing direct firelines whenever safe and practical to do so.
37. Utilize retardant and mechanized equipment to minimize burned acreage during initial attack.
38. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.

Fire Operations Best Management Practices for Sage-Grouse Conservation

1. Compile district-level information into state-wide sage-grouse tool boxes. Tool boxes will contain maps, listing of resource advisors, contact information, local guidance, and other relevant information for each district, which will be aggregated into a state-wide document.
2. Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.
3. Assign a resource advisor with sage-grouse expertise, or who has access to sage-grouse expertise, to all extended attack fires in or near sage-grouse habitat areas. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals.
4. On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.
5. As appropriate, utilize existing fuel breaks, such as roads or discrete changes in fuel type, as control lines in order to minimize fire spread.
6. During periods of multiple fires, ensure line officers are involved in setting priorities.
7. To the extent possible, locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas, heli-bases, etc.) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas, grasslands, near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover.
8. Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and ATVs prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread.
9. Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.
10. Minimize burnout operations in key sage-grouse habitat areas by constructing direct fireline whenever safe and practical to do so.
11. Utilize retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack.
12. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.
13. Adequately document fire operation activities in sage-grouse habitat for potential follow-up coordination activities.

Fuels Management Best Management Practices for Sage-Grouse Conservation

1. Where applicable, design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which most benefit sage-grouse habitat.
2. Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally.
3. Use burning prescriptions which minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion).
4. Ensure proposed sagebrush treatments are planned with full interdisciplinary input pursuant to NEPA and coordination with state fish and wildlife agencies, and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.
5. Where appropriate, ensure that treatments are configured in a manner that promotes use by sage-grouse.
6. Where applicable, incorporate roads and natural fuel breaks into fuel break design.
7. Power-wash all vehicles and equipment involved in fuels management activities, prior to entering the area, to minimize the introduction of undesirable and/or invasive plant species.
8. Design vegetation treatments in areas of high fire frequency which facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to sage-grouse habitat. Additionally, develop maps for sage-grouse habitat which spatially display current fuels treatment opportunities for suppression resources.
9. Give priority for implementing specific sage-grouse habitat restoration projects in areas infested with undesirable annual grasses, first to sites which are adjacent to or surrounded by preliminary priority habitat (PPH) or that reestablish continuity between priority habitats. Areas infested with undesirable annual grasses are a second priority for restoration when the sites are not adjacent to PPH, but within two miles of PPH. The third priority for areas infested with undesirable annual grasses habitat restoration projects are sites beyond two miles of PPH. The intent is to focus restoration outward from existing, intact habitat.
10. As funding and logistics permit, restore areas infested with undesirable annual grasses to a species composition characterized by perennial grasses, forbs, and shrubs or one of that referenced in land use planning documentation.
11. Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
12. Remove standing and encroaching trees within at least 100 meters of occupied sage-grouse leks and other habitats (e.g., nesting, wintering and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit.
13. Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.

Oil and Gas Development

1. Require unitization when deemed necessary for proper development and operation of an area or to facilitate more orderly (e.g., phased and/or clustered) development as a means of minimizing adverse impacts to resources, including greater sage-grouse, so long as the unitization plan adequately protects the rights of all parties including the United States, according to the Federal Lease Form, 3100-11, Sections 4 and 6.

2.0 BEST MANAGEMENT PRACTICES

The best management practices (BMPs) shown in this appendix are not intended to encompass all potentially applicable BMPs. Instead, Appendix L was developed to address specific issues brought forward during scoping, alternative development, and comments from the public and cooperating agencies.

2.1 Best Management Practices for Important Cultural Resource and Trail Settings

The BLM should use standard measures to reduce the visual impact of proposed actions within trail settings, where setting is a contributing element of eligibility to the National Register of Historic Places and the setting has integrity. Standard measures should be used as stipulations or conditions of approval attached to authorizations. Standard measures, or BMPs, for reducing the visibility of proposed actions include, but are not limited to:

- Apply a controlled surface use (CSU) stipulation to surface-disturbing activities or surface occupancy.
- Visual Contrast Ratings and, as appropriate, require visual simulations.
- Consolidate project facilities among oil and gas developers; maximize use of existing locations.
- Develop coordinated road and pipeline systems.
- Reduce the amount of surface development by consolidating facilities.
- Use low profile facilities.
- Locate projects to maximize the use of topography and vegetation to screen development.
- Design projects to blend with topographic forms and existing vegetation patterns.
- Use environmental coloration or camouflage techniques to reduce the visual impact of facilities that cannot be completely hidden.
- Use broken linear patterns for road developments to screen roads as much as possible. This can include feathering or blending of the edges of linear rights-of-way to soften the dominant line form.
- For livestock control, use electric fencing with low-visibility fiberglass posts and environmental colors.
- Design linear facilities and seismic lines to run parallel to key observation points rather than perpendicular.
- Position facilities to present less of a visual impact (e.g., a facility with several tanks lined up so that one obscures the visibility of the others).

2.2 Decontamination Procedure for Aquatic Invasive Species

To prevent the spread of aquatic invasive species, the Wyoming Game and Fish Department recommends following the guidelines outlined in the *Aquatic Invasive Species in Wyoming* brochure (link below). Specific BMPs to aquatic invasive species spread prevention include, but are not limited to:

- Decontamination should first occur before arrival at a project site, so aquatic invasive species are not transferred from the last visited area. Decontamination should occur again before leaving a project site, so aquatic invasive species are not transferred to the next site.
- Decontamination may consist of either:

    1. Drain all water from equipment and compartments, clean equipment of all mud, plants, debris, or animals, and dry equipment for five days in summer (June, July, and August); 18 days in spring (March, April, and May) and fall (September, October, and November); or three days in winter (December, January, and February) when temperatures are at or below freezing,

    -or-

    2. Use a high pressure (2,500 pounds per square inch [psi]) hot water (140°F) pressure washer to thoroughly wash equipment and flush all compartments that may hold water.

http://gf.state.wy.us/fish/AIS/index.asp

2.3 Wyoming Forestry Best Management Practices

The Wyoming Forestry Best Management Practices: Forestry BMPs Water Quality Protection Guidelines (link below) describes BMPs for the management of forest lands. These BMPs are a set of voluntary preferred methods of forestland management designed to protect water quality and forest soils, and are intended for use on non-industrial private, forest industry, state-owned and federal forests.

http://slf-web.state.wy.us/forestry/bmp2.aspx

2.4 Reseeding Best Management Practices

The following recommendations may be required depending on the project size and location.

1. Proposed actions where native brush species located on lands proposed to be disturbed are unique and desirable for interim and final reclamation purposes, and the seed supply for these desirable brush species is not commercially available, will be collected from the area and stored using the procedures of the Seeds of Success program. Seedlings or plugs of common dominant species will be propagated, preferably locally, in preparation for use in portions of area to be reclaimed to expedite vegetation recovery.
2. Areas of sustainable plant communities and populations (where they do not conflict with other allowable resource uses) will be identified as sources for native plant material and will be managed under consideration of the need to consistently produce seed stocks of non-commercially available materials for use in reclamation and restoration work (e.g., to support reclamation of abandoned mine lands or well pads or to supplement commercially available seeds in high fire years).

2.5 Engineering Best Management Practices

Road maintenance, construction, and any other related travel and transportation management will be mandated by BLM Manual 9113. BLM Manual 9113 provides for BMPs to be used in evaluating, maintaining, and constructing BLM travel and transportation routes. As stated in Manual 9113, "Bureau roads must be designed to an appropriate standard no higher than necessary to accommodate their intended functions adequately (timber hauling administrative access, public travel); and design, construction, and maintenance activities must be consistent with national policies for safety, aesthetics, protection and preservation of cultural, historic, and scenic values, and accessibility for the physically handicapped. The following is a list of BMPs that are recommended but not binding for road maintenance practices:

1. Design roads to minimize total disturbance, to conform with topography, and to minimize disruption of natural drainage patterns.
2. Base road design criteria and standards on road management objectives such as traffic requirements of the proposed activity and the overall TP, economic analysis, safety requirements, resource objectives, and minimizing damage to the environment.
3. Locate roads on stable terrain such as ridge tops, natural benches, and flatter transitional slopes near ridges, and valley bottoms, and moderate side slopes and away from slumps, slide prone areas, concave slopes, clay beds, and where rock layers dip parallel to the slope. Locate roads on well-drained soil types; avoid wet areas when possible.
4. Construct cut and fill slopes to be approximately 3 horizontal (h):1 vertical (v) or flatter where feasible. Locate roads to minimize heights of cutbanks. Avoid high, steeply sloping cutbanks in highly fractured bedrock.
5. Avoid headwalls, midslope locations on steep, unstable slopes, fragile soils, seeps, old landslides, side slopes in excess of 70 percent, and areas where the geologic bedding planes or weathering surfaces are inclined with the slope. Implement extra mitigation measures when these areas cannot be avoided.
6. Construct roads for surface drainage by using outslopes, crowns, grade changes, drain dips, waterbars and in-sloping to ditches as appropriate.
7. Sloping the road base to the outside edge for surface drainage is normally recommended for local spurs or minor collector roads where low-volume traffic and lower traffic speeds are anticipated. This is also recommended in situations where long intervals between maintenance will occur and where minimum excavation is wanted. Out-sloping is not recommended on steep slopes. Sloping the road base to the inside edge is an acceptable practice on roads with steep side slopes and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure.
8. Crown and ditching is recommended for arterial and collector roads where traffic volume, speed, intensity and user comfort are considerations. Recommended gradients range from 0 to 15 percent where crown and ditching may be applied, as long as adequate drainage away from the road surface and ditch lines is maintained.
9. Minimize excavation, when constructing roads, through the use of balanced earthwork, narrowing road widths, and end hauling where side slopes are between 50 and 70 percent.

10. If possible, construct roads when soils are dry and not frozen. When soils or road surfaces become saturated to a depth of 3 inches, BLM-authorized activities should be limited or ceased unless otherwise approved by the authorized officer.
11. Consider improving inadequately surfaced roads that are to be left open to public traffic during wet weather with gravel or pavement to minimize sediment production and maximize safety.
12. Retain vegetation on cut slopes unless it poses a safety hazard or restricts maintenance activities. Roadside brushing of vegetation should be done in a way that prevents disturbance to root systems and visual intrusions (i.e., avoid using excavators for brushing).
13. Retain adequate vegetation between roads and streams to filter runoff caused by roads.
14. Avoid riparian/wetland areas where feasible; locate in riparian/wetland areas only if the roads do not interfere with the attainment of resource objectives.
15. Minimize the number of unimproved stream crossings. When a culvert or bridge is not feasible, locate drive-through (low water crossings) on stable rock portions of the drainage channel. Harden crossings with the addition of rock and gravel if necessary. Use angular rock if available.
16. Locate roads and limit activities of mechanized equipment within stream channels to minimize their influence on riparian areas. When crossing a stream is necessary, design the approach and crossing perpendicular to the channel, where practicable. Locate the crossing where the channel is well defined, unobstructed, and straight.
17. Avoid placing fill material in floodplain unless the material is large enough to remain in place during flood events.
18. Use drainage dips instead of culverts on level 2 roads where gradients will not present a safety issue. Locate drainage dips in such a way so that water will not accumulate or where outside berms prevent drainage from the roadway. Locate and design drainage dips immediately upgrade of stream crossings and provide buffer areas and catchment basins to prevent sediment from entering the stream.
19. Construct catchment basins, brush windrows, and culverts in a way to minimize sediment transport from road surfaces to stream channels. Install culverts in natural drainage channels in a way to conform with the natural streambed gradients with outlets that discharge onto rocky or hardened protected areas.
20. Design and locate water crossing structures in natural drainage channels to accommodate adequate fish passage, provide for minimum impacts to water quality, and to be capable of handling a 100-year event for runoff and floodwaters.
21. Use culverts that pass, at a minimum, a 25-year storm event or have a minimum diameter of 24 inches for permanent stream crossings and a minimum diameter of 18 inches for road cross drains.
22. Replace undersized culverts and repair or replace damaged culverts and downspouts. Provide energy dissipaters at culvert outlets or drainage dips.
23. Locate culverts or drainage dips in such a manner as to avoid discharge onto unstable terrain such as headwalls or slumps. Provide adequate spacing to avoid accumulation of water in ditches or road surfaces. Culverts should be placed on solid ground to avoid road failures.

24. Proper sized aggregate and riprap should be used during culvert construction. Place riprap at culvert entrance to streamline waterflow and reduce erosion.
25. Establish adapted vegetation on all cuts and fill immediately following road construction and maintenance.
26. Remove berms from the downslope side of roads, consistent with safety considerations.
27. Leave abandoned roads in a condition that provides adequate drainage without further maintenance. Close abandoned roads to traffic. Physically obstruct the road with gates, large berms, trenches, logs, stumps, or rock boulders as necessary to accomplish permanent closure.
28. Abandon and rehabilitate roads that are no longer needed. Leave these roads in a condition that provides adequate drainage. Remove culverts.
29. When plowing snow for winter use of roads, provide breaks in snow berms to allow for road drainage. Avoid plowing snow into streams. Plow snow only on existing roads.
30. Maintenance should be performed to conserve existing surface material, retain the original crowned or out-sloped self-draining cross section, prevent or remove rutting berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid wasting loose ditch or surface material over the shoulder where it can cause stream sedimentation or weaken slump-prone areas. Avoid undercutting back slopes.
31. Do not disturb the toe of cut slopes while pulling ditches or grading roads. Avoid sidecasting road material into streams.
32. Grade roads only as necessary. Maintain drain dips, waterbars, road crown, in-sloping and outsloping, as appropriate, during road maintenance.
33. Maintain roads in special areas according to special area guidance. Generally, retain roads within existing disturbed areas and sidecast material away from the special area.
34. When landslides occur, save all soil and material usable for reclamation or stockpile for future reclamation needs. Avoid sidecasting of slide material where it can damage, overload, and saturate embankments, or flow into down-slope drainage courses. Reestablish vegetation as needed in areas where vegetation has been destroyed due to sidecasting.
35. Strip and stockpile topsoil ahead of construction of new roads, if feasible. Reapply soil to cut and fill slopes prior to revegetation.

2.6 Best Management Practices for Livestock Grazing

The purpose of this section is not to attempt to select certain practices and require that only those be used. It is not possible to evaluate all the known practices and make determinations as to which are best. What is best must be determined as a result of a site-specific investigation of the proposed management action. No one management practice is best suited to every site or situation. BMPs must be adaptive and monitored regularly to evaluate effectiveness.

The following sources contain information regarding grazing BMPs. Over time, other sources of information will become available and will be considered in proposed management actions.

The National Range and Pasture Handbook
http://www.glti.nrcs.usda.gov/technical/publications/nrph.html

Best Management Practices for Grazing
http://deq.state.wy.us/wqd/watershed/Downloads/NPS%20Program/92602.pdf

The following BMPs for livestock grazing management within greater sage-grouse Priority Habitat Management Areas have been identified from Cagney et al. (2010):

Sage-Grouse Habitat Season

- Mating Leks: Avoid any new sources of disturbance such as range improvements on lek sites.
- Nesting/Early Brood-Rearing: Maintain the Sagebrush/Bunchgrass Plant Community wherever currently present. Manage for high vigor in all plant communities. Avoid repeatedly using cool-season bunchgrasses in the critical growing season and limit utilization to moderate levels to assure that the previous year's standing crop is available for hiding cover.
- Late Brood-Rearing: Avoid repeatedly grazing riparian areas in seasons when temperatures are high.
- Winter: Avoid levels of browsing on sagebrush that would limit sage-grouse access to their food supply and cover. Additionally, avoid heavy use of herbaceous standing crop as this will adversely affect hiding cover the following spring.

Vegetation Community

- Bunchgrass: Consider changes in management that would increase utilization or change the timing of grazing on these sites.
- Sagebrush/Bunchgrass:
  - Retain sufficient residual cover to provide Sage-Grouse hiding cover the following year.
  - Employ planned grazing; periodic small-scale disturbance such as occasional thinning or specialized small ruminant grazing of dense (30+ percent canopy cover) sagebrush will help maintain this desired state.
- Sagebrush/Rhizomatous Grass/Bluegrass:
  - Establish grazing strategies tailored to plant growth requirements of cool-season grasses.
  - Retain sufficient residual cover to provide Sage-Grouse hiding cover the following year.
  - Avoid confining animals on inadequate pasture or supplemental feeding to compensate for a lack of natural forage.
- Sagebrush/Bare Ground: Restrict grazing in conjunction with restoration efforts until the site is ready to sustain grazing.

2.7 Best Management Practices for Visual Resources

The following BMPs would be considered to reduce impacts to all visual resource management classes within the Planning Area:

- Burying of distribution power lines and flow lines in or adjacent to access roads;
- Repeating elements of form, line, color, and texture to blend facilities and access roads with the surrounding landscape;
- Painting all above-ground structures, production equipment, tanks, transformers, and insulators not subject to safety requirements to blend with the natural color of the landscape, using paint that is a non-reflective "standard environmental color" approved by the BLM visual resource management (VRM) specialist:
  - All new equipment brought onto the sites should be painted the same color(s);
  - Semi-gloss paints will stain and fade less than flat paints;
  - Typically, the background is a vegetated background, and seldom a solid background;
  - The selected color should be one or two shades darker than the background; and
  - Consider the predominant season of public use; however, never paint an object to match snow.
- Performing final reclamation recontouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography;
- Avoiding facility placement on steep slopes, ridge tops, and hilltops;
- Screening facilities from view;
- Following contours of the land to reduce unnecessary disturbance;
- Recontouring and revegetating disturbed areas to blend with the surrounding landscape;
- Reclaiming unnecessary access roads as soon as possible to the original contour;
- Using gravel of a similar color to adjacent dominant soil and vegetation colors for road surfacing;
- Use dust abatement to reduce fugitive dust, as well as minimize the light colors of the routes;
- Avoiding locating pads in areas visible from primary roads;
- Using subsurface or low-profile facilities to prevent protrusion above horizon line when viewed from any primary road;
- Co-locating wells when possible;
- Locating facilities far enough from the cut and fill slopes to facilitate recontouring for interim reclamation;
- Locating wells away from prominent features, such as rock outcrops;
- Completing an annual transportation plan for entire area before beginning construction, and making a layout that will minimize disturbance and visual impact;
- Designing and constructing all new roads to a safe and appropriate standard "no higher than necessary" to accommodate their intended use;
- Locating roads far enough off the back of ridgelines so they aren't visible from state, county, or BLM roads;
- Using remote monitoring to reduce traffic and road requirements;
- Removing unused equipment, trash, and junk immediately.

2.8 Best Management Practices for Water Resources

BMPs would be appropriate for consideration to mitigate potential water quality impacts when proposed oil and gas activities are within 500 feet of riparian areas and surface waters of the state, Source Water Protection Areas identified in Wellhead or Source Water Protection Plans approved by the local governing body, and "High" and "Moderately High" sensitivity aquifers (identified throughout the use of the Wyoming Groundwater Vulnerability Assessment Handbook (as updated over time). BMPs to mitigate impacts to water resources include, but are not limited to, the following:

- Those management approaches for oil and gas activities required by Source Water and Wellhead Protection Plans approved by the local governing body; or
- Use closed loop drilling systems;
- Do not use evaporation ponds in proximity to shallow aquifers;
- Do not use unlined ponds or pits overlying sensitive aquifers;
- Line surface impoundment ponds (evaporation ponds or drilling pits) with synthetic liners and subsequently decommission by removing all contaminants and liner and reclaiming the area;
- Identify water supply wells and implement appropriate protection measures for the affected aquifer(s), as necessary to prevent the introduction of contaminants into the well;
- Require a monitoring plan which includes collection of baseline and periodic water quality data from potentially affected water supply wells, identification of parameters to monitor, reporting results to BLM and well owners, reporting to Wyoming Department of Environmental Quality-Air Quality Division;
- Review the geology of shallow aquifers to determine well construction requirements, which may include cementing to surface and drilling with a fresh water mud system;
- Requirement surface casing and cement to a specific formation or depth to protect aquifers at depth that need protection:
    - Set surface casing below the lowermost underground sources of drinking water and set into a confining (e.g., shale) layer;
    - Set an intermediate string of casing and cement in the event of deep aquifers;
    - Require submittal of a well logging plan and document submittal of plan to ensure proper well construction to protect groundwater. If a lost circulation event occurs during the installation of surface casing, a cement bond log will be required to be run on the surface casing to determine if the cement is adequate and protective.
    - Review the geology of shallow aquifers in proximity to groundwater development activities to determine potential impacts to flow patterns supporting water elements such as fen, wetlands, springs, and seeps, and ponds.

2.9 Best Management Practices for Greater Sage-Grouse Protection

Knowledge of BMPs for greater sage-grouse protections is an evolving field. As research is done on impacts of various kinds of activities, or the absence thereof, on greater sage-grouse, additional protections will be identified. While some of these will be generic enough to be applied planning area-wide, others will require site-specific analysis to determine if they are appropriate for inclusion as a

mandatory COA. This BMP section of this appendix will be supplemented as technology and understanding of greater sage-grouse advance.

3.0 REFERENCES

Cagney, Jim, Bainter, E., B. Budd, T. Christiansen, V. Herren, M. Holloran, B. Rashford, M. Smith, J. Williams. 2010. Grazing Influence, Objective Development, and Management in Wyoming's Greater Sage-grouse Habitat. University of Wyoming Cooperative Extension Service. B-1203. 62pp.

Sage-Grouse NTT (National Technical Team). 2011. A Report on National Greater Sage-Grouse Conservation Measures. December.

Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix M

Land Disposal and Acquisition

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APPENDIX M

LAND DISPOSAL AND ACQUISITION

1.0 LAND TENURE DESCRIPTIONS

The Bighorn Basin Resource Management Plan (RMP) revision project identifies land retention and disposal as defined in Table M-1 below.

Table M-1. Land Tenure Descriptions

Land Tenure	Description
Retention	Not available for disposal, except by R&PP or only by exchange if land with better resource values could be obtained.
Disposal	Available for disposal. Could include community expansion or to adjust property boundaries or to meet agriculture needs. *Example: Sale of land having an existing gas processing plant. A FLPMA sale to a local government or private party. Airport Grant to a local government. Patent of R&PP lease[1]. Public lands without resource conflicts within 2 miles of communities.*
Other (Disposal for the Westside Irrigation Project)	Pursuant to an act of Congress, convey all right, title, and interest (excluding mineral interest) to the Westside Irrigation District after completion of an environmental analysis under NEPA. Lands within the boundary which are not conveyed under the final decision for this transfer (patent) would be retained in federal ownership and would not be available for other disposal actions. (Public Law 106-485 [November 9, 2000; 114 Stat. 2199])

[1]The Planning Area is open to applications for conveyances to qualified applicants under the Recreation and Public Purpose Act or Federal Public Airport Act.

FLPMA Federal Land Policy and Management Act
NEPA National Environmental Policy Act
R&PP Recreation and Public Purposes

2.0 LANDS AVAILABLE FOR DISPOSAL

In Table M-2 below, the Bighorn Basin RMP revision project specifically identifies areas available for consideration for disposal by employing the "isolated, difficult or expensive to manage, or needed-for community expansion" disposal criteria in the FLPMA. The areas below were identified during the RMP revision process as complying with FLPMA disposal criteria. Inclusion in this table does not constitute a decision that the land will be disposed. Before taking any disposal action, consideration will be given to each individual tract and will include public involvement. As stated elsewhere in the RMP, the preferred method of disposal or acquisition of lands is through exchanges. Proposals for disposal of lands not identified in this table will be considered if they are consistent with the objectives of the approved RMP and may require a land use plan amendment.

Table M-2. Properties Identified for Disposal in the Planning Area

Field Office	Legal Description and (Acreage)[1]
WFO	T. 41N., R. 87W., sec. 1, lot 11 (5.15)
WFO	T. 41N., R. 87W., sec. 7, E2SE (79.64)
WFO	T. 41N., R. 87W., sec. 8, lot 1, S2S2 (172.89)
WFO	T. 41N., R. 87W., sec. 11, lot 5, NENW (64.27)
WFO	T. 41N., R. 87W., sec. 14, lots 5-7, N2SE, NESW (145.19)
WFO	T. 41N., R. 87W., sec. 16, lot 1 (105.28)
WFO	T. 41N., R. 87W., sec. 19, SENE (40.52)
WFO	T. 41N., R. 87W., sec. 20, lot 1, SWNW, N2SW, NWSE (193.59)
WFO	T. 41N., R. 87W., sec. 22, lot 4, SENE (50.00)
WFO	T. 41N., R. 87W., sec. 23, lots 9,10 (70.56)
WFO	T. 41N., R. 88W., sec. 13, NWSE (42.07)
WFO	T. 41N., R. 88W., sec. 15, NENE (39.17)
WFO	T. 41N., R. 88W., sec. 22, lot 5, SESW (58.59)
WFO	T. 41N., R. 88W., sec. 24, W2NE, SENW, N2SW (203.87)
WFO	T. 41N., R. 90W., sec. 2, lot 1, S2NE, NWSE (159.72)
WFO	T. 41N., R. 90W., sec. 13, E2SE (86.41)
WFO	T. 41N., R. 90W., sec. 20, SENE (40.12)
WFO	T. 41N., R. 90W., sec. 21, NWNW (40.18)
WFO	T. 41N., R. 90W., sec. 23, W2SW (82.33)
WFO	T. 41N., R. 90W., sec. 24, N2NE, SENE, SENW, NESW (214.37)
WFO	T. 41N., R. 90W., sec. 26, NENW (40.26)
WFO	T. 41N., R. 90W., sec. 27, NWNE (40.23)
WFO	T. 41N., R. 91W., sec. 9, E2SW, SE (227.20)
WFO	T. 41N., R. 91W., sec. 11, SESW (41.19)
WFO	T. 41N., R. 91W., sec. 17, E2NE, NESE (126.16)
WFO	T. 41N., R. 91W., sec. 18, NESE (42.17)
WFO	T. 41N., R. 91W., sec. 24, SWNW (42.26)
WFO	T. 41N., R. 91W., sec. 29, NESW (40.66)
WFO	T. 41N., R. 91W., sec. 35, SWNW (39.46)
WFO	T. 41N., R. 92W., sec. 9, SWSW (40.32)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
WFO	T. 41N., R. 92W., sec. 11, SENW (38.81)
WFO	T. 41N., R. 92W., sec. 15, SESW (38.39)
WFO	T. 41N., R. 92W., sec. 21, SWNE, NWSE (81.19)
WFO	T. 41N., R. 92W., sec. 22, W2NE, E2NW, SW, SESE (247.76)
WFO	T. 41N., R. 92W., sec. 27, NENE, SWNE, S2NW (162.69)
WFO	T. 41N., R. 92W., sec. 28, S2NE, SENW (121.63)
WFO	T. 41N., R. 93W., sec. 3, lots 1,4, SWNW (121.06)
WFO	T. 41N., R. 93W., sec. 4, SENE (39.98)
WFO	T. 41N., R. 93W., sec. 14, W2NW, N2SW (160.51)
WFO	T. 41N., R. 93W., sec. 15, E2NE (80.65)
WFO	T. 41N., R. 93W., sec. 22, S2NW, W2SE, NESW (205.08)
WFO	T. 41N., R. 93W., sec. 23, E2W2 (157.69)
WFO	T. 41N., R. 93W., sec. 34, SESE (38.17)
WFO	T. 41N., R. 93W., sec. 35, S2SW (78.83)
WFO	T. 42N., R. 86W., sec. 20, SWNW (39.29)
WFO	T. 42N., R. 86W., sec. 30, N2NE, W2W2, SENW (269.65)
WFO	T. 42N., R. 86W., sec. 31, N2N2 (155.69)
WFO	T. 42N., R. 86W., sec. 32, S2SW (78.43)
WFO	T. 42N., R. 86W., sec. 22, SESE (39.84)
WFO	T. 42N., R. 86W., sec. 32, W2NW, NWSW (118.79)
WFO	T. 42N., R. 87W., sec. 10, SWNE, W2SE (120.83)
WFO	T. 42N., R. 87W., sec. 15, NWNE (40.27)
WFO	T. 42N., R. 87W., sec. 25, E2SE (84.39)
WFO	T. 42N., R. 87W., sec. 34, NWNE, SWNW, N2S2 (240.69)
WFO	T. 42N., R. 90W., sec. 30, E2NE (80.56)
WFO	T. 42N., R. 91W., sec. 1, NWSE (40.39)
WFO	T. 42N., R. 93W., sec. 15, NWSW (40.07)
WFO	T. 42N., R. 93W., sec. 20, SWSE (40.12)
WFO	T. 42N., R. 93W., sec. 21, NENW (39.98)
WFO	T. 42N., R. 93W., sec. 27, N2SE (79.99)
WFO	T. 42N., R. 93W., sec. 29, SWNE, NESW, NWSE (119.08)
WFO	T. 42N., R. 93W., sec. 28, NE, E2SE (239.12)
WFO	T. 42N., R. 93W., sec. 32, SE (158.22)
WFO	T. 42N., R. 93W., sec. 33, SW, NWSE, S2NW, NWNW (318.48)
WFO	T. 42N., R. 93W., sec. 34, NENW (39.83)
WFO	T. 42N., R. 96W., sec. 1, W2SE, SESE (119.83)
WFO	T. 42N., R. 96W., sec. 11, lot 4, NWNE, S2NE, SE, SESW (362.92)
WFO	T. 42N., R. 96W., sec. 23, lot 1 (43.30)
WFO	T. 43N., R. 86W., sec. 2, lot 4, SW, S2NW (278.99)
WFO	T. 43N., R. 86W., sec. 3, lot 1, SESE (80.58)
WFO	T. 43N., R. 86W., sec. 11, NWNE, NWNW, N2NW, (156.03)
WFO	T. 43N., R. 86W., sec. 12, E2SE (78.20)
WFO	T. 43N., R. 86W., sec. 24, SESE (39.39)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
WFO	T. 43N., R. 87W., sec. 4, lot 2, SWSE, E2SE (160.29)
WFO	T. 43N., R. 87W., sec. 5, E2SW, W2SE (161.37)
WFO	T. 43N., R. 87W., sec. 7, E2NE (78.86)
WFO	T. 43N., R. 87W., sec. 8, NENW, E2SW (120.60)
WFO	T. 43N., R. 87W., sec. 9, NESE (40.02)
WFO	T. 43N., R. 87W., sec. 17, E2NE, S2SW (161.34)
WFO	T. 43N., R. 87W., sec. 19, NESE (40.20)
WFO	T. 43N., R. 87W., sec. 20, NWNE, E2NW, SWNW, NWSW (201.99)
WFO	T. 43N., R. 87W., sec. 30, E2SE (80.48)
WFO	T. 43N., R. 87W., sec. 31, NENE (39.84)
WFO	T. 43N., R. 90W., sec. 15, E2SE (80.00)
WFO	T. 43N., R. 90W., sec. 26, NW (160.34)
WFO	T. 43N., R. 90W., sec. 30, lots 5,6 (24.02)
WFO	T. 43N., R. 92W., sec. 22, 51D (10.00)
WFO	T. 43N., R. 95W., sec. 26, SWNW (39.58)
WFO	T. 43N., R. 95W., sec. 27, SENE (39.60)
WFO	T. 43N., R. 96W., sec. 26, lot 4, SESW (84.38)
WFO	T. 43N., R. 96W., sec. 35, lots 1-3, NENW (169.43)
WFO	T. 43N., R. 99W., sec. 1, SWNE (40.14)
WFO	T. 43N., R. 99W., sec. 9, S2SW, SWSE (120.04)
WFO	T. 43N., R. 99W., sec. 17, S2SE (79.75)
WFO	T. 43N., R. 99W., sec. 18, SESW (40.60)
WFO	T. 43N., R. 99W., sec. 19, NENW (40.40)
WFO	T. 43N., R. 99W., sec. 20, NENW, N2NE (119.61)
WFO	T. 43N., R. 99W., sec. 21, NWNW (40.05)
WFO	T. 43N., R. 100W., sec. 9, E2NE, SE (239.98)
WFO	T. 43N., R. 100W., sec. 10, W2SW (81.72)
WFO	T. 43N., R. 100W., sec. 11, SWNE (39.92)
WFO	T. 43N., R. 100W., sec. 15, NW, W2NE (237.96)
WFO	T. 43N., R. 100W., sec. 17, N2NE, SENE (119.36)
WFO	T. 43N., R. 100W., sec. 21, S2NW, N2SW, SWNE (202.43)
WFO	T. 43N., R. 100W., sec. 23, SESE (40.54)
WFO	T. 44N., R. 86W., sec. 1, S2SW (79.22)
WFO	T. 44N., R. 86W., sec. 2, SESW, E2SE (117.33)
WFO	T. 44N., R. 86W., sec. 11, N2NE, S2SW, NESE (194.74)
WFO	T. 44N., R. 86W., sec. 12, NW, N2SW, SESW (279.53)
WFO	T. 44N., R. 86W., sec. 14, SWNE, SENW, NWSE, NESW (159.51)
WFO	T. 44N., R. 86W., sec. 15, SESW, W2SE (120.69)
WFO	T. 44N., R. 86W., sec. 22, NENW (40.51)
WFO	T. 44N., R. 86W., sec. 24, E2NE, SENW, SESE (161.89)
WFO	T. 44N., R. 86W., sec. 25, S2SE (82.47)
WFO	T. 44N., R. 86W., sec. 33, SESE (39.65)
WFO	T. 44N., R. 86W., sec. 34, NWSW (40.64)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
WFO	T. 44N., R. 86W., sec. 35, E2NE, NESE (122.22)
WFO	T. 44N., R. 87W., sec. 1, lot 3, SENW, SESW (123.63)
WFO	T. 44N., R. 87W., sec. 6, lots 3,4 (73.64)
WFO	T. 44N., R. 87W., sec. 8, SWNW, W2SW, SESW (157.01)
WFO	T. 44N., R. 87W., sec. 17, N2NW (81.06)
WFO	T. 44N., R. 87W., sec. 29, S2NE, SENW, NESW, SE (309.50)
WFO	T. 44N., R. 87W., sec. 32, NE, SENW (191.39)
WFO	T. 44N., R. 87W., sec. 33, S2NW, SENE, W2SE (198.55)
WFO	T. 44N., R. 88W., sec. 1, 38A (39.80)
WFO	T. 44N., R. 94W., sec. 17, W2NW (73.92)
WFO	T. 44N., R. 94W., sec. 18, NENE, S2NE, N2SE, SESE (212.29)
WFO	T. 44N., R. 94W., sec. 19, lots 1,2, SENW (128.03)
WFO	T. 44N., R. 98W., sec. 27, SESE, W2E2, SENW, NESW, NWSW (321.00)
WFO	T. 44N., R. 98W., sec. 22, NESE, S2SE (120.52)
WFO	T. 44N., R. 98W., sec. 26, NESW, S2SW (121.93)
WFO	T. 44N., R. 98W., sec. 34, E2NE, NESE (120.45)
WFO	T. 44N., R. 99W., sec. 22, N2SE (79.40)
WFO	T. 44N., R. 99W., sec. 23, N2SW, NWSE (120.36)
WFO	T. 45N., R. 86W., sec. 1, S2NE, NESE (122.35)
WFO	T. 45N., R. 86W., sec. 4, lot 3, SENW (83.66)
WFO	T. 45N., R. 86W., sec. 31, lots 3,4, E2SW (155.79)
WFO	T. 45N., R. 86W., sec. 32, S2NE (80.54)
WFO	T. 45N., R. 86W., sec. 35, NWNW (38.90)
WFO	T. 45N., R. 97W., sec. 23, S2SE (78.37)
WFO	T. 45N., R. 97W., sec. 28, SENE (39.48)
WFO	T. 45N., R. 97W., sec. 29, SENW, E2SW, SESE (159.23)
WFO	T. 45N., R. 97W., sec. 32, NENW, SWNW (79.97)
WFO	T. 45N., R. 98W., sec. 5, lots 1,2, SWNE (119.07)
WFO	T. 45N., R. 99W., sec. 5, lots 3,4, SWNW (124.14)
WFO	T. 45N., R. 99W., sec. 14, S2NE (78.09)
WFO	T. 45N., R. 100W., sec. 8, SWSW (40.90)
WFO	T. 45N., R. 100W., sec. 9, NESW (39.85)
WFO	T. 45N., R. 100W., sec. 10, SESW (41.01)
WFO	T. 45N., R. 100W., sec. 12, S2NE, NWSE, SW (283.17)
WFO	T. 45N., R. 100W., sec. 13, NWNW, NESE (81.68)
WFO	T. 45N., R. 100W., sec. 14, W2 (321.40)
WFO	T. 45N., R. 100W., sec. 15, N2N2 (160.63)
WFO	T. 45N., R. 100W., sec. 31, SESE (40.12)
WFO	T. 46N., R. 86W., sec. 1, SWNE (39.87)
WFO	T. 46N., R. 86W., sec. 3, lots 5-8* (171.40)
WFO	T. 46N., R. 86W., sec. 4, lots 1,4 (82.62)
WFO	T. 46N., R. 86W., sec. 12, NENW (42.37)
WFO	T. 46N., R. 86W., sec. 13, SWSW (40.94)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
WFO	T. 46N., R. 86W., sec. 14, SESE (40.72)
WFO	T. 46N., R. 86W., sec. 26, NENE (39.91)
WFO	T. 46N., R. 87W., sec. 1, S2NWNW, SWNW, NESE (102.05)
WFO	T. 46N., R. 87W., sec. 10, N2NE, NENW (120.00)
WFO	T. 46N., R. 87W., sec. 20, NE, N2NW (240.00)
WFO	T. 46N., R. 87W., sec. 21, W2NW, (40.00)
WFO	T. 46N., R. 87W., sec. 25, SESW, SWSE (80.83)
WFO	T. 46N., R. 87W., sec. 29, NESW, NWSE, S2SW (161.20)
WFO	T. 46N., R. 87W., sec. 30, NESW (40.75)
WFO	T. 46N., R. 88W., sec. 2, lots 6-9, SESE (210.79)
WFO	T. 46N., R. 88W., sec. 11, lot 1 (3.73)
WFO	T. 46N., R. 88W., sec. 13, lots 2,3,5,6,7 (103.11)
WFO	T. 46N., R. 88W., sec. 14, lots 1,7,8 (20.29)
WFO	T. 46N., R. 94W., sec. 5, lot 16 (39.71)
WFO	T. 46N., R. 94W., sec. 9, NWSW (40.12)
WFO	T. 46N., R. 98W., sec. 27, S2NW (81.63)
WFO	T. 46N., R. 98W., sec. 32, SWSE (40.65)
WFO	T. 46N., R. 99W., sec. 13, SESE (31.24)
WFO	T. 46N., R. 99W., sec. 22, S2SW (78.44)
WFO	T. 46N., R. 99W., sec. 24, lot 3 (2.50)
WFO	T. 46N., R. 99W., sec. 27, NW, NWSW (199.30)
WFO	T. 46N., R. 99W., sec. 32, NWSE (41.75)
WFO	T. 46N., R. 100W., sec. 3, lots 1-4, SWNW, NWSW (248.09)
WFO	T. 46N., R. 100W., sec. 4, SWNW, SW, NESE (247.34)
WFO	T. 46N., R. 100W., sec. 6, E2SW (81.62)
WFO	T. 46N., R. 100W., sec. 7, lot 2, NENW (80.39)
WFO	T. 46N., R. 100W., sec. 11, NENE, NWSE (82.20)
WFO	T. 46N., R. 100W., sec. 18, SENW, SWNE (81.35)
WFO	T. 46N., R. 100W., sec. 20, NENE (40.69)
WFO	T. 46N., R. 100W., sec. 21, NWNW, SENW (82.25)
WFO	T. 46N., R. 101W., sec. 1, lots 9-11 (50.55)
WFO	T. 46N., R. 101W., sec. 3, lot 11 (20.93)
WFO	T. 46N., R. 101W., sec. 4, lot 9, S2SW (102.36)
WFO	T. 46N., R. 101W., sec. 5, lot 6 (39.36)
WFO	T. 47N., R. 86W., sec. 1, lot 3, SENW, E2SE (160.13)
WFO	T. 47N., R. 86W., sec. 10, NENE (39.84)
WFO	T. 47N., R. 86W., sec. 11, NWNW, SESW, SE (239.64)
WFO	T. 47N., R. 86W., sec. 12, N2NE, SWNE, SW, SESE (319.42)
WFO	T. 47N., R. 86W., sec. 13, lots 1,2, NWNW (124.38)
WFO	T. 47N., R. 86W., sec. 14, NENE (39.86)
WFO	T. 47N., R. 86W., sec. 15, SWSE (40.37)
WFO	T. 47N., R. 86W., sec. 24, SE (159.21)
WFO	T. 47N., R. 86W., sec. 25, E2NE (83.00)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
WFO	T. 47N., R. 86W., sec. 25, E2NE, S2NW, W2SW (245.94)
WFO	T. 47N., R. 86W., sec. 34, NENW (40.08)
WFO	T. 47N., R. 88W., sec. 17, Tr. 64 B-D (139.30)
WFO	T. 47N., R. 88W., sec. 21, lots 2,3 (75.37)
WFO	T. 47N., R. 87W., sec. 21, S2SE (77.61)
WFO	T. 47N., R. 87W., sec. 28, SESW (40.68)
WFO	T. 47N., R. 87W., sec. 33, NENW (40.57)
WFO	T. 47N., R. 87W., sec. 34, S2SWNE, S2NW, N2SE (181.57)
WFO	T. 47N., R. 87W., sec. 35, W2SWSW, SESWSW (30.18)
WFO	T. 47N., R. 89W., sec. 3, lots 7,8 (89.42)
WFO	T. 47N., R. 92W., sec. 10, NWSW (40.20)
WFO	T. 47N., R. 92.5W., sec. 13, Tr. 65 B, C (66.15)
WFO	T. 47N., R. 93W., sec. 12, lot 15; Tr. 63 Clot, Dlot; Tr. 65 A (19.27)
WFO	T. 47N., R. 93W., sec. 13, Tr. 63 Clot-Hlot; Tr. 65 D, E; Tr. 65 A, D, E (256.46)
WFO	T. 47N., R. 93W., sec. 23, lots 1-3, S2NE, NWSE (216.75)
WFO	T. 47N., R. 93W., sec. 24, lots 3,4 (59.46)
WFO	T. 47N., R. 93W., sec. 26, lot 1 (27.95)
WFO	T. 47N., R. 100W., sec. 7, lot 4 (41.41)
WFO	T. 47N., R. 100W., sec. 15, S2SW (82.43)
WFO	T. 47N., R. 100W., sec. 17, SWSE (40.64)
WFO	T. 47N., R. 100W., sec. 19, lot 2 (41.29)
WFO	T. 47N., R. 100W., sec. 20, N2NW, SENW, NESW, S2SW, W2E2, (401.68)
WFO	T. 47N., R. 100W., sec. 21, NE, SENW (205.11)
WFO	T. 47N., R. 100W., sec. 22, NW, N2SW (246.40)
WFO	T. 47N., R. 100W., sec. 25, NWNW, NESW (89.04)
WFO	T. 47N., R. 100W., sec. 26, NENW, S2N2, SESE (241.74)
WFO	T. 47N., R. 100W., sec. 27, NENW, S2SW, SESE, (168.84)
WFO	T. 47N., R. 100W., sec. 28, E2SW, W2SE, SESE (207.01)
WFO	T. 47N., R. 100W., sec. 29, NW, NWSW (196.84)
WFO	T. 47N., R. 100W., sec. 30, lots 2-4, SESW (159.19)
WFO	T. 47N., R. 100W., sec. 31, lot 1, NENW, S2NE (160.18)
WFO	T. 47N., R. 100W., sec. 32, E2, E2NW, SWNW, SW (691.55)
WFO	T. 47N., R. 100W., sec. 33, NW, N2NE, SWNE, N2SW (372.84)
WFO	T. 47N., R. 100W., sec. 34, S2S2, N2NW (248.66)
WFO	T. 47N., R. 100W., sec. 35, E2SE, SWSW (124.57)
WFO	T. 47N., R. 101W., sec. 1, lots 3,4 (79.81)
WFO	T. 47N., R. 101W., sec. 2, lot 1 (39.75)
WFO	T. 47N., R. 101W., sec. 11, NENE (40.16)
WFO	T. 47N., R. 101W., sec. 24, S2SW (80.54)
WFO	T. 47N., R. 101W., sec. 25, SWNW, NWSW (78.34)
WFO	T. 47N., R. 101W., sec. 35, SWNE (40.28)
WFO	T. 48N., R. 88W., sec. 29, lot 2 (20.98)
WFO	T. 48N., R. 89W., sec. 18, N2SWNE, NENW, N2SENW (80.00)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
WFO	T. 48N., R. 89W., sec. 25, N2N2 (76.77)
WFO	T. 48N., R. 89W., sec. 26, N2N2NE (38.37)
WFO	T. 48N., R. 90W., sec. 2, Tr. 91-93 (109.94)
WFO	T. 48N., R. 90W., sec. 3, lots 5-8 (119.69)
WFO	T. 48N., R. 90W., sec. 4, lots 6-8, T49-51; T61-63 (235.24)
WFO	T. 48N., R. 90W., sec. 5, Tr. 51 (33.97)
WFO	T. 48N., R. 90W., sec. 10, lot 1 (25.39)
WFO	T. 48N., R. 90W., sec. 11, lots 1-6; Tr. 103, 104 (225.38)
WFO	T. 48N., R. 90W., sec. 13, lots 3,6 (51.17)
WFO	T. 48N., R. 99W., sec. 3, All (678.78)
WFO	T. 48N., R. 99W., sec. 4, lots 5-8 (62.03)
WFO	T. 48N., R. 99W., sec. 5, lots 5-8 (58.53)
WFO	T. 48N., R. 99W., sec. 6, lots 8-11, SESE (95.89)
WFO	T. 48N., R. 99W., sec. 7, lot 4, SESW, SE (246.73)
WFO	T. 48N., R. 99W., sec. 10, lots 1-3, lot 5, NWNE, N2NW, SWNW, SWSW (310.03)
WFO	T. 48N., R. 99W., sec. 11, lot 2 (35.31)
WFO	T. 48N., R. 99W., sec. 17, N2NE, SENE, NESE (163.55)
WFO	T. 48N., R. 99W., sec. 18, lot 1, NENW (82.97)
WFO	T. 48N., R. 89W., sec. 21, SW1/4SW1/4NW1/4 (10)
WFO	T. 48N., R. 100W., sec. 1, lots 5-8 (72.52)
WFO	T. 48N., R. 100W., sec. 3, lot 1, SENE, S2SE (161.86)
WFO	T. 48N., R. 100W., sec. 10, E2NE, NWNE (125.93)
WFO	T. 48N., R. 100W., sec. 11, NW, N2SW, S2SE, SESW (379.47)
WFO	T. 48N., R. 100W., sec. 12, E2, S2SW (400.00)
WFO	T. 48N., R. 100W., sec. 13, NW, N2NE, NESW (293.44)
WFO	T. 48N., R. 100W., sec. 14, NE (167.56)
WFO	T. 48N., R. 100W., sec. 21, S2NE, NWSE, NESW (164.49)
WFO	T. 48N., R. 100W., sec. 22, NESW (40.75)
WFO	T. 48N., R. 100W., sec. 23, N2NW (82.12)
WFO	T. 48N., R. 101W., sec. 35, E2W2 (163.85)
WFO	T. 49N., R. 90W., sec. 4, lots 9,15 (40.19)
WFO	T. 49N., R. 90W., sec. 8, Tr. 61 B, 61 I (76.18)
WFO	T. 49N., R. 90W., sec. 19, lot 6 (29.50)
WFO	T. 49N., R. 90W., sec. 29, lots 1,2, E2SW, SWNW (185.15)
WFO	T. 49N., R. 90W., sec. 30, lots 5,6 (47.48)
WFO	T. 49N., R. 90W., sec. 32, lots 1,2 (63.83)
WFO	T. 49N., R. 90W., sec. 33, lots 2,4,5 (128.50)
WFO	T. 49N., R. 98W., sec. 19, E2E2, SWSE (199.89)
WFO	T. 49N., R. 98W., sec. 29, NENE, N2NW (120.00)
WFO	T. 49N., R. 98W., sec. 20, SW (160.18)
WFO	T. 49N., R. 98W., sec. 30, N2NE (79.95)
WFO	T. 49N., R. 99W., sec. 19, lot 8 (39.60)
WFO	T. 49N., R. 99W., sec. 30, lots 5,6, E2NW (159.03)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
WFO	T. 49N., R. 100W., sec. 24, S2SE (77.87)
WFO	T. 49N., R. 100W., sec. 25, S2 (314.23)
WFO	T. 49N., R. 100W., sec. 36, lots 1-4 (110.68)
WFO	T. 49N., R. 100W., sec. 35, lots 1,5, NWNE (102.37)
CYFO	T. 49N., R. 100W., sec. 7, lot 4, SESE (78.88)
CYFO	T. 49N., R. 100W., sec. 18, lots 1,2 (77.84)
CYFO	T. 49N., R. 100W., sec. 36, lots 1,2 (54.93)
CYFO	T. 49N., R. 101W., sec. 23, lots 1,2,5, NENW, W2NW (159.58)
CYFO	T. 49N., R. 101W., sec. 34, lot 1 (36.63)
CYFO	T. 49N., R. 101W., sec. 36, lots 1,2 (64.91)
WFO	T. 50N., R. 93W., sec. 9, lot 6 (39.16)
WFO	T. 50N., R. 98W., sec. 7, E2SW, S2SE (160.0)
WFO	T. 50N., R. 99W., sec. 15, lot 31 (9.56)
WFO	T. 51N., R. 89W., sec. 6, E2 (312.03)
WFO	T. 51N., R. 94W., sec. 17, lots 1-6, NESW, SWSW (288.32)
WFO	T. 51N., R. 94W., sec. 18, lots 7,8 (72.17)
WFO	T. 51N., R. 95W., sec. 27, lot 24 (36.51)
WFO	T. 51N., R. 95W., sec. 28, lots 7,12,13,15,20,21,23,27,28, SWNE, NWSE (217.23)
WFO	T. 51N., R. 95W., sec. 29, E2NENE, E2NW, W2NE, S2NWNENE, SWNENE (195.00)
WFO	T. 51N., R. 96W., sec. 21, lot 33,41,42 (38.07)
WFO	T. 51N., R. 97W., sec. 2, lots 42,43 (8.02)
WFO	T. 51N., R. 97W., sec. 3, lots 33-36 (10.03)
WFO	T. 51N., R. 97W., sec. 9, lots 10,13,14,17,18,19,20; Tr. 47 D, E2SE (242.21)
WFO	T. 51N., R. 97W., sec. 10, lot 2, NE, NENW, S2NW, N2SE (356.20)
WFO	T. 51N., R. 97W., sec. 11, S2SW, N2NW (80.00)
WFO	T. 51N., R. 97W., sec. 14, lots 4,5 (72.89)
WFO	T. 52N., R. 88W., sec. 9, SWNW (39.94)
WFO	T. 52N., R. 88W., sec. 29, SESE (40.06)
WFO	T. 52N., R. 88W., sec. 33, NWSW (40.03)
WFO	T. 52N., R. 88W., sec. 32, N2NE, SWNE, N2SE (200.58)
WFO	T. 52N., R. 89W., sec. 30, SW (160.00)
WFO	T. 52N., R. 89W., sec. 31, N2SE (81.28)
WFO	T. 52N., R. 92W., sec. 1, lot 5; Tr. 66 A-D (184.66)
WFO	T. 52N., R. 93W., sec. 1, lot 2 (18.91)
WFO	T. 52N., R. 93W., sec. 31, W2NE, E2NW, NESW, NWSE (224.54)
WFO	T. 53N., R. 91W., sec. 31, SESE (40.00)
WFO	T. 53N., R. 91W., sec. 32, SWSW (40.00)
WFO	T. 53N., R. 91W., sec. 35, E2NE (80.00)
CYFO	T. 47N., R. 101W., sec. 6, lot 5 (37.64)
CYFO	T. 48N., R. 100W., sec. 7, lot 3, NE1/4 SW1/4, NW1/4 SE1/4 (44.42)
CYFO	T. 48N., R. 101W., sec. 3, E1/2 SE1/4
CYFO	T. 48N., R. 101W., sec. 9, N1/2 SW1/4, S1/2 SE1/4
CYFO	T. 48N., R. 101W., sec. 10, NE1/4 NE1/4

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
CYFO	T. 48N., R. 101W., sec. 11, SW1/4 NE1/4, NW1/4, N1/2 SW1/4, NW1/4 SE1/4
CYFO	T. 48N., R. 101W., sec. 12, N1/2 SE1/4
CYFO	T. 48N., R. 101W., sec. 15, NW1/4
CYFO	T. 49N., R. 101W., sec. 6, lot 9 (14.64)
CYFO	T. 49N., R. 101W., sec. 7, lot 2 (18.83)
CYFO	T. 49N., R. 101W., sec. 8, lot 11 (20.62)
CYFO	T. 49N., R. 101W., sec. 13, lot 3 (24.96)
CYFO	T. 49N., R. 101W., sec. 14, lot 7 (52.09)
CYFO	T. 49N., R. 101W., sec. 18, lot 1 (25.39)
CYFO	T. 49N., R. 102W., sec. 1, lot 5 (42.85)
CYFO	T. 49N., R. 102W., sec. 12, lot 1 (26.12)
CYFO	T. 50N., R. 99W., sec. 2, lots 34 (9.87), 35 (1.55)
CYFO	T. 50N., R. 99W., sec. 10, lot 38 (0.87)
CYFO	T. 50N., R. 99W., sec. 11, lots 35 (4.39), 37 (4.66), 39 (3.61)
CYFO	T. 50N., R. 99W., sec. 15, lots 6 (8.33), 24 (26.18), 25 (8.00)
CYFO	T. 50N., R. 99W., sec. 17, NE1/4 SW1/4
CYFO	T. 50N., R. 99W., Tr. 84 (4.2), formerly part of sec. 11
CYFO	T. 50N., R. 101W., sec. 18, lot 1, NE1/4 NW1/4, SE1/4 SW1/4, SE1/4 (23.66)
CYFO	T. 50N., R. 102W., sec. 7, lot 10 (0.36)
CYFO	T. 50N., R. 102W., sec. 20, NE1/4 SE1/4
CYFO	T. 50N., R. 104W., sec. 5, lots 6 (2.65), 36 (2.50)
CYFO	T. 50N., R. 104W., sec. 6, lots 31 (4.82), 34 (1.82)
CYFO	T. 50N., R. 104W., sec. 7, lots 16 (24.62), 17 (40.00), 20 (34.23), 25 (5.28), 26 (3.27)
CYFO	T. 50N., R. 104W., sec. 8, lot 28 (1.74)
CYFO	T. 50N., R. 104W., sec. 17, lot 7 (2.90)
CYFO	T. 50N., R. 104W., sec. 22, lot 5 (1.55)
CYFO	T. 50N., R. 105W., sec. 1, SW1/4 SE1/4
CYFO	T. 50N., R. 105W., sec. 12, NW1/4 NE1/4
CYFO	T. 51N., R. 97W., sec. 7, lot 42 (18.92)
CYFO	T. 51N., R. 98W., sec. 12, lot 27 (26.27)
CYFO	T. 51N., R. 98W., sec. 20, lot 22 (26.15)
CYFO	T. 51N., R. 98W., sec. 21, SE1/4 NW1/4 SW1/4
CYFO	T. 51N., R. 98W., Tr. 66A, (41.58) formerly in sec. 20
CYFO	T. 51N., R. 98W., Tr. 67, (40.22)
CYFO	T. 51N., R. 98W., Tr. 62I, (40.59) formerly in sec. 12
CYFO	T. 51N., R. 98W., Tr. 91, (40.00) formerly in sec. 14
CYFO	T. 51N., R. 101W., sec. 3, NW1/4 SW1/4
CYFO	T. 51N., R. 101W., sec. 4, lots 1 (45.85), 10 (45.17), 11 (45.19)
CYFO	T. 51N., R. 101W., sec. 9, lot 8 (6.37)
CYFO	T. 51N., R. 101W., sec.11, W1/2 NW1/4 NE1/4 SW1/4, NW1/4 SW1/4 NE1/4 SW1/4, NE1/4 NW1/4 SW1/4, N1/2 SE1/4 NW1/4 SW1/4
CYFO	T. 51N., R. 101W., Tr. 79 (39.98) formerly in sec. 4
CYFO	T. 51N., R. 102W., sec. 23, SW1/4 SE1/4

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
CYFO	T. 51N., R. 102W., sec. 26, W1/2 NE1/4
CYFO	T. 51N., R. 103W., sec. 19, lots 8 (11.29), 10 (5.85)
CYFO	T. 51N., R. 103W., sec. 31, lot 1 (6.48)
CYFO	T. 51N., R. 104W., sec. 24, lot 40 (15.06)
CYFO	T. 51N., R. 104W., sec. 25, lot 23 (1.08)
CYFO	T. 51N., R. 104W., sec. 28, NW1/4 NE1/4, NE1/4 NW1/4
CYFO	T. 51N., R. 104W., sec. 31, lot 30 (4.79)
CYFO	T. 51N., R. 104W., sec. 33, lots 2 (2.09), 12 (0.87), 18 (23.23), 19 (36.84), 23 (2.13), 36 (2.42)
CYFO	T. 51N., R. 104W., sec. 34, lots 2 (0.56), 3 (0.42), 6 (0.01)
CYFO	T. 51N., R. 104W., sec. 35, lots 6 (0.58), 7 (0.62)
CYFO	T. 51N., R. 104W., Tr. 76 (41.83) formerly in sec. 24
CYFO	T. 52N., R. 93W., sec. 7, lots 1 (34.12), 2 (34.21), 4 (26.71), 5 (34.29), 6 (34.38), 7 (25.52), W1/2 E1/2, E1/2 W1/2
CYFO	T. 52N., R. 93W., sec. 17, lots 11 (4.13), 12 (5.06)
CYFO	T. 52N., R. 93W., sec. 18, lots 1 (23.00), 2 (34.45), 3 (34.50), 4 (34.56), 5 (34.61), NW1/4 NE1/4, SE1/4 NE1/4, NE1/4 NW1/4, SW1/4 SE1/4 SW1/4, W1/2 SE1/4 SE1/4
CYFO	T. 52N., R. 93W., sec. 19, lots 1 (26.25), 2 (29.60), 3 (34.60), 4 (34.50), NE1/4 NW1/4
CYFO	T. 52N., R. 94W., sec. 7, lots 49G (40.29), 49H (40.29)
CYFO	T. 52N., R. 94W., sec. 8, 47E (40.95), 47F (40.96)
CYFO	T. 52N., R. 94W., sec. 12, E1/2 E1/2
CYFO	T. 52N., R. 94W., sec. 13, E1/2 E1/2
CYFO	T. 52N., R. 94W., sec. 24, lot 1, NE1/4 NE1/4 (27.33)
CYFO	T. 52N., R. 95W., Tr. 43P (44.62) formerly lot 15
CYFO	T. 52N., R. 96W., sec. 20, lots 1 (0.53), 9 (0.26), 33 (29.23), 34 (10.27)
CYFO	T. 52N., R. 96W., sec. 22, lots 25 (26.88), 5 (0.47)
CYFO	T. 52N., R. 97W., sec. 24, lots 24 (5.11), 25 (37.79), 34 (37.98)
CYFO	T. 52N., R. 97W., sec. 26, lot 34 (36.49)
CYFO	T. 52N., R. 97W., sec. 27, lot 29 (36.97)
CYFO	T. 52N., R. 101W., sec. 1, lot 5 (26.74)
CYFO	T. 52N., R. 101W., sec. 2, lot 5 (21.74)
CYFO	T. 52N., R. 101W., sec. 6, lots 2 (34.90), 3 (40.16), 4 (36.91)
CYFO	T. 52N., R. 101W., sec. 7, lots 2 (34.91), 3 (34.95), W1/2 NE1/4, SE1/4 NE1/4, E1/2 NW1/4, E1/2 SW1/4, SE1/4 SE1/4
CYFO	T. 52N., R. 101W., sec. 8, lot 7, SE1/4 NW1/4 SW1/4, S1/2 SE1/4 NW1/4 SW1/4, SW1/4 SW1/4, S1/2 SE1/4 SW1/4 (20.24)
CYFO	T. 52N., R. 101W., sec.17, lots 1 (53.02), 2 (53.15), 3 (53.29), 4 (32.71), 5 (29.20)
CYFO	T. 52N., R. 101W., sec. 18, E1/2 NE1/4, NE1/4 SE1/4
CYFO	T. 52N., R. 101W., sec. 20, W1/2 W1/2
CYFO	T. 52N., R. 101W., sec. 33, lot 4 (43.66)
CYFO	T. 52N., R. 101W., Tr. 41 S (24.81), 41 T (24.83)
CYFO	T. 52N., R. 102W., sec. 1, S1/2 NE1/4 SE1/4, SE1/4 SE1/4
CYFO	T. 52N., R. 102W., sec. 11, lots 1 (34.45), 2 (34.52), N1/2 NW1/4 SW1/4
CYFO	T. 52N., R. 102W., sec. 12, lot 4, E1/2 NE1/4 (51.36)
CYFO	T. 52N., R. 103W., sec. 5, lots 1 (55.57), 17 (42.86)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
CYFO	T. 52N., R. 104W., sec. 16, lots 21 (3.10), 22 (11.63), 27 (14.38)
CYFO	T. 52N., R. 104W., sec. 30, lots 9 (3.59), 14 (3.52), 26 (3.44), 32 (2.34)
CYFO	T. 53N., R. 90W., sec. 17, lot 4 (33.27)
CYFO	T. 53N., R. 90W., sec. 19, lot 2 (38.74)
CYFO	T. 53N., R. 91W., sec. 24, SE1/4 SW1/4
CYFO	T. 53N., R. 91W., sec. 26, NW1/4 NE1/4
CYFO	T. 53N., R. 93W., sec. 19, lots 3 (39.30), 4 (39.34), 7 (39.38), 8 (39.42), SE1/4 NW1/4, E1/2 SW1/4, W1/2 SE1/4, SE1/4 SE1/4
CYFO	T. 53N., R. 93W., sec. 29, W1/2 NW1/4 NW1/4, W1/2 SW1/4 NW1/4, SE1/4 SW1/4 NW1/4, N1/2 SW1/4, N1/2 S1/2 SW1/4
CYFO	T. 53N., R. 93W., sec. 30, all
CYFO	T. 53N., R. 93W., sec. 31, lots 1 (39.65), 2 (39.75), 3 (39.85), 4 (39.95), NE1/4, E1/2 W1/2, N1/2 SE1/4
CYFO	T. 53N., R. 93W., sec. 32, lots 3 (33.88), 4 (33.33), N1/2 NW1/4, N1/2 SE1/4 NW1/4, E1/2 SW1/4 SE1/4 NW1/4, SE1/4 SE1/4 NW1/4
CYFO	T. 53N., R. 94W., sec. 13, S1/2 NE1/4 SW1/4, N1/2 SE1/4 SW1/4, SE1/4 SE1/4 SW1/4, W1/2 SE1/4, SE1/4 SE1/4
CYFO	T. 53N., R. 94W., sec. 24, N1/2 NE1/4, N1/2 SW1/4 NE1/4, SE1/4 SW1/4 NE1/4, SE1/4 NE1/4, N1/2 NE1/4 SE1/4, SE1/4 NE1/4 SE1/4, NE1/4 SE1/4 SE1/4
CYFO	T. 53N., R. 100W., sec. 30, lot 8 (18.92)
CYFO	T. 53N., R. 100W., sec. 31, lots 5 (50.64), 6 (50.65), 7 (50.65), 8 (50.66)
CYFO	T. 53N., R. 100W., Trs. 41 E (40.00), F (40.00), K (40.00), L (40.00), M (15.17), N (15.19)
CYFO	T. 53N., R. 101W., sec. 21, lot 3 (7.05)
CYFO	T. 53N., R. 101W., sec. 25, lots 5 (14.98), 6 (29.33), 7 (21.59), 8 (14.93)
CYFO	T. 53N., R. 101W., sec. 36, lots 1 (18.27), 2 (35.98), 3 (29.34), 4 (18.01), 5 (35.89), 6 (29.34)
CYFO	T. 53N., R. 101W., Tr. 701 (40.53)
CYFO (Minerals only, Cody Industrial Park)	T. 53N., R. 101W., sec. 20, S1/2 SE1/4 SW1/4 SE1/4
CYFO (Minerals only, Cody Industrial Park)	T. 53N., R. 101W., sec. 29, lots 7 (9.91), 9 (38.24), 10 (31.29), 12 (5.78), 13 (8.64), 14 (0.04), 15 (9.73), S1/2 NE1/4 NE1/4 NW1/4, SW1/4 NE1/4 NW1/4, SE1/4 NW1/4 NW1/4, NW1/4 SW1/4 NW1/4
CYFO (Minerals only, Cody Industrial Park)	T. 53N., R. 101W., sec. 30, lots 31 (16.95), 32 (16.30)
CYFO (Minerals only, Cody Industrial Park)	Tr. 101 (13.24)
CYFO	T. 53N., R. 102W., sec. 4, lot 8 (39.56)
CYFO	T. 53N., R. 102W., sec. 5, lots 5 (1.63), 6 (31.43), NE1/4 SE1/4
CYFO	T. 53N., R. 102W., sec. 7, lots 10 (29.40), 11 (37.25), 12 (19.76), SE1/4 SE1/4
CYFO	T. 53N., R. 102W., sec. 8, SW1/4 SW1/4
CYFO	T. 53N., R. 102W., sec. 36, lots 6 (28.24), 9 (6.92), 10 (20.38)
CYFO	T. 53N., R. 103W., sec. 12, lot 10 (9.71)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
CYFO	T. 53N., R. 103W., sec. 33, SE1/4 NW1/4
CYFO	T. 54N., R. 91W., sec. 4, lots 6 (37.10), 7 (40.47)
CYFO	T. 54N., R. 91W., sec. 28, lot 3 (39.62)
CYFO	T. 54N., R. 91W., sec. 29, lot 8 (40.04)
CYFO	T. 54N., R. 91W., sec. 32, lots 6 (38.88), 7 (39.98), 9 (38.76)
CYFO	T. 54N., R. 102W., sec. 32, lots 5 (8.04), 6 (1.15)
CYFO	T. 55N., R. 94W., sec. 22, SW1/4 NE1/4
CYFO	T. 55N., R. 94W., sec. 28, lot 4 (48.40)
CYFO	T. 55N., R. 97W., sec. 2, lots 2 (37.32), 4 (37.41), 6 (35.84), 40B (40.33)
CYFO	T. 55N., R. 97W., sec. 9, lots 1 (46.95), 2 (52.87), 5 (36.10)
CYFO	T. 55N., R. 97W., sec. 10, lots 2 (42.92), 6 (35.90), N1/2 SW1/4
CYFO	T. 55N., R. 100W., sec. 10, lot 4 (1.31), sec. 11, lot 89G, (5.33)
CYFO	T. 55N., R. 103W., sec. 4, lots 9 (19.91), 10 (20.04), 13 (20.16), SW1/4 SW1/4
CYFO	T. 55N., R. 103W., sec. 5, SW1/4 SW1/4
CYFO	T. 55N., R. 103W., sec. 8, SW1/4 NE1/4
CYFO	T. 55N., R. 103W., sec. 9, SE1/4 SE1/4
CYFO	T. 55N., R. 103W., sec. 10, S1/2 S1/2
CYFO	T. 55N., R. 103W., sec. 11, SW1/4 SW1/4
CYFO	T. 55N., R. 103W., sec. 14, SW1/4 NW1/4, NW1/4 SW1/4
CYFO	T. 55N., R. 103W., sec. 15, NW1/4 NE1/4, NW1/4 SE1/4
CYFO	T. 55N., R. 103W., sec. 17, SE1/4 NW1/4
CYFO	T. 56N., R. 95W., sec. 5, lot 1 (25.63)
CYFO	T. 56N., R. 95W., sec. 6, lot 1 (54.04)
CYFO	T. 56N., R. 95W., sec. 17, lot 9 (16.77)
CYFO	T. 56N., R. 95W., sec. 18, lot 7 (11.65)
CYFO	T. 56N., R. 95W., sec. 20, W1/2 NE1/4 NW1/4, NE1/4 NW1/4 NW1/4
CYFO	T. 56N., R. 95W., Tr. 116A (43.14), Tr. 116B (43.27) formerly in sec. 18
CYFO	T. 56N., R. 96W., sec. 2, lots 1 (42.90), 2 (43.18), 3 (40.0), 4 (40.0), 5 (40.0), 6 (40.0), 9 (40.0), 10 (40.0), N1/2 SW1/4
CYFO	T. 56N., R. 96W., sec. 3, lots 10 (8.65), 86A (41.50), 86B (41.47), 86C (41.43), 86G (41.50), 86H (40.00)
CYFO	T. 56N., R. 96W., sec. 30, lots 6 (9.46), 9 (1.39), 10 (2.33)
CYFO	T. 56N., R. 96W., sec. 35, lots 1 (20.89), 2 (47.27), 3 (25.06)
CYFO	T. 56N., R. 97W., sec. 19, lots 2 (37.15), 3 (37.19), SE1/4 NW1/4, NE1/4 SW1/4
CYFO	T. 56N., R. 97W., sec. 20, lot 2, lot 65c (81.89)
CYFO	T. 56N., R. 97W., sec. 21, NW1/4 NE1/4, SE1/4 NE1/4
CYFO	T. 56N., R. 97W., sec. 22, lot 4, NW1/4 SW1/4, W2W2SWNW (45.05)
CYFO	T. 56N., R. 97W., sec. 25, lot 1 (3.00)
CYFO	T. 56N., R. 97W., sec. 27, lot 54E (40.00)
CYFO	T. 56N., R. 99W., sec. 17, lot 6 (25.86)
CYFO	T. 57N., R. 95W., sec. 27, S1/2 SW1/4, W1/2 SW1/4 SE1/4, SE1/4 SW1/4 SE1/4, SW1/4 SE1/4 SE1/4, W1/2 SE1/4 SE1/4 SE1/4
CYFO	T. 57N., R. 95W., sec. 28, E1/2 SE1/4 SE1/4
CYFO	T. 57N., R. 97W., sec. 29, all of bock 75 of the Deaver Townsite, lots 1,9,10,11,12,13,14 of block 76 of the Deaver Townsite (61.19)

Table M-2. Properties Identified for Disposal in the Planning Area (Continued)

Field Office	Legal Description and (Acreage)[1]
CYFO	T. 57N., R. 95W., sec. 33, S1/2 NW1/4, N1/2 SW1/4, SW1/4 SW1/4, NW1/4 SE1/4
CYFO	T. 57N., R. 95W., sec. 33, E1/2 E1/2 NE1/4, E1/2 E1/2 NE1/4 SE1/4
CYFO	T. 57N., R. 95W., sec. 34, W1/2 E1/2 NE1/4 NE1/4, W1/2 NE1/4 NE1/4, W1/2 NE1/4, NW1/4
CYFO	T. 57N., R. 96W., sec. 28, N1/2 NW1/4
CYFO	T. 57N., R. 96W., sec. 35, W1/2 SW1/4, SE1/4 SE1/4
CYFO	T. 58N., R. 99W., sec. 29, S1/2 NW1/4, N1/2 SW1/4
CYFO	T. 57N., R. 101W., sec. 10, NE1/4 NE1/4 SW1/4 NE1/4 (2.5)

[1]Some legal descriptions encompass more land than is intended for possible disposal, resulting in smaller map polygons than the area listed in the legal description.

Note: The public parcel in T. 55N., R. 98W., sec. 16 and 17 is no longer in federal ownership; it was conveyed by the BLM to the Powell Recreation District in February 2014 while the Proposed RMP and Final EIS was being prepared. As the RMP is finalized, the associated acreages will be updated accordingly.

CYFO Bureau of Land Management Cody Field Office
E East
N North
R Range
S South
Sec. Section
T Township
Tr. Tract
W West
WFO Bureau of Land Management Worland Field Office

3.0 CRITERIA FOR RETENTION, ACQUISITION, OR DISPOSAL

The FLPMA provides for retention of the public lands in federal ownership and management by the BLM for multiple uses. The FLPMA and other federal laws, executive orders, and policies suggest criteria to use when categorizing public lands for retention or disposal, and for identifying acquisition priorities. Disposal by sale, exchange, airport grant, or Recreation and Public Purpose (R&PP) patent remains an option if such an action would serve an important objective and have a public benefit.

Site-specific environmental review and documentation in conformance with NEPA, including completion of categorical exclusions and plan conformance determinations where appropriate, will be accomplished for each proposed land program action. Interdisciplinary impact analysis will be tiered within the framework of this and other applicable environmental documents. Many of the foregoing provisions of this appendix are based upon current policy. Future shifts in policy and national priorities may result in modifications of these provisions and changes in addressing priority lands actions. Land tenure adjustments must serve the public interest.

The following is suggested criteria to consider in land tenure adjustment proposals, but it is not considered all-inclusive. These criteria are meant to guide and streamline consideration of land tenure adjustment proposals.

3.1 Criteria for Retention or Acquisition

Acquisition of lands will be considered, if in compliance with the RMP, to facilitate various resource management objectives and to acquire lands with high resource values including, but not limited to:

- Important, crucial, or critical habitat for fish, wildlife, and plants;
- Riparian areas, wetlands, and designated floodplains;
- Parcels that provide access to larger blocks of public land;
- Lands with special designation or management emphasis;
- Important cultural resources;
- Recreation opportunities and benefits;
- Mineral development potential;
- VRM Class I and Class II areas;
- The preferred method for acquisition will be through exchange;
- Acquisitions, including easements, can be completed through exchange, Land and Water Conservation Funds (LWCF) purchases, or donations; and
- Acquisitions of private lands will be pursued only with willing landowners. The following geographic areas are identified as priority areas for acquisition:
    - Rattlesnake Mountain;
    - Carter Mountain;
    - Cedar Mountain (Cody);
    - Little Mountain;
    - Sheep Mountain (west of Buffalo Bill Reservoir);
    - McCullough Peaks (includes Wild Horse Management area);
    - Clarks Fork River; and
    - Bighorn River.

3.1.1 Criteria for Disposal

Current policy prescribes general priorities for land disposal actions that include:

- BLM and other federal jurisdictional transfers;
- Transfers to state and local agencies (e.g., R&PP patents, airport patents);
- State exchanges;
- Private exchanges;
- Sales;
- Desert land entries;
- Parcels difficult or costly to administer;
- Parcels of special importance to local communities; and
- Parcels more suitable for management by another federal or state agency.

Transfer to other public agencies will also be considered if improved management efficiency would result. Prior to any disposal, a site-specific analysis must determine that the lands considered contain

no significant wildlife, recreation, or other resource values the loss of which could not be mitigated; have no overriding public values; and represent no substantial public investments. Exchange will be the preferred method for disposals.

3.1.1.1 Exchanges

Land exchanges that serve the national interest and are beneficial to BLM programs or that support the programs of other agencies (reference Sections 102, 205, and 206 of FLPMA) will be promoted.

- Transfer of leasable minerals out of federal ownership should be avoided except when non-federal leasable minerals are to be received in return. It is preferable to trade both surface and subsurface (mineral) estates.
- Exchanges should involve lands similar in character and/or value. Lands acquired by the BLM in an exchange will generally be retained under federal ownership or control, unless there is a compelling reason for doing so.
- Exchanges should not be made solely for the purpose of blocking up federal land ownership.

Sales

Public land sale proposals are the result of a BLM initiative or in response to expressed public interest or need. Lands to be considered for disposal, at a minimum, must meet the following criteria as outlined in Section 203 of the FLPMA:

- They are difficult and uneconomical to manage and are not suitable for management by another federal department or agency;
- Disposal would serve important public objectives, including but not limited to, community expansion or economic development, that could not be achieved prudently or feasibly on land other than public lands and that outweigh other public objectives or values; or
- The tract was acquired for a specific purpose, and the tract is no longer required for that purpose or any other federal purpose.

Generally, exchanges are the preferred method of disposal but sales will be used when: it is required by national policy; or it is required to achieve disposal objectives on a timely basis, and where disposal through exchange would cause unacceptable delays, or disposal through exchange is not feasible. The preferred method of selling public land will be by competitive bidding at public auction to qualifying purchasers. However, modified competitive bidding procedures and direct sales may be used in certain situations.

Sales and Exchanges Involving Wetlands

BLM policy is to retain wetlands in federal ownership unless federal, state, public, and private institutions and parties have demonstrated the ability to maintain, restore, and protect wetlands and riparian habitats on a continuous basis (BLM Manual 6740). Sales and exchanges may be authorized when:

- The tract of public wetlands is either so small or remote that it is uneconomical to manage; or
- The tract of public wetlands is not suitable for management by another federal agency.

3.1.2 Recreation and Public Purposes Lease/Patent

The objective of the R&PP Act is to meet the needs of state and local governmental agencies and other qualified organizations for public lands required for recreational and public purposes. Use of the R&PP Act protects public values in the land through its reversionary provisions and helps qualified entities obtain the more liberal pricing authorized under the R&PP Act.

Public lands shall be conveyed or leased only for an established or definitely proposed project for which there is a reasonable timetable of development and satisfactory development and management plans. No more land than is reasonably necessary for the proposed use shall be conveyed.

3.1.3 Airport Grants

Grants of public land for airports and airways are available to public agencies through the Federal Aviation Administration (FAA) under the Airport and Airway Improvement Act (reference 43 Code of Federal Regulations [CFR] §2640). Use of this act protects public values in the land through its reversionary provisions and helps qualified entities obtain land at no cost (except for administrative processing charges) as authorized under this act.

3.1.4 Desert Land Entries

The purpose of the Desert Land Law is to permit the reclamation by irrigation of arid public land through individual effort and private capital (reference 43 Code of Federal Regulations [CFR] §2520).

Lands that will not produce any reasonably remunerative agricultural crop by the usual means or methods of cultivation, without artificial irrigation, may be considered for a desert land entry. The lands must be surveyed, unreserved, unappropriated, non-mineral, non-timber, and incapable of producing an agricultural crop without irrigation. The lands must be suitable for agricultural purposes and more valuable for that purpose than for any other. Tracts need not be contiguous, but shall be sufficiently close to each other to be managed satisfactorily as an economic unit.

The proposed crop may include any agricultural product to which the land under consideration is generally adapted and which would return a fair reward for the expense of producing it.

All Desert Land Entry applications will be coordinated with the Wyoming State Water Engineer and the Natural Resources Conservation Service.

4.0 ACCESS AND EASEMENTS

Access/improved access or easements have been identified in the following areas:

Cody Field Office

- Rattlesnake Mountain
- Hogan/Luce/Bald Ridge area
- Carter Mountain
- Cedar Mountain (Cody)
- Hudson Falls (Shell)
- Little Mountain/Dugans Bench

- Sheep Mountain (west of Buffalo Bill Reservoir)
- Coon Creek (Byron)
- McCullough Peaks
- Seven Mountain Subdivision (Cooper lane near Cody)
- Dry Bear/Bear Creek (north of Greybull)
- Clarks Fork River
- Heart Mountain
- Sheep Mountain/Bighorn Lake/River access

Worland Field Office

- Shell/Webber Canyon
- Hyattville logging road area
- Tatman/Fenton Pass
- Hamilton Dome
- Upper Owl Creek
- Bighorn River
- Neiber Road (off of South Flat)
- Road 1406 in Sand draw (east of Cedar Mountain WSA)
- South Rim Shell Canyon to South Rim Trapper Canyon (south to Alkali Road)
- Upper White Creek Drainage
- West of Hamilton Dome between Cottonwood and Owl Creek
- South Fork Owl Creek
- Rock Creek
- South Fork North Fork Owl Creek
- Dutch Nick Flats Road (across Dave Slover property, T. 47N., R. 97W. sec. 23)

Access for Recreation:

- Upper Grass Creek Area
- Enos Creek
- Upper Cottonwood Creek
- Upper South Fork of Owl Creeks of the Absaroka Mountain Foothills

Foot/horseback Access:

- Shoshone National Forest

Limited motorized vehicle access on roads in the Red Canyon Creek Area (Thermopolis Community Pit).

Access to public lands on the Bighorn and Greybull Rivers:

- Basin Ridge, Dry Bear Creek, Heron West, Kane East, Kane West, Lovell Draw, Manderson Bridge, Perkins Bottom-East, Rairden Bridge, Red Bluff View, Red Rim Meadows-South, Sheep Mountain West, South Flat Bridge, Stucco South

Access in the **15-Mile Badlands area.** Includes the following – but not limited to:

- Burlington Pass Road, Fenton Pass Road, Badger Gulch Road, 15-Mile Road, Dorsey Creek Road, Murphy Draw Road, Elk Creek Road

Access in the **Trapper Creek RMZ** (includes Shell Canyon to Red Gulch Road, to the Bighorn NF):

- Horse Mountain, Trapper Creek, White Creek

Access into the **Paint Rock RMZ** (Alkali Road, Bighorn NF, Luman Creek Road area to Wyoming Route 31):

- Laddie Creek and Paint Rock Creek

Access to the **Brokenback RMZ** (Luman Creek Area, Bighorn NF, Highway 16, Hyattville-Ten Sleep Road):

- Laddie Creek, Military Creek, Luman Creek, Dorn Draw Road, additional access into North and South Brokenbacks, yearlong public access on North and South Brokenback

South Bighorns RMZ (Rome Hill Road, Hazelton Road, Upper Nowood, South WFO boundary):

- Access into upper Nowood area, Otter Creek, Deep Creek, Little Canyon Creek, Public land tracts along the Nowood River, Cherry Creek Road/Split Rock Road to Hazelton Road, Lysite Mountain, Land parcels within Spring Creek, Spring Creek Road to Rome Hill Road

Access into **Canyon Creek RMZ** (Highway 16 to Rome Hill Road, Smilo Road to BLM Road 1417.

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix N

Wyoming Standards For Healthy Rangelands

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APPENDIX N

WYOMING STANDARDS FOR HEALTHY RANGELANDS

1.0 INTRODUCTION

According to the Department of the Interior's final rule for grazing administration, effective August 21, 1995, the Wyoming Bureau of Land Management (BLM) State Director is responsible for the development of standards for healthy rangelands and guidelines for livestock grazing management on 18 million acres of Wyoming's public rangelands. The development and application of these standards and guidelines are to achieve the four fundamentals of rangeland health outlined in the grazing regulations (43 CFR [Code of Federal Regulations] 4180.1). Those four fundamentals are: (1) watersheds are functioning properly; (2) water, nutrients, and energy are cycling properly; (3) water quality meets State standards; and (4) habitat for special status species is protected.

Standards address the health, productivity, and sustainability of the BLM-administered public rangelands and represent the minimum acceptable conditions for the public rangelands. The standards apply to all resource uses on public lands. Their application will be determined as use-specific guidelines are developed. Standards are synonymous with goals and are observed on a landscape scale. They describe healthy rangelands rather than important rangeland by-products. The achievement of a standard is determined by observing, measuring, and monitoring appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles.

Guidelines provide for, and guide the development and implementation of, reasonable, responsible, and cost-effective management practices at the grazing allotment and watershed level. The guidelines in this document apply specifically to livestock grazing management practices on the BLM-administered public lands. These management practices will either maintain existing desirable conditions or move rangelands toward statewide standards within reasonable timeframes. Appropriate guidelines will ensure that the resultant management practices reflect the potential for the watershed, consider other uses and natural influences, and balance resource goals with social, cultural/historic, and economic opportunities to sustain viable local communities. Guidelines, like standards, apply statewide.

Implementation of the Wyoming standards and guidelines will generally be done in the following manner. Grazing allotments or groups of allotments in a watershed will be reviewed based on the BLM's current allotment categorization and prioritization process. Allotments with existing management plans and high-priority allotments will be reviewed first. Lower priority allotments will be reviewed as time allows or when it becomes necessary for BLM to review the permit/lease for other reasons such as permit/lease transfers, permittee/lessee requests for change in use, etc. The permittees and interested publics will be notified when allotments are scheduled for review and encouraged to participate in the review. The review will first determine if an allotment meets each of the six standards. If it does, no further action will be necessary. If any of the standards aren't being met, then rationale explaining the contributing factors will be prepared. If livestock grazing practices are found to be among the contributing factors, corrective actions consistent with the guidelines will be developed and implemented before the next grazing season in accordance with 43 CFR 4180. If a lack of data prohibits the reviewers from determining if a standard is being met, then a strategy will be developed to acquire the data in a timely manner.

On a continuing basis, the Standards for Healthy Rangelands will direct on-the-ground management on the public lands. They will serve to focus the development and implementation of activity plans or grazing permits/leases to maintain or achieve healthy rangelands.

Quantifiable resource objectives and specific management practices to maintain or achieve the standards will be developed at the local BLM District and Field Office levels and will consider all reasonable and practical options available to achieve desired results on a watershed or grazing allotment scale. The objectives shall be reflected in site-specific activity/implementation plans and/or in livestock grazing permits/leases for the public lands. These objectives and practices may be developed formally or informally through mechanisms available and suited to local needs (such as Coordinated Resource Management [CRM] efforts).

The development and implementation of standards and guidelines will enable on-the-ground management of the public rangelands to maintain a clear and responsible focus on both the health of the land and its dependent natural and human communities. This development and implementation will ensure that any mechanisms currently being employed or that may be developed in the future will maintain a consistent focus on these essential concerns. This development and implementation will also enable immediate attention to be brought to bear on existing resource concerns.

These standards and guidelines are compatible with BLM's three-tiered land use planning process. The first tier includes the laws, regulations, and policies governing BLM's administration and management of the public lands and their uses. The previously mentioned fundamentals of rangeland health specified in 43 CFR 4180.1, the requirement for BLM to develop these state (or regional) standards and guidelines, and the standards and guidelines themselves, are part of this first tier. Also part of this first tier are the specific requirements of various federal laws and the objectives of 43 CFR 4100.2 that require BLM to consider the social and economic well-being of the local communities in its management process.

These standards and guidelines will provide for statewide consistency and guidance in the preparation, amendment, and maintenance of BLM land use plans, which represent the second tier of the planning process. The BLM land use plans provide general allocation decisions concerning the kinds of resource and land uses that can occur on the BLM-administered public lands, where they can occur, and the types of conditional requirements under which they can occur. In general, the standards will be the basis for development of planning area-specific management objectives concerning rangeland health and productivity, and the guidelines will direct development of livestock grazing management actions to help accomplish those objectives.

The third tier of the BLM planning process, activity or implementation planning, is directed by the applicable land use plan and, therefore, by the standards and guidelines. The standards and guidelines, as BLM statewide policy, will also directly guide development of the site-specific objectives and the methods and practices used to implement the land use plan decisions. Activity or implementation plans contain objectives which describe the site-specific conditions desired. Grazing permits/leases for the public lands contain terms and conditions which describe specific actions required to attain or maintain the desired conditions. Through monitoring and evaluation, the BLM, grazing permittees, and other interested parties determine if progress is being made to achieve activity plan objectives.

Wyoming rangelands support a variety of uses which are of significant economic importance to the State and its communities. These uses include oil and gas production, mining, recreation and tourism, fishing, hunting, wildlife viewing, and livestock grazing. Rangelands also provide amenities which contribute to the quality of life in Wyoming such as open spaces, solitude, and opportunities for personal renewal. Wyoming's rangelands should be managed with consideration of the State's historical, cultural, and social development and in a manner which contributes to a diverse, balanced, competitive, and resilient

economy in order to provide opportunity for economic development. Healthy rangelands can best sustain these uses.

To varying degrees, BLM management of the public lands and resources plays a role in the social and economic well-being of Wyoming communities. The National Environmental Policy Act (part of the above-mentioned first planning tier) and various other laws and regulations mandate the BLM to analyze the socioeconomic impacts of actions occurring on public rangelands. These analyses occur during the environmental analysis process of land use planning (second planning tier), where resource allocations are made, and during the environmental analysis process of activity or implementation planning (third planning tier). In many situations, factors that affect the social and economic well-being of local communities extend far beyond the scope of BLM management or individual public land users' responsibilities. In addition, since standards relate primarily to physical and biological features of the landscape, it is very difficult to provide measurable socioeconomic indicators that relate to the health of rangelands. It is important that standards be realistic and within the control of the land manager and users to achieve.

2.0 STANDARDS FOR HEALTHY PUBLIC RANGELANDS

2.1 Standard #1

Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.

THIS MEANS THAT:

The hydrologic cycle will be supported by providing for water capture, storage, and sustained release. Adequate energy flow and nutrient cycling through the system will be achieved as optimal plant growth occurs. Plant communities are highly varied within Wyoming.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Water infiltration rates
- Soil compaction
- Erosion (rills, gullies, pedestals, capping)
- Soil micro-organisms
- Vegetative cover (gully bottoms and slopes)
- Bare ground and litter

The above indicators are applied as appropriate to the potential of the ecological site.

2.2 Standard #2

Riparian and wetland vegetation has structural, age, and species diversity characteristic of the stage of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for groundwater recharge.

THIS MEANS THAT:

Wyoming has highly varied riparian and wetland systems on public lands. These systems vary from large rivers to small streams and from springs to large wet meadows. These systems are in various stages of natural cycles and may also reflect other disturbance that is either localized or widespread throughout the watershed. Riparian vegetation captures sediments and associated materials, thus enhancing the nutrient cycle by capturing and utilizing nutrients that would otherwise move through a system unused.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Erosion and deposition rate
- Channel morphology and floodplain function
- Channel succession and erosion cycle
- Vegetative cover
- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.)
- Bank stability
- Woody debris and instream cover
- Bare ground and litter

The above indicators are applied as appropriate to the potential of the ecological site.

2.3 Standard #3

Upland vegetation on each ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.

THIS MEANS THAT:

In order to maintain desirable conditions and/or recover from disturbance within acceptable timeframes, plant communities must have the components present to support the nutrient cycle and adequate energy flow. Plants depend on nutrients in the soil and energy derived from sunlight. Nutrients stored in the soil are used over and over by plants, animals, and microorganisms. The amount of nutrients available and the speed with which they cycle among plants, animals, and the soil are fundamental components of rangeland health. The amount, timing, and distribution of energy captured through photosynthesis are fundamental to the function of rangeland ecosystems.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Vegetative cover
- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.)
- Bare ground and litter
- Erosion (rills, gullies, pedestals, capping)
- Water infiltration rates

The above indicators are applied as appropriate to the potential of the ecological site.

2.4 Standard #4

Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.

THIS MEANS THAT:

The management of Wyoming rangelands will achieve or maintain adequate habitat conditions that support diverse plant and animal species. These may include listed threatened or endangered species (U.S. Fish and Wildlife-designated), species of special concern (BLM-designated), and other sensitive species (State of Wyoming-designated). The intent of this standard is to allow the listed species to recover and be delisted, and to avoid or prevent additional species becoming listed.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Noxious weeds
- Species diversity
- Age class distribution
- All indicators associated with the upland and riparian standards
- Population trends
- Habitat fragmentation

The above indicators are applied as appropriate to the potential of the ecological site.

2.5 Standard #5

Water quality meets State standards.

THIS MEANS THAT:

The State of Wyoming is authorized to administer the Clean Water Act. BLM management actions or use authorizations will comply with all Federal and State water quality laws, rules and regulations to address water quality issues that originate on public lands. Provisions for the establishment of water quality standards are included in the Clean Water Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in *Wyoming's Water Quality Rules and Regulations*. The latter regulations contain Quality Standards for Wyoming Surface Waters. Natural processes and human actions influence the chemical, physical, and biological characteristics of water. Water quality varies from place to place with the seasons, the climate, and the kind substrate through which water moves. Therefore, the assessment of water quality takes these factors into account.

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Chemical characteristics (e.g., pH, conductivity, dissolved oxygen)
- Physical characteristics (e.g., sediment, temperature, color)
- Biological characteristics (e.g., macro- and micro-invertebrates, fecal coliform, and plant and animal species)

2.6 Standard #6

Air quality meets State standards.

THIS MEANS THAT:

The State of Wyoming is authorized to administer the Clean Air Act. BLM management actions or use authorizations will comply with all Federal and State air quality laws, rules, regulations and standards. Provisions for the establishment of air quality standards are included in the Clean Air Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in *Wyoming Air Quality Standards and Regulations.*

INDICATORS MAY INCLUDE BUT ARE NOT LIMITED TO:

- Particulate matter
- Sulfur dioxide
- Photochemical oxidants (ozone)
- Volatile organic compounds (hydrocarbons)
- Nitrogen oxides
- Carbon monoxide
- Odors
- Visibility

3.0 BLM WYOMING GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

1. Timing, duration, and levels of authorized grazing will ensure that adequate amounts of vegetative ground cover, including standing plant material and litter, remain after authorized use to support infiltration, maintain soil moisture storage, stabilize soils, allow the release of sufficient water to maintain system function, and to maintain subsurface soil conditions that support permeability rates and other processes appropriate to the site.
2. Grazing management practices will restore, maintain, or improve riparian plant communities. Grazing management strategies consider hydrology, physical attributes, and potential for the watershed and the ecological site. Grazing management will maintain adequate residual plant cover to provide for plant recovery, residual forage, sediment capture, energy dissipation, and groundwater recharge.
3. Range improvement practices (instream structures, fences, water troughs, etc.) in and adjacent to riparian areas will ensure that stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform are maintained or enhanced. The development of springs, seeps, or other projects affecting water and associated resources shall be designed to protect the ecological and hydrological functions, wildlife habitat, and significant cultural, historical, and archaeological values associated with the water source. Range improvements will be located away from riparian areas if they conflict with achieving or maintaining riparian function.
4. Grazing practices that consider the biotic communities as more than just a forage base will be designed in order to ensure that the appropriate kinds and amounts of soil organisms, plants, and

animals to support the hydrologic cycle, nutrient cycle, and energy flow are maintained or enhanced.

5. Continuous season-long or other grazing management practices that hinder the completion of plants' life-sustaining reproductive and/or nutrient cycling processes will be modified to ensure adequate periods of rest at the appropriate times. The rest periods will provide for seedling establishment or other necessary processes at levels sufficient to move the ecological site condition toward the resource objective and subsequent achievement of the standard.
6. Grazing management practices and range improvements will adequately protect vegetative cover and physical conditions and maintain, restore, or enhance water quality to meet resource objectives. The effects of new range improvements (water developments, fences, etc.) on the health and function of rangelands will be carefully considered prior to their implementation.
7. Grazing management practices will incorporate the kinds and amounts of use that will restore, maintain, or enhance habitats to assist in the recovery of Federal threatened and endangered species or the conservation of federally-listed species of concern and other State-designated special status species. Grazing management practices will maintain existing habitat or facilitate vegetation change toward desired habitats. Grazing management will consider threatened and endangered species and their habitats.
8. Grazing management practices and range improvements will be designed to maintain or promote the physical and biological conditions necessary to sustain native animal populations and plant communities. This will involve emphasizing native plant species in the support of ecological function and incorporating the use of non-native species only in those situations in which native plant species are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.
9. Grazing management practices on uplands will maintain desired plant communities or facilitate change toward desired plant communities.

3.1 Definitions

Activity Plans: Allotment Management Plans (AMPs), Habitat Management Plans (HMPs), Watershed Management Plans (WMPs), and other plans developed at the local level to address specific concerns and accomplish specific objectives.

Coordinated Resource Management (CRM): A group of people working together to develop common resource goals and resolve natural resource concerns. CRM is a people process that strives for win-win situations through consensus-based decision making.

Desired Plant Community: A plant community which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established for an ecological site(s). The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.

Ecological Site: An area of land with specific physical characteristics that differs from other areas both in its ability to produce distinctive kinds and amounts of vegetation and in its response to management.

Erosion: (v.) Detachment and movement of soil or rock fragments by water, wind, ice, or gravity. (n.) The land surface worn away by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Grazing Management Practices: Grazing management practices include such things as grazing systems (rest-rotation, deferred rotation, etc.), timing and duration of grazing, herding, salting, etc. They do not include physical range improvements.

Guidelines (For Grazing Management): Guidelines provide for, and guide the development and implementation of, reasonable, responsible, and cost-effective management actions at the allotment and watershed level which move rangelands toward statewide standards or maintain existing desirable conditions. Appropriate guidelines will ensure that the resultant management actions reflect the potential for the watershed, consider other uses and natural influences, and balance resource goals with social, cultural/historic, and economic opportunities to sustain viable local communities. Guidelines, and therefore, the management actions they engender, are based on sound science, past and present management experience, and public input.

Indicator: An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. An indicator can be evaluated at a site- or species-specific level. Monitoring of an indicator must be able to show change within timeframes acceptable to management and be capable of showing how the health of the ecosystem is changing in response to specific management actions. Selection of the appropriate indicators to be observed, measured, or monitored in a particular allotment is a critical aspect of early communication among the interests involved on-the-ground. The most useful indicators are those for which change or trend can be easily quantified and for which agreement as to the significance of the indicator is broad based.

Litter: The uppermost layer of organic debris on the soil surface, essentially the freshly fallen or slightly decomposed vegetal material.

Management Actions: Management actions are the specific actions prescribed by the BLM to achieve resource objectives, land use allocations, or other program or multiple use goals. Management actions include both grazing management practices and range improvements.

Objective: An objective is a site-specific statement of a desired rangeland condition. It may contain either or both qualitative elements and quantitative elements. Objectives frequently speak to change. They are the focus of monitoring and evaluation activities at the local level. Monitoring of the indicators would show negative changes or positive changes. Objectives should focus on indicators of greatest interest for the area in question.

Rangeland: Land on which the native vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs. This includes lands revegetated naturally or artificially when routine management of that vegetation is accomplished mainly through manipulation of grazing. Rangelands include natural grasslands, savannas, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows.

Rangeland Health: The degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained.

Riparian: An area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lakeshores and streambanks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not have vegetation dependent on free water in the soil.

Standards: Standards are synonymous with goals and are observed on a landscape scale. Standards apply to rangeland health and not to the important by-products of healthy rangelands. Standards relate to the current capability or realistic potential of a specific site to produce these by-products, not to the

presence or absence of the products themselves. It is the sustainability of the processes, or rangeland health, which produces these by-products.

Terms and Conditions: Terms and conditions are very specific land use requirements that are made a part of the land use authorization in order to assure maintenance or attainment of the standard. Terms and conditions may incorporate or reference the appropriate portions of activity plans (e.g., Allotment Management Plans). In other words, where an activity plan exists that contains objectives focused on meeting the standards; compliance with the plan may be the only term and condition necessary in that allotment.

Upland: Those portions of the landscape which do not receive additional moisture for plant growth from run-off, streamflow, etc. Typically these are hills, ridgetops, valley slopes, and rolling plains.

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix O

Recreation Management

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APPENDIX O

RECREATION MANAGEMENT

1.0 RECREATION MANAGEMENT AREA PRESCRIPTIONS

This appendix displays the details of the management action prescriptions for each of the alternatives (B, C, D, E, and F). Alternative A prescriptions are described in Chapter 2 of the Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS). Recreation management in the Bighorn Basin Planning Area is separated into two types of recreation management units; Special Recreation Management Areas (SRMA), and Extensive Recreation Management Areas (ERMA). These units are delineated and managed accordingly to the desired recreational setting character conditions, activities, experiences, and beneficial outcomes. Data collected to arrive at allocating these areas as separate recreation management areas were from intensive public outreach including formal Bureau of Land Management (BLM) public scoping meetings, on the ground visitor surveys, field monitoring and observations, and work with stakeholders such as tourism entities and industries, Special Recreation Permit (SRP) permittees, and others who rely heavily on BLM-administered public lands.

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation. SRMAs are managed to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation setting characteristics. SRMAs may be divided into recreation management zones (RMZ) to further delineate specific recreation opportunities. Recreation Management is prescribed and implemented at the RMZ level. For example; the Badlands SRMA is further divided into three RMZs; one managed for recreational touring activities and associated experiences and benefits; one managed to enhance back-country types of activities and associated experiences and benefits; and one managed for primitive activities, experiences, and benefits. Not all SRMAs within the Planning Area are divided into RMZs because of the commonality of desired settings, activities, experiences, and beneficial outcomes. Canyon Creek SRMA and Middle Fork of the Powder River SRMA are such examples. Within an SRMA, recreation and visitor services management is recognized as the predominant land use planning focus, where specific recreation opportunities and recreation setting characteristics are managed and protected on a long-term basis.

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or recreation and visitor services program investments. Management objectives under an ERMA are to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. Management of ERMA areas is commensurate with the management of other resources and resource uses. While generally unnecessary, ERMAs may be subdivided into recreation management zones (RMZ) to ensure recreation and visitor services are managed commensurate with the management of other resources and resource uses.

Public lands that are not designated a Recreation Management Area (SRMA or ERMA) are managed to meet basic recreation and visitor services and resource stewardship needs. Recreation is not emphasized, however recreation activities may occur except on those lands closed to public use. The recreation and visitor services are managed to allow recreation uses that are not in conflict with the primary uses of these lands. Management actions and allowable use decisions will still be necessary to address visitor health and safety, use user conflicts, the type(s), activities and locations where special

recreation permits would be issued or not issued, and mitigation of recreation impacts on cultural and natural resources.

Recreational activities are popular within the Planning Area for both residents and non-residents. Popular recreational activities include but are not limited to camping, hunting, fishing, hiking, rock hounding, spelunking, floating and rafting, cross country skiing, wildlife viewing, driving for pleasure, all-terrain vehicle (ATV)/four-wheel drive touring, motocross and endurance sports, mountain biking, target shooting, and sightseeing. A spike in recreational use on BLM-administered public lands is observed during the summer months, and especially during the big game hunting season, which attracts most of the recreational users, not just within the region, but visitors from outside of Wyoming.

Recreational uses inherently contain conflicting uses which compromises health and safety, user conflicts, goal interference, un-realization of desired experiences and beneficial outcomes, and ultimately natural resource damage. Allocating, or dividing the Planning Area into sub-recreational units, based off of desired settings, activities, experiences, and beneficial outcomes will aid in appropriate recreational marketing, niche-matching, diminish user conflicts, and ultimately an appreciation of the recreational resources which fosters resource protection.

Recreation and visitor services scoping meetings were conducted throughout the Planning Area, resulting in a stand-alone Recreation and Travel Management review report. The BLM will use this land use planning process to gather additional data to support managing areas as either an SRMA or an ERMA, and to further identify the desired recreation settings character conditions, activities, experiences, and beneficial outcomes. Recreation management designation or prescriptions may be modified if deemed necessary as a result of public comments.

The *Bighorn Basin Resource Management Plan Revision Project Summary of the Recreation and Travel Management Workshops* reports may be viewed under the Documents Library at: *http://www.blm.gov/wy/st/en/programs/Planning/rmps/bighorn/docs.html*.

The following recreational matrix further details the allocation of recreation management based on desired settings, activities, experiences, and beneficial outcomes. Because the criteria currently being used as guidance for allocating recreational management into SRMAs and ERMAs did not exist at the time of the last Land Use Plans, the following recreational matrix does not include recreation sub-units for Alternative A.

However, there are seven areas currently designated as SRMAs within the Planning Area. The Cody Field Office manages the Worland Caves, Historic Trails, and The Rivers SRMAs and part of the Bighorn River and West Slope SRMAs. The Worland Field Office manages the Absaroka Mountain Foothills and Badlands SRMAs and part of the Bighorn River and West Slope SRMAs. The Cody Resource Area Land Use Plan (November, 1990), the Grass Creek Resource Area Land Use Plan (September, 1998), and the Washakie Resource Area Land Use Plan (September, 1988) designated these areas to be managed as SRMAs because of the unique recreational niches, recreational setting characters, opportunities and activities, and popularity.

ALTERNATIVES B AND E

Absaroka Mountain Foothills SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This SRMA is necessary to accommodate semi-primitive to middle country recreational experiences in a recreational resource rich environment. The Absaroka Mountain Foothills area is a very popular destination for both local residents and out-or-region visitors. The area is abundant in a wide variety of wildlife including grizzly bears, major access into the Shoshone National Forest and the Washakie Wilderness, and dramatic scenery.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Absaroka Mountain Foothills as a destination SRMA for non-motorized recreationists to engage in hiking, hunting, wildlife viewing, and nature viewing so that they realize a "moderate" level of the targeted experience and benefit outcomes in these Back Country and Middle Country settings.

Activities:

Wildlife viewing, nature viewing, hiking, hunting.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Feeling good about solitude, being isolated, and independent.

Learning more about things here.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Improved mental well-being and physical fitness and health maintenance.

Heightened sense of satisfaction with our area as a place to live.

Positive contributions to local-regional economic stability.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back Country.

Implement/maintain road closures to maintain back country settings.

Naturalness:

Back Country.

Manage for back country and middle country settings where natural setting

Social

Contacts and Group size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small. May have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Allow for primitive motorized routes and non-motorized trails to exist. Facilities and structures are rare and often accessible via unimproved routes. Horse and hiking trailheads will be constructed at major key access points.

Operational

Mechanized Use:

Middle/Front Country.

Main access roads are crowned and ditched gravel roads accessed by 2-wheel and 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use. Roads within the LU Sheep Company area are closed, but available for public access during hunting season. Trails for non-motorized use will be constructed so as to access public lands.

Management Controls and Visitor Services:

Middle Country.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails, and seasonal closures within the LU Sheep Company area.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the LU Ranch cooperative agreement.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Develop trailheads for foot and horse travel. Potential locations will include the Blue Creek Trail, and sites along the North and South forks of the Owl Creek and Rock Creek areas. Additional sites may be identified throughout the life of the plan.

Administrative

Visual Resource Management:

Class I within Owl Creek WSA, Class II for the remainder of SRMA.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) limited to designated roads and trails.

Close Owl Creek WSA to motorized and mechanized use.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within Absaroka Mountain Foothills SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO stipulation will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Maintain cooperative agreement with Wyoming State Land Board, Wyoming State Game and Fish, and LU Sheep Company.

Partners:

Surrounding private land owners, Shoshone National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls.

Pack goats are prohibited.

Badlands SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Tour de Badlands RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is contained within the Badlands SRMA, which is popular for motorized touring to explore the scenic desert basin. Natural recreational resources within the SRMA contain wildlife, open spaces, wild horses, and an erratic landscape which offers outstanding scenic quality.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Tour de Badlands RMZ for motorized recreationists to engage in motorized sightseeing touring, hunting, wildlife viewing, and nature viewing so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes in these Middle Country and Front Country settings.

Activities:

Driving for pleasure, hunting, wildlife viewing, nature viewing, sightseeing.

Experiences:

Enjoy having easy access to natural landscapes.

Enjoy having access to close-to-home outdoor amenities.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Benefits:

Improved mental well-being.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Positive contributions to local-regional economic stability.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country/Front Country.

On or near 4-wheeled drive and improved roads. Maintain main access roads through the area for 2-wheel and 4-wheel drive access into the Badlands area.

Naturalness:

Middle Country.

Natural setting may have moderately dominant alterations but would not draw the attention of the observers on trails and primitive roads within the area.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Front Country.

2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use. On site controls and services present but subtle.

Management Controls and Visitor Services:

Middle Country.

On site controls and services present but subtle. Signs present at key access points. Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM monitoring presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, wildlife, and wild horses resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the wild horse program, and surrounding WSAs.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Maintain a strong sign program so as to keep the access routes within the RMZ well marked.

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop one or more scenic interpretive sites and driving loops for motorized and mechanized travel in the Tour de Badlands area within the Badlands SRMA to highlight the area's scenic values. These could involve the Fifteenmile Creek and Dorsey Creek roads and The Murphy Draw Road with overlooks at the Painted Canyon of Elk Creek and at Bobcat Draw.

Identify routes to close and reclaim, construct new routes, and identify routes to remain open.

Develop trailheads for ATV unloading stations.

Interpretive signs at trailheads and parking areas.

Additional sites may be identified throughout the life of the plan.

Signs present at key access points, but limited within the RMZ.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

Limited to designated roads and trails.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Tour de Badlands RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Private landowners, Wyoming Department of Transportation, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, IMBA, community ATV organizations, and other clubs/organizations.

Other Administration:

Limit the use of signing or other administrative controls.

Badlands SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Wild Badlands RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is within the Badlands SRMA. This RMZ is rich in natural recreational resources such as erratic and dramatic landscapes, management to maintain the primitive to semi-primitive setting characteristics, wilderness characteristics, three WSAs, wildlife, and wild horses which caters to primitive and semi-primitive recreational experiences.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Wild Badlands RMZ exclusively for non-motorized recreationists to engage in hiking, hunting, wildlife viewing, and nature viewing so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country settings.

Activities:

Hiking, hunting, wildlife viewing, nature viewing, sightseeing.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Feeling good about solitude, being isolated, and independent.

Enjoy having easy access to natural landscapes.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Closer relationship with the natural world.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back Country.

Maintain road closures to maintain back country settings.

Naturalness:

Back Country.

Manage the natural setting so that they may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Primitive and Back Country.

Trails may exist but do not exceed standard to carry expected use. Facilities and structures are extremely rare and

developed only in occasions where necessary to protect the back country settings.

Social

Contacts and Group Size:

Back Country.

Manage for a season average of fewer than 6 encounters/day on and off travel routes.

Operational

Mechanized Use:

Primitive.

Non-motorized and non-mechanized (foot and horseback) travel only.

Management Controls and Visitor Services:

Back Country.

On site controls and services present at key access points, but subtle.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM monitoring presence during hunting season.

Minimum amount of BLM facilitating outputs necessary to achieve planning objectives.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop educational signs at trailheads and parking areas on user ethics, geology, and wilderness.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with WSAs, access points, information regarding the wilderness program, and outdoor ethics messages such as Leave No Trace!

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Identify routes to close and reclaim. Modify identified routes into non-motorized and non-mechanized trails.

Develop primitive trailheads at key access points.

Install kiosks and signs at trailheads and parking areas.

Signs present at key access points, but very limited within the RMZ.

Administrative

Visual Resource Management:

Class I.

Comprehensive Trails and Travel Management:

Closed to motorized and non-mechanized travel.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Minerals, Oil and Gas Leasing, and Other Surface-Disturbing Activities:

Mineral uses, Oil and Gas and Geothermal leasing, exploration, and development will be guided by the Interim

Management Policy for Lands under Wilderness Review (IMP).

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Including, but not limited to: Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, Sierra Club, Wyoming Wilderness Association.

Other Administration:

Limit the use of signing or other administrative controls.

Badlands SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Tatman Mountain RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is within the Badlands SRMA. Much like the Wild Badlands RMZ, this RMZ is rich in natural recreational resources such as erratic and dramatic landscapes, dominant mountainous environment, and current management to maintain the primitive to semi-primitive setting characteristics, wildlife, and wild horses which caters to primitive and semi-primitive recreational experiences. The RMZ is located to the west of Sheep Mountain WSA and provides for exceptional wildlife resource opportunities, access, motorized and primitive forms of touring, and high scenic quality.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Tatman Mountain RMZ for non-motorized recreationists to engage in muscle-powered activities such as hiking, hunting, mountain biking, and horseback riding so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes in these Back country to Middle country settings.

Activities:

Hiking, hunting, mountain biking, wildlife viewing, nature viewing, sightseeing.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Feeling good about solitude, being isolated, and independent.

Enjoy having easy access to natural landscapes.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Closer relationship with the natural world.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Naturalness:

Back Country.

Manage the natural setting so that they may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Trails may exist but do not exceed standard to carry expected use. Facilities and structures are extremely rare and developed only in occasions where necessary to protect the back country settings.

Social

Contacts and Group Size:

Back Country.

Manage for a season average of fewer than 6 encounters/day on and off travel routes. In issuing SRPs, allow for a group size less than 5 participants.

Operational

Mechanized Use:

Back/Middle Country.

Middle country for the access routes acting as main portals into the RMZ. Manage for back country settings (non-motorized travel) outside of those corridors.

Management Controls and Visitor Services:

Back/Middle Country.

On site controls and services present at key access points, but subtle.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM monitoring presence during hunting season.

Minimum amount of BLM facilitating outputs necessary to achieve planning objectives.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop educational signs at trailheads and parking areas on user ethics, geology, wild horses, and wilderness characteristics.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated routes and trails, key access points, private lands, and outdoor ethics messages such as Tread Lightly and Leave No Trace!

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Identify routes to maintain as open to motorized use. Reclaim routes identified as closed. Maintain open routes so as to sustain motorized use. Modify identified closed routes into non-motorized and mechanized trails for muscle-powered recreational activities.

Develop primitive trailheads at key access points.

Install kiosks and signs at trailheads and parking areas.

Signs present at key access points, but very limited within the RMZ.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

Motorized use is limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Minerals, Oil and Gas Leasing, and Other Surface-Disturbing Activities:

Pursue withdrawal from all forms of appropriation under all laws pertaining to mineral leasing, location, and sale and closed to leasing within the Tatman Mountain RMZ.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Including, but not limited to: Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, Sierra Club, Wyoming Wilderness Association.

Other Administration:

Limit the use of signing or other administrative controls.

West Slope SRMA – Cody Field Office

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The west slope of the Bighorn mountains attracts visitors from the surrounding communities and from outside the region due to the spectacular scenery, abundant wildlife, and exposed geologic formations. Nearby attractions which also draw visitors to the area include the Bighorn Canyon National Recreation Area, and the Medicine Wheel on the Bighorn National Forest. Also, some visitors traveling to or from Yellowstone National Park spend time in the area. The SRMA includes the Little Mountain, Five Springs, and Brown/Howe Dinosaur Areas of Critical Environmental Concern (ACECs), several creeks found eligible for possible inclusion into the Wild and Scenic River system, and significant cave and karst resources. The Five Springs Falls Campground and the Cottonwood Creek Trailhead are BLM-managed sites within the SRMA. The west slope of the Bighorns provides important wildlife habitat and access into the Bighorn National Forest. These resources provide for excellent semi-primitive non-motorized recreation to motorized (touring) recreation.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hunting, hiking, horseback riding, wildlife viewing, sightseeing, fishing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back, Middle, and Front Country settings.

Activities:

Hunting, wildlife viewing, hiking, photography, sightseeing, driving for pleasure.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Developing skills and abilities.

Enjoy going exploring on my/our own.

Enjoying the closeness of family.

Benefits:

Improved mental well-being and physical fitness and health maintenance.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Heightened sense of satisfaction with our area as a place to live.

Positive contributions to local-regional economic stability.

Maintenance of community's distinctive recreation/tourism market niche or character.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country.

Maintain Middle Country settings on much of the SRMA where lands are on or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Back Country.

Maintain back country settings where lands are more than 0.5 mile from any road, but not as distant as 3 miles, and no road is in sight.

Naturalness:

Back Country and Middle Country where natural setting may have subtle to moderately dominant modifications that would be noticed but not draw the attention of the casual observer wandering through the area and primitive motorized routes and non-motorized trails may exist.

Facilities and Structures:

Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

Maintain Middle Country settings where 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use are acceptable.

Management Controls and Visitor Services:

Middle Country.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, and camp sites.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads, campgrounds, and parking areas.

Do not develop a recreation site at Rainbow Canyon.

Administrative

Visual Resource Management:

Class I within wild segments of several creeks eligible for possible inclusion into the Wild and Scenic River System, Class II

for the remainder of the SRMA.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Lands and Realty:

ROW exclusion area.

Alternative energy avoidance area for realty actions.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Prohibit surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls.

West Slope SRMA – Worland Field Office

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Paint Rock RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is contained within the West Slope of the Bighorns SRMA. The Paint Rock RMZ attracts visitors from the surrounding communities to outside the region. The Medicine Lodge State Park attracts many visitors who enjoy exploring the slope of the Bighorns. Such resources include the Medicine Lodge WSA, Paint Rock Canyon, the Hyattville Logging Road, the Red Gulch/Alkali Road Backcountry Byway, prominent wildlife habitat management areas, abundant wildlife and fishing, and access into the Bighorn National Forest. These resources provide for excellent semi-primitive non-motorized recreation to motorized (touring) recreation.

Objective Statement:

Manage the Paint Rock RMZ as a zone within the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hiking, wildlife viewing, hunting, fishing, nature viewing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country and Middle Country settings.

Activities:

Wildlife viewing, fishing, nature viewing, hiking, photography, sightseeing, hunting.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Developing skills and abilities.

Enjoy going exploring on my/our own.

Enjoying the closeness of family.

Benefits:

Improved mental well-being and physical fitness and health maintenance.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Heightened sense of satisfaction with our area as a place to live.

Positive contributions to local-regional economic stability.

Maintenance of community's distinctive recreation/tourism market niche or character.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle/Back Country.

On land surrounding the Red Gulch/Alkali Road Back Country Byway, Cold Springs Road, and the Black Butte road, maintain middle country settings on or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight. Maintain back country settings within the WSA.

Naturalness:

Middle/Back Country.

Natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area and primitive motorized routes and non-motorized trails may exist. Maintain primitive

naturalness settings for the WSA where lands are essentially an unmodified natural environment. Evidence of humans is unnoticed by an observer wandering through the area.

Facilities and Structures:

Primitive and Back Country.

Facilities and structures are rare and often accessible via unimproved routes. Maintain primitive settings in the WSA where trails may exist but do not exceed standard to carry expected use. Facilities and structures are extremely rare.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Middle/Back Country.

Maintain Middle country settings along the Cold Springs Road, Black Butte Road, and the Red Gulch/Alkali Road Back Country Byway where 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use are acceptable.

Management Controls and Visitor Services:

Middle/Back Country.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails outside WSA. Within the Medicine Lodge WSA, motorized and mechanized use is prohibited.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Red Gulch/Alkali Road Back Country Byway, Medicine Lodge Wildlife Habitat Area, and the Medicine Lodge WSA.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Develop new and maintain trailheads for foot and horse travel. Potential locations will include the Wapiti Ridge Trail, Lone Tree Trail and trailhead, Black Butte, and along the Red Gulch/Alkali Road Back Country Byway. Additional sites may be identified throughout the life of the plan.

Upgrade access route to the Lone Tree trailhead and upgrade the Lone Tree Trail.

Develop hiking trails in the Wet and Dry Medicine Lodge Canyons.

Maintain the off-highway vehicle (OHV) route between the Medicine Lodge State Park and Cold Springs Road.

Designate motorized touring loops connecting with the Bighorn National Forest, the Trapper Creek RMZ, and the Brokenback/Logging Road RMZ, which may include new construction.

Develop campgrounds if needed.

Administrative

Visual Resource Management:

Class I within the Medicine Lodge WSA, Class II for the remainder of SRMA.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Close Medicine Lodge WSA to motorized and mechanized use.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Paint Rock RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Maintain cooperative agreement with Wyoming State Land Board, and Wyoming State Game and Fish.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls.

West Slope SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Trapper Creek RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ contains natural recreational resources which support recreational activities including hunting, sightseeing, and fishing. This areas contains the Trapper Creek WSA, two waterway segments identified as eligible and suitable for inclusion into the Wild and Scenic River System, Spanish Point ACEC, significant cave and karst resources, the Red Gulch/Alkali Road Backcountry Byway, the Red Gulch Dinosaur Tracksite and the Red Gulch Dinosaur Tracksite ACEC, and highly rated scenic quality. This area attracts visitors from within and outside the region to enjoy the resources in these semi-primitive setting to a middle country settings.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Trapper Creek RMZ as a zone within the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hiking, hunting, wildlife viewing, nature viewing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country, Middle Country, and Front Country settings.

Activities:

Hunting, wildlife viewing, nature viewing, hiking, sightseeing, photography.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Enjoying the closeness of family.

Benefits:

Improved mental well-being.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Front/Back Country.

On land surrounding the Red Gulch/Alkali Road Back Country Byway, maintain front country settings on or near improved county roads, but at least 0.5 mile from any highway. Maintain back country settings within the Trapper Creek and Alkali

Creek WSAs where lands are more than 0.5 mile from any road, but not as distant as 3 miles, and no road is in sight.

Naturalness:

Back Country/Primitive.

Manage for a Back Country setting where natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Maintain primitive naturalness settings for the WSAs where lands are essentially an unmodified natural environment. Evidence of humans is unnoticed by an observer wandering through the area.

Facilities and Structures:

Front Country/Primitive.

For lands within the Back Country Byway, maintain the front country settings where primitive and improved routes/trails may exist. Facilities and structures are scattered.

Maintain primitive settings in the WSAs where trails may exist but do not exceed standard to carry expected use. Facilities and structures are extremely rare.

Social

Contacts and Group Size:

Middle Country/Back County/Primitive.

For lands along the Byway, maintain middle country settings where usually 7-14 encounters/day off travel routes and campsites, and 15-29 encounters/day on travel routes. Usually group size is small to moderate.

Manage for back country settings for remainder of SRMA not including WSAs. Manage for 3-6 encounters/day off travel routes, and 7-15 encounters/day on travel routes. Usually group size is small.

Manage for primitive settings for WSAs. Usually fewer than 3 encounters/day at campsites and fewer than 6 encounters/day on travel routes. Usually group size is small in relation to surrounding areas.

Operational

Mechanized Use:

Front Country/Primitive.

Maintain front country settings along the Red Gulch/Alkali Road Back Country Byway where 2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized are appropriate.

Manage for primitive settings for the WSAs where there is no mechanized or motorized travel whatsoever.

Management Controls and Visitor Services:

Middle/Back Country.

Manage for middle country settings where on site controls and services are present but subtle.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails outside WSAs. Within the Trapper and Alkali Creek WSAs, motorized and mechanized use is prohibited.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Red Gulch/Alkali Road Back Country Byway, Trapper Creek and Alkali Creek WSAs, the Madison Recharge zone, and caving ethics.

Maintain the Red Gulch Dinosaur Tracksite.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Develop new and maintain trailheads for foot and horse travel. Potential locations will include the Webber Canyon area, White Creek, and Black Mountain areas. Additional sites may be identified throughout the life of the plan.

Construct trailheads to accommodate mountain bike users.

Construct pull-offs along the Red Gulch/Alkali Road.

Back Country Byway.

Designate motorized touring loops within the Trapper Creek RMZ, as well as connecting with the Paint Rock RMZ, and the Bighorn National Forest, which may include new construction.

Administrative

Visual Resource Management:

Class I within the Trapper Creek and Alkali Creek WSAs, and the White Creek and Trapper Creek WSRs. Class II for the remainder of SRMA.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Close WSAs and Spanish Point Karst ACEC to motorized and mechanized use.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Consider the acquisition of legal and/or physical access for hunting, fishing, and camping.

Consider acquiring areas such as Horse Mountain, Trapper Creek, and White Creek.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Trapper Creek RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Maintain cooperative agreements with the Big Horn National Forest.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, IMBA, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls.

West Slope SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Brokenback/Logging Road RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This area exhibits exceptional scenic quality, wildlife resources, and exposed geologic formations. The Hyattville Logging Road is within this area and is proposed to be a backcountry byway for Alternative B. The Logging Road is a popular access point into the Bighorn Mountains. Two other routes, the North and South Brokenback Roads act as very popular access points into the RMZ, as well as the Bighorn National Forest, especially during the big game hunting seasons. Access into this area is in part due to a coordinated agreement between the Wyoming Game and Fish and surrounding private land holders, as well as a foot/horse trail developed by the BLM so as to access more of this area. This area is a very popular hunting area for both local and visiting hunters.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Brokenback/Logging Road RMZ as a zone within the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hiking, hunting, wildlife viewing, nature viewing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country and Middle Country settings.

Activities:

Hunting, hiking, wildlife viewing, nature viewing, driving for pleasure.

Experiences:

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoying the closeness of family.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Stronger ties with my family and friends.

Greater awareness that the Bighorn Basin is special.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country Settings.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Front Country settings along the Hyattville Logging Road.

On or near improved country roads, but at least 0.5 mile from any highway.

Naturalness:

Back Country Settings.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Front Country settings for lands along the South and North Brokenback Roads, and along the Hyattville Logging Road.

Primitive and improved routes/trails may exist. Facilities and structures are back country settings where they are rare and isolated.

Remainder of RMZ is Middle Country.

Primitive motorized and non-motorized trails may exist.

Social

Contacts and Group Size:

Back Country.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services present but subtle. Minimum amount necessary to achieve planning objectives.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Hyattville/Logging Road Back Country Byway, Carter Access area, and Wyoming Game and Fish Wildlife Habitat Management Areas.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop facilities to enhance recreation and visitor services for the following areas:

- Trailheads for North and South Brokenback areas, Laddie Creek, and the Hyatteville Logging Road.
- Pull-outs along the Hyatteville Logging Road.
- Improve Salt Lick trail and trailhead.
- Construct additional trailheads and trails.

Designate motorized touring loops within the Brokenback/Logging road RMZ as well as connecting with the Paint Rock RMZ and the Bighorn National Forest, which may include new construction.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Continue to implement current South Broken Back Travel Management Plan.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Consider the acquisition of legal and/or physical access for hunting, fishing, and camping for areas including but not limited to North and South Brokenback roads, Luman Creek Road, Military Creek Road, Dorn Draw Road.

Lengthen public access duration for the North and South Brokenback roads to yearlong access.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Brokenback/Logging Road RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Pursue additional access agreement in the South Brokenback, and North Brokenback areas.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls.

West Slope SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

South Bighorns RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The southern Bighorns are popular for visitors to explore, hike, and especially hunt. Outfitters and tour guides enjoy guiding clients here due to the impressive and exceptional scenic qualities, abundant wildlife, and alternative access points onto 33-Mile Road (Hazelton Road) which exhibits exceptional viewing opportunities of the surrounding mountain landscape, the Cloud Peak Wilderness, the Bighorn Basin, and the Powder River Basin to the east; as well as access into the Hole-in-the-Wall region, the Middle Fork of the Powder River, Casper, and the Bighorn National Forest. The South Bighorns contain a rich history including cattle and sheep operations, mining, and infamous outlaws including Billy the Kid. Currently, impressive coordinated travel management efforts between the BLM, Wyoming State Game and Fish, Wyoming State Land Board, and the Orchard Ranch are improving access into the area as well as improving resource management. BLM manages a campground along the Middle Fork of the Powder River which is a destination area for visitors from within and outside the region. The Middle Fork of the Powder River is managed as a blue ribbon trout fishery, as well as identified as eligible and draft suitable for inclusion into the Wild and Scenic River System. The Buffalo Field Office had also identified the Middle Fork of the Powder River within their jurisdiction as eligible for inclusion into the Wild and Scenic River System. The impressive Deep Creek is another waterway segment identified as eligible and draft suitable for inclusion into the Wild and Scenic Rivers System, as well as a sought-after fishery for exceptional fishing and sightseeing opportunities. This area has received significant managerial support from both the Worland and Buffalo Field Offices in improving access into the area to support a variety of recreational activities such as hunting and fishing.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the South Bighorns RMZ as a zone within the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hiking, hunting, wildlife viewing, nature viewing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country and Middle Country settings.

Activities:

Hunting, fishing, hiking, wildlife viewing, nature viewing, driving for pleasure.

Experiences:

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoying the closeness of family.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Stronger ties with my family and friends.

Greater awareness that the Bighorn Basin is special.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country Settings.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Front Country settings along Rome Hill Road, Dry Farm Road, and Hazelton Road.

On or near improved country roads, but at least 0.5 mile from any highway.

Naturalness:

Back Country Settings.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Middle Country Settings for lands within the Middle Fork of the Powder River Campground.

Natural setting may have moderately dominant alterations but would not draw the attention of the observers on trail and primitive roads within the area.

Facilities and Structures:

Middle Country.

Primitive motorized and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Manage the Middle Fork of the Powder River Campground as Front Country.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Rural settings along Upper Nowood Road.

People seem to be everywhere, but human contact remains intermittent.

Operational

Mechanized Use:

Front/Middle Country.

Front Country along Cherry Creek Road, Dry Farm Road, Spring Creek Road, Rome Hill Road, and Hazelton Road.

2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Middle Country for remainder of RMZ.

4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Hazelton Road Back Country Byway, and the Upper Nowood Travel Management Plan.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop facilities necessary to maximize recreational opportunities at the Middle Fork camping area, the Cherry Creek stock driveway crossing of Deep Creek, Otter Creek.

Develop trailheads for Middle Fork Campground, Mahogany Butte, Deep Creek, Upper Nowood areas, and in other areas on a case-by-case basis.

Administrative

Visual Resource Management:

Class II. Class I within the Deep Creek WSR.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Continue to implement current Upper Nowood Travel Management Plan.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Consider the acquisition of legal and/or physical access for hunting, fishing, boating, and camping. Areas to be considered for acquisition include Otter Creek, Deep Creek, Little Canyon Creek, public land tracts along the Nowood River area, Cherry Creek Road to Hazelton Road, Lysite Mountain, land parcels within Spring Creek, and Spring Creek Road to Rome Hill Road.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the South Bighorns RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO stipulation will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of

damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Maintain cooperative agreement with Double-H Ranch, Wyoming State Land Board, and Wyoming Game and Fish.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Orchard Ranch, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls.

Canyon Creek SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

Canyon Creek area is located within the southern Bighorns just south of Highway 16, which is a very popular highway over the Bighorn Mountains as well as a popular route to Yellowstone National Park. Canyon Creek exhibits exceptionally high scenic qualities from the exposed dolomite and Ten Sleep formation observed through the impressive canyon complemented by the perennial Canyon Creek which supports a blue-ribbon fishery and a healthy riparian zone through the canyon. A subdivision (Canyon Creek Village) is growing south of the area in which residents enjoy exploring, hiking, hunting, and fishing Canyon Creek. Canyon Valley Resort is located within the area which provides recreational opportunities such as guiding services for visitors, big game outfitting, and golfing opportunities. The scenic qualities as well as the wildlife resources establish the foundation for the tourism market in this area. Smilo Road provides access into BLM-administered public lands east of Canyon Creek as well as the Bighorn National Forest.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Canyon Creek SRMA for non-motorized recreationists to engage in hiking, hunting, fishing, nature viewing, and wildlife viewing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country settings.

Activities:

Fishing, hunting, hiking, nature viewing, wildlife viewing.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Develop skills and abilities.

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Enjoying getting some needed physical exercise.

Benefits:

Improved mental well-being.

Improved physical fitness and health maintenance.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back Country.

More than 0.5 mile from any road, but not as distant as 3 miles, and no road is in sight. Smilo Road, the access route to

the Canyon Creek fishing access parking area, and few other two-tracks are observed along the edges of the area.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Trails may exist but do not exceed standard to carry expected use. Facilities and structures are rare and isolated.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Operational

Mechanized Use:

Back Country.

Mountain bikes perhaps other mechanize use but all is non-motorized. Smilo Road will remain open to motorized access into area.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, non-native invasive weed species found within the area, geology, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails, and camp sites.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop looping hiking trails in Canyon Creek, and off of Smilo Road.

Develop trailheads at Canyon Creek and Smilo Road.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Acquire legal and physical access to maximize recreational opportunities.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Canyon Creek SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Pursue a cooperative agreement with the Canyon Creek Estates.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Canyon Creek Estates, Back Country Horsemen, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls.

Red Canyon Creek SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

Red Canyon Creek is located along the slopes of the Owl Creek Mountains outside the community of Thermopolis. This area exhibits high scenic qualities, wildlife resources, and opportunities for primitive-type recreation. A subdivision is growing on the north side of the area, which the adjacent BLM-administered public lands provides for easy-to-access public lands for the local residents. The community of Thermopolis has been marketing its natural recreational resources (most especially its thermal resources located within the very popular Hot Springs State Park), as well as prioritizing primitive-type recreational opportunities such as hiking, and horseback riding within the State Park.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Red Canyon Creek SRMA for motorized and non-motorized recreationists to engage in hunting, hiking, wildlife viewing, and nature viewing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Middle Country settings.

Activities:

Hiking, wildlife viewing, hunting, nature viewing.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Develop skills and abilities.

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Enjoying getting some needed physical exercise.

Benefits:

Improved mental well-being.

Improved physical fitness and health maintenance.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back Country.

Most of the SRMA is more than 0.5 mile from any road, but not as distant as 3 miles, and no road is in sight. Access routes (two-tracks and improved route) exist along the fringe of the SRMA, as well as within parcels of private lands within the area.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Primitive motorized routes and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Operational

Mechanized Use:

Back Country.

Manage the SRMA for mountain bikes perhaps other mechanized use but all is non-motorized. The fringes will be managed for 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use so as to maintain current land uses.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, geology, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails, and camp sites.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop hiking trail to Red Canyon Creek.

Develop trailheads at northern access point.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Red Canyon Creek SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Community of Thermopolis, Hot Springs State Park, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Back Country Horsemen, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls.

The Rivers SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Rivers destination SRMA is made up of BLM-managed public lands on the North and South Forks of the Shoshone River, the main stem of the Shoshone River, and the Clarks Fork of the Yellowstone River. These rivers are very popular for fishing, floating, sightseeing, and hunting and are used by local residents as well as visitors from throughout the nation and from foreign countries. Many visitors traveling to or from Yellowstone National Park spend time in Cody. Several companies offer commercial fishing or floating trips on these rivers. BLM and the Wyoming Game and Fish Department (WGFD) have an agreement which recognizes the high recreational value of various tracts of land along these rivers and provides for cooperative efforts to develop access and manage the sites. Many sites have been developed over the years. Several of the river access sites also serve as trailheads for hiking and horseback access to the Shoshone National Forest. In addition, there are access sites which have been developed by other parties. The North Fork of the Shoshone River and portions of the Shoshone River are considered blue-ribbon trout fisheries.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage The Rivers SRMA for motorized and non-motorized recreation opportunities such as fishing, floating, photography, hunting, hiking, and nature viewing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes in these rural, front, and middle country settings.

Activities:

Fishing, floating, sightseeing, hunting, photography, and nature viewing.

Experiences:

Enjoy going exploring on my/our own.

Enjoy the closeness of family.

Experiencing a greater sense of independence.

Testing endurance.

Enjoy risk taking adventure.

Benefits:

Improved mental well-being.

Closer relationship with the natural world.

Enhanced sense of personal freedom.

Improved physical fitness and health maintenance.

Improved skills for outdoor enjoyment.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Increased local job opportunities.

Increased local tourism revenue.

Improved local economic stability.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural Country.

On or near primary highways, but still within a rural area.

Front Country.

On or near improved county roads, but at least 0.5 mile from any highway.

Middle Country.

On or near 4-wheel drive roads, but at least ½ mile from all improved roads, though they may be in sight.

Naturalness:

Rural, Front, and Middle Country.

Natural setting is culturally modified to the point that it is dominant to the sensitive travel route observer in some locations. In other locations, natural setting may have moderately dominant alterations but would not draw the attention of the observers on trails and primitive roads within the area.

Facilities and Structures:

Rural and Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Front Country setting.

Usually up to 29 encounters/day off travel routes and 30 or more encounters/day en-route.

Group size varies from small to large.

Visitor encounters can be high during peak use periods at the major boat ramps.

Operational

Mechanized Use:

Front Country.

Manage the majority of the river tracts for a Front Country setting where 2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Management Controls and Visitor Services:

Front Country.

On site controls and services are present but harmonize with the natural environment.

Personnel periodic.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs. Use information and interpretation to lessen visitor conflicts, resource impacts, and to increase visitor awareness of wildlife habitat and wetland management.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, boat ramps, hazards, and BLM-administered public land tracts.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Work closely with the gateway communities of Cody, Powell, Thermopolis, Worland, Basin, Lovell, and Greybull, and other partners in the region in marketing and outreach.

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other river segments, institute fee areas, or limit river use.

Management

Continue to provide for experiences and associated facilities with an emphasis on maintaining rural to front country recreation settings.

Continue to provide opportunities that contribute to meeting recreation demand while protecting resources.

In cooperation with WGFD and other partners, provide and maintain visitor facilities, services, signing, and programs.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

Motorized use is limited to designated roads and trails for the North and South Forks of the Shoshone River and the Clarks Fork of the Yellowstone River and is limited to existing roads and trails for the Shoshone River area.

Lands and Realty:

Manage lands within one mile of the Shoshone, Greybull, and Clarks Fork of the Yellowstone Rivers as avoidance areas for construction of above ground power lines. Alternative energy avoidance area for realty actions.

Retain recreational access to the North and South Forks of the Shoshone, the Shoshone, and the Clarks Fork of the Yellowstone Rivers.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Apply NSO to some lands within the Rivers SRMA (WGFD/BLM access areas on the Clarks Fork of the Yellowstone and the North and South Forks of the Shoshone River).

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Communities of Cody, Powell, Lovell, Wyoming Game and Fish, Trout Unlimited, Shoshone Back Country Horsemen, Shoshone National Forest, Park County Recreation Board, and other interested groups.

Other Administration:

On site controls and services are present but harmonize with the natural environment.

McCullough Peaks SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The McCullough Peaks SRMA lies east of Cody and north of U.S. Highway 14/16/20. This scenic, popular area is used by residents of Cody, Powell, Park and Big Horn Counties for uses such as viewing wild horses, sightseeing, hunting, horseback riding, mountain biking, hiking, photography, driving for pleasure (including ATVs and motorcycles), and wildlife viewing. Colorful badlands provide excellent photographic opportunities. Tourists traveling to or from Yellowstone National Park also use the area. Several commercial permittees provide wild horse viewing tours or interpretive tours in the area. The McCullough Peaks WSA lies within the SRMA as does the McCullough Peaks Wild Horse Herd Management Area (HMA).

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the McCullough Peaks SRMA for motorized and non-motorized recreation opportunities such as wildlife and wild horse viewing, nature viewing, horseback riding, hunting, and hiking so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes in these rural, front, middle and back country settings.

Activities:

Viewing wild horses and wildlife, sightseeing, hunting, mountain biking, hiking, photography, driving for pleasure, horseback riding.

Experiences:

Enjoy going exploring on my/our own.

Learn.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoy the closeness of family.

Learning more about things here.

Enjoy having easy access to natural landscapes.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural, Front, Middle, and Back Country.

The eastern and southern boundaries lie along major highways. There are several BLM roads and numerous two-tracks and ATV trails in the SRMA area.

Naturalness:

Front and Middle Country.

Natural setting may have modifications which range from being easily noticed to strongly dominant to observers within the area but not draw the attention of observers on trails and primitive routes.

Back Country.

Natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Rural and Front Country.

Primitive and improved motorized routes and non-motorized trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Middle Country.

Primitive motorized routes and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes and up to 15 encounters/day on travel routes. Usually group size is small.

Middle Country settings.

Usually up to 14 encounters/day off travel routes, and up to 29 encounters/day en route. Usually group size is small. Most of the time, social settings will reflect back country definition.

Operational

Mechanized Use:

Front and Middle Country.

Manage the SRMA for 2-wheel drive and 4-wheel drive vehicles, ATVs, dirt bikes and non-motorized mechanized use.

Management Controls and Visitor Services:

Middle Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Work with partners and other interested publics to determine road and trail maintenance and construction needs, signing needs, and access points.

Work with volunteers to develop and maintain limited facilities, as needed, in the area.

Signs present at key access points and to identify such items as travel routes, the WSA boundary, and the herd area boundary.

Interpretive signs at trailheads and parking areas, where appropriate.

Provide opportunities for the public to view wild horses in the McCullough Peaks HMA.

Administrative

Visual Resource Management:

Class I in the McCullough Peaks WSA and Class II elsewhere in the SRMA.

Comprehensive Trails and Travel Management:

Motorized vehicle use is limited to designated roads and trails in the entire SRMA.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).

No leasing within the McCullough Peaks WSA and NSO elsewhere in the SRMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Prohibit organized SRPs using domestic horses in the McCullough Peaks HMA.

Partners:

City of Cody; Park County Recreation Board; private landowners; local mountain biking, hiking, equestrian, and motorized groups, FOAL, Wyoming State Trails Program, and other interested groups.

Basin Gardens SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Basin Gardens Play Area RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This area is located between the Communities of Greybull and Basin, Wyoming. This area is currently being used for off-road hill climbs used by both ATVs and motorcycles, dominantly motorcycles. Visitors are from within the communities, as well as from outside the area, particularly Billings, Montana. The area is composed of bentonite and mostly devoid of vegetation. The Basin Gardens area provides for exceptional motorized hill climbing opportunities ranging from novice riders to very challenging climbs for the experienced riders. The communities from RMP Scoping opportunities had identified this area as highly desired for motorized recreational opportunities.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Basin Gardens Play Area RMZ for motorized recreationists to engage in ATV, motorbike, and other motorized hill climbing activities so that visitors report realizing a "moderate" level of recreation experience and benefit outcomes in these Front Country settings.

Activities:

Driving for pleasure, motorcycle hill climbing.

Experiences:

Developing skills and abilities.

Enjoying risk-taking adventure.

Being around people I know and enjoy.

Benefits:

Improved physical fitness and health maintenance.

Improved outdoor recreation skills.

Enhanced sense of personal freedom.

More well-rounded childhood development.

Heightened sense of satisfaction with our area as a place to live.

Increased desirability as a place to live or retire.

Improved local economic stability.

Increased local tourism revenue.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Front Country.

The RMZ is surrounded by county roads, and displays tracks from heavy off-road use.

Naturalness:

Front Country.

The area's natural setting from the intense off-road use may have modifications which range from being easily noticed to strongly dominant to observers within the area. These alterations would remain unnoticed or visually subordinate from sensitive travel routes (Highway 16, 20) and use areas.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Middle Country settings.

Usually 7-14 encounters/day off travel routes (e.g., staging areas), and 15-29 encounters/day en route. Usually group size is small to moderate.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Front Country.

On site controls and services are present but harmonize with the natural environment.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, and user safety.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated routes, trailheads, docking stations, designated areas tailored for different degrees of riding experience (novice areas to experienced areas).

Make information available to the surrounding communities.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop areas for novice riders to highly experienced riders.

Develop trailheads containing loading dock stations, kiosks, comfort stations, and adequate parking.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Administrative

Visual Resource Management:

Class III.

Comprehensive Trails and Travel Management:

Motorized use open to off-road/cross-country use.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Basin Gardens Play RMZ.

Prohibit mineral material sales and/or free use permits in the Basin Gardens Play Area.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding communities including but not limited to Greybull, Basin, Manderson, and Worland, Wyoming State Trails Program, surrounding private land owners, NOHVCC, Sagehoppers, and other interested groups and OHV clubs.

Other Administration:

No glass containers and pallets (burning, etc.) allowed.

Noise constraints are enforceable via 43 CFR 8343.1.

Basin Gardens SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Basin Gardens RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Basin Gardens RMZ area was identified through public scoping as a desirable area to enjoy motorized and non-motorized opportunities on BLM-administered public lands that are located close to the communities. Non-motorized opportunities, most especially mountain biking was identified as a highly popular activity. The area is located outside of Greybull, Wyoming. The hills west of the area are very popular for motorized hill climbing activities, as well as some identified mountain biking activities. Management focus for this RMZ will be for non-motorized recreation that would potentially be displaced by the motorized activities that dominate the adjoining RMZ.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Basin Gardens RMZ for motorized and non-motorized recreationists to engage in hiking, hunting, nature viewing, and wildlife viewing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these back to middle country settings.

Activities:

Hiking, hunting, nature viewing, wildlife viewing, mountain biking.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Developing skills and abilities.

Benefits:

Improved physical fitness and health maintenance.

Improved capacity for outdoor physical activity.

Greater community involvement in recreation and other land use decisions.

Heightened sense of satisfaction with our area as a place to live.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Naturalness:

Back Country.

Natural settings may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Trails may exist but do not exceed standard to carry expected use. Facilities and structures are rare and isolated.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services present but subtle. Minimum amount necessary to achieve planning objectives.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, user safety, and designated travel routes.

Provide stewardship information to help preserve the special landscape character.

Make information available to the surrounding communities.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop mountain biking trailheads and mountain biking routes.

Develop trailheads containing loading dock stations, kiosks, comfort stations, and adequate parking.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Administrative

Visual Resource Management:

Class III.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated routes and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Basin Gardens RMZ.

Prohibit mineral material sales and/or free use permits in the Basin Gardens RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding communities including but not limited to Greybull, Basin, Manderson, and Worland, Wyoming State Trails Program, surrounding private land owners, IMBA, Backcountry Horsemen, and other interested groups.

Horse Pasture SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Horse Pasture SRMA is 144 acres of BLM-administered public land nestled along the foothills of Rattlesnake Ridge and surrounded by agriculture uses. This area was once used as an oil and gas staging area, complete with residential buildings. Currently, in coordination with Devon Energy Corporation, the BLM is in the process of reclaiming the area to pre-development landscape. The area is used by the community of Worland for uses such as walking, hunting (bird and big game), and nature viewing.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Objective Statement:

Manage the Horse Pasture SRMA for non-motorized recreationists to engage in photography, hunting, nature viewing, and sightseeing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these middle country settings.

Activities:

Hiking, wildlife viewing, nature viewing, photography, hunting (bird and big game), dog interaction (walking, training, hunting, etc.).

Experiences:

Enjoy going exploring on my/our own.

Learn.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoy the closeness of family.

Learning more about things here.

Enjoy having easy access to natural landscapes.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Front Country.

The south boundary is along an improved road used for agricultural purpose. Some primitive routes exist within the area from past management. Within the SRMA, the desired remoteness setting will be middle country, the edge will, by default, be front country.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Primitive motorized routes and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small. Most of the time, social settings will reflect primitive definition.

Operational

Mechanized Use:

Back Country.

Manage the SRMA for mountain bikes perhaps other mechanized use but all is non-motorized. The fringes will be managed for 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use so as to maintain current land uses.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop interpretive/historic nature trail within the Horse Pasture.

Develop trailhead at western edge of SRMA.

Signs present at key access points, but limited within the SRMA, with exception to nature trail.

Interpretive signs at trailhead, and along trail.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

The area is closed to motorized use.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Horse Pasture SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO stipulation will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Community of Worland, Wyoming State Trails Program, Wyoming Game and Fish, Devon Energy, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls.

Bighorn River SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Bighorn River has been a very popular area known for river recreation such as boating/floating, fishing, hunting, and motor boating. The southern river segments (from Wedding of the Waters to Skelton Bridge) are managed as a blue-ribbon fishery with many Wyoming Game and Fish managed put-in and take-outs. The river contains BLM-administered islands, as well as other scattered tracts of land that provide for river access. Recently, the BLM acquired the Eggert tract which has enhanced user access to the river, as well as extended float trips from boaters putting-in upstream of the tract. From Greybull north to Bighorn Lake, there are three public access locations: Railroad, Greybull Bridge, and ML Dike Ramp. The Bighorn River tracts are currently managed under the Bighorn River Habitat Management Plan and Recreation Area Management Plan (2/23/1989). The HMP/RAMP prescribes management for other resources such as wildlife, vegetation, fisheries, and invasive and noxious weed management.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Bighorn River SRMA for river recreation use for visitors to engage in sightseeing, hunting, photography, fishing, and floating so that they report realizing a "moderate" level of recreation experience and benefit outcomes in back to middle country settings.

Activities:

Sightseeing, hunting, photography, fishing, and floating.

Experiences:

Enjoy going exploring on my/our own.

Enjoy the closeness of family.

Experiencing a greater sense of independence.

Testing endurance.

Enjoy risk taking adventure.

Benefits:

Improved mental well-being.

Closer relationship with the natural world.

Enhanced sense of personal freedom.

Improved physical fitness and health maintenance.

Improved skills for outdoor enjoyment.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Increased local job opportunities.

Increased local tourism revenue.

Improved local economic stability.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Front Country.

The tracts provide for main access points to the Bighorn River, which are on or near improved county roads, but at least 0.5 mile from any highway.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area. Some tracts along the Bighorn River (Durkee Boat Ramp) are Front Country due to adjacent land uses.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Back Country settings.

Most of the Bighorn River Tracts are usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on travel routes. Usually group size is small. Most of the time, social settings will reflect primitive definition.

Visitor encounters can be high during peak use periods at the boat ramp. Encounters diminish the further downstream (north).

Operational

Mechanized Use:

Front Country.

Manage the majority of the river tracts for a Front Country setting where 2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Minimum amount necessary to achieve planning objectives.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs. Use information and interpretation to lessen visitor conflicts, resource impacts, and to increase visitor awareness of wildlife habitat and wetland management.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, boat ramps, hazards, and BLM-administered public land tracts.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Work closely with the gateway communities of Thermopolis, Worland, Basin, Lovell, and Greybull, and other partners in the region in marketing and outreach.

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other river segments, institute fee areas, or limit river use.

Management

Continue to provide for a day use experience and associated facilities with an emphasis on maintaining a middle country recreation setting.

Continue to provide opportunities that contribute to meeting recreation demand while protecting resources.

Provide and maintain visitor facilities, services, signing, and programs.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

Motorized use is limited to designated roads and trails.

Lands and Realty:

ROW exclusion area.

Alternative energy exclusion area for realty actions.

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Bighorn River SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

An NSO stipulation will be applied.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Communities of Thermopolis, Worland, Basin, Lovell, and Greybull, Wyoming Game and Fish, National Park Service, Friends of Bighorn Lake, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls.

Beck Lake Area SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Beck Lake Area SRMA contains about 6,483 acres of BLM-administered public land south of Beck Lake. The area is used by residents of Cody and Park County for uses such as mountain biking, hiking, hunting, driving for pleasure, and wildlife viewing. The City of Cody is seeking a Recreation and Public Purpose (R&PP) lease for land in the northern portion of the SRMA. That land would complement the recreation facilities the City manages at Beck Lake Park. Management of the R&PP area would be governed by agreement(s) and operating plan(s) associated with its R&PP status.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Beck Lake Area community SRMA for non-motorized recreationists to engage in mountain biking, hiking, photography, wildlife viewing, and sightseeing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these rural and front country settings.

Activities:

Mountain biking, hiking, wildlife viewing, nature viewing, photography, hunting, dog interaction (walking, training, hunting, etc.).

Experiences:

Enjoy going exploring on my/our own.

Learn.

Enjoy the closeness of family.

Learning more about things here.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural and Front Country.

A major highway lies along the eastern boundary of the SRMA. Numerous primitive and developed roads lie within the area.

Naturalness:

Rural to Front Country.

Natural setting may have modifications which range from being easily noticed to strongly dominant to observers within the area.

Facilities and Structures:

Rural and Front Country.

Primitive and improved motorized routes and non-motorized trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Middle Country settings.

Usually up to 14 encounters/day off travel routes, and up to 29 encounters/day en route. Usually group size is small.

Operational

Mechanized Use:

Back Country.

Manage the SRMA for mountain bikes perhaps other mechanized use but all is non-motorized.

Management Controls and Visitor Services:

Middle Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with access, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Work with partners and other interested publics to determine trail maintenance and construction needs, signing needs, and access points.

Work with volunteers to develop and maintain limited facilities, as needed, in the area.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailhead.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

The area is closed to motorized use.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).

NSO.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property.

The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

City of Cody, Park County Recreation Board, private landowners, local mountain biking and hiking groups, Wyoming State Trails Program, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls.

Newton Lake Ridge SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Newton Lake Ridge SRMA contains about 1,997 acres of BLM-administered public land north of Newton Lakes. The area is used by residents of Cody and Park County for uses such as mountain biking, hiking, hunting, and wildlife viewing.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Newton Lake Ridge SRMA for non-motorized recreationists to engage in mountain biking, hiking, photography, hunting, wildlife viewing, and sightseeing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these rural, front, and middle country settings.

Activities:

Mountain biking, hiking, wildlife viewing, nature viewing, photography, hunting.

Experiences:

Enjoy going exploring on my/our own.

Learn.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoy the closeness of family.

Learning more about things here.

Enjoy having easy access to natural landscapes.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural, Front, and Middle Country.

The northeastern boundary is along a major highway. Several short, primitive routes occur within the SRMA.

Naturalness:

Front and Middle Country.

Natural setting may have modifications which range from being easily noticed to strongly dominant to observers within

the area but not draw the attention of observers on trails and primitive routes.

Facilities and Structures:

Rural and Front Country.

Primitive and improved motorized routes and non-motorized trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small. Most of the time, social settings will reflect primitive definition.

Operational

Mechanized Use:

Back Country.

Manage the SRMA for mountain bikes perhaps other mechanized use but all is non-motorized.

Management Controls and Visitor Services:

Middle Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Work with partners and other interested publics to determine trail maintenance and construction needs, signing needs, and access points.

Work with volunteers to develop and maintain limited facilities, as needed, in the area.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailhead.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

The area is closed to motorized use.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

NSO.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

City of Cody, Park County Recreation Board, private landowners, local mountain biking and hiking groups, Wyoming State Trails Program, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls.

Worland Caves ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

This ERMA is within the entire Bighorn Basin Planning Area and will guide recreation management for the known and for newly discovered cave and karst systems for both the Worland and the Cody Field Offices. A cave is defined as any naturally occurring void, cavity, recess, or system of interconnected passages occurring beneath the surface of the Earth or within a cliff or ledge large enough to permit an individual to enter, whether or not the entrance is naturally formed or man. In the planning area, solution caves are, by far the most common type of cave. They are found in limestone and dolomite strata and are formed by the dissolving of rock along and adjacent to joints (fractures), faults, and bedding planes in the rock. Caves were often used by Native Americans as temporary living quarters, storage areas, shelter, and game traps. Cave resources are fragile due to their association with other resources such as groundwater hydrologic systems and biological communities. They may also be considered non-renewable resources due to paleontological and archaeological deposits, speleothems (formations inside caves), and biological resources.

The known cave and karst resources throughout the planning area are very popular for recreational activities. Spirit Mountain, in the Cody Field Office, is an example of observed high recreation use. Caves provide for very unique opportunities and experiences and nearly every caving experience results in desired beneficial outcomes for the visitor. Managing the cave resources as a separate ERMA will enable to focus more recreation management to be more proactive in adequately managing the cave resources, as well as providing for desired cave and karst activities, experiences, and beneficial outcomes.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Guidelines to be considered in addressing resource demands include, but are not limited to: a regulation of surface disturbance in regard to future renewable energy developments, the avoidance of future ROW actions through any cave areas deemed to be significant, attempts to acquire resources through exchange, implementing fire suppression restrictions and geophysical exploration restrictions to comply with OHV restrictions, and management under Visual Resource Management (VRM) Class II, III, and IV guidelines as identified for each cave unit. Cave resources could be monitored for degradation. Managers may evaluate the desirability and practicality of various monitoring strategies including, but are not limited to, photo monitoring, water quality monitoring, and a periodic census of indicator species. Management policies and guidelines should be established for cave resources specific to the planning area identifying how to manage the land around the resources including policies related to travel management, gates or barricades, erosion, appropriate recreation use, and resource protection.

MANAGEMENT ACTIONS & ALLOWABLE USE DECISIONS

Identify management action and allowable use decisions for R&VS and other programs necessary to: facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts; and, address the type(s), activities, and locations where special recreation permits would or would not be issued.

Physical

Remoteness:

Maintain primitive and pristine environment in the cave and karst systems.

Naturalness:

Manage the natural setting so that they may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Facilities and structures are extremely rare and developed only in occasions where necessary to protect the cave and karst environment.

Social

Contacts and Group Size:

Manage for a season average of fewer than 6 encounters/day on and off travel routes.

Operational

Mechanized Use:

Manage for both non-motorized and motorized travel above ground over cave and karst passages.

Within cave and karst passages, foot traffic only.

Management Controls and Visitor Services:

On site controls and services present at key access points, but subtle.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM monitoring presence during spike caving use, usually during the summer.

Minimum amount of BLM facilitating outputs necessary to achieve planning objectives.

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop educational signs at trailheads and parking areas on user ethics, geology, and wilderness.

Provide stewardship information to help preserve the special landscape character.

Make available for special outdoor educational programs such as Boy Scouts, CORE, and Take it Outside!

Monitoring

Vehicle counters with surveys and observation.

Visitor registers and cave register to observe crowding issues.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered.

Management

Cave and Karst management will be guided from the Worland Caves Management Plan.

Develop primitive trailheads at key access points.

Install kiosks and signs at trailheads and parking areas.

Signs present at key access points, but very limited within the ERMA.

Administrative

Visual Resource Management:

Manage consistent with underlying resource VRM prescriptions.

Comprehensive Trails and Travel Management:

Motorized use is limited to designated roads and trails in areas over important caves or cave passages.

Lands and Realty:

Manage Lands and Realty actions consistent with underlying management prescriptions.

Minerals, Oil and Gas Leasing, and Other Surface-Disturbing Activities:

Cave and karst areas are closed to mineral material disposals, withdrawn from locatable entry, and closed to mineral leasing. These same restrictions apply to important caves or cave passages and karst resources as they are identified.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Including, but not limited to: Wyoming State Land Board, Wyoming Game and Fish, Back Country Horsemen, Sierra Club, Wyoming Wilderness Association, NOLS, NSS, and local grotto clubs.

Other Administration:

Limit the use of signing or other administrative controls.

ALTERNATIVE C

Rattlesnake Ridge SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This area is located approximately 4 miles east of Worland, Wyoming. This area is currently being used for off-road hill climbs used by both ATVs and motorcycles, dominantly motorcycles; as well as oil and gas extraction activities, ROW projects including radio signal towers, and grazing. Most of the visitors are from within the Worland area, as well as from other areas outside of the Worland area, most especially from Thermopolis, Wyoming. The area is heavily used by motorized use enthusiasts, and is mostly devoid of vegetation. The Rattlesnake Ridge area provides for exceptional motorized hill climbing opportunities ranging from novice riders to very challenging climbs for the experienced riders. In addition, the surrounding communities had identified this area as highly desirable for motorized recreational opportunities during the RMP Scoping meetings.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Rattlesnake Ridge SRMA with a community recreation strategy for motorized recreationists to engage in ATV, motorbike, and other motorized hill climbing activities so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes in these front to rural settings.

Activities:

Driving for pleasure, motorcycle hill climbing.

Experiences:

Developing skills and abilities.

Enjoying risk-taking adventure.

Being around people I know and enjoy.

Benefits:

Improved physical fitness and health maintenance.

Improved outdoor recreation skills.

Enhanced sense of personal freedom.

More well-rounded childhood development.

Heightened sense of satisfaction with our area as a place to live.

Increased desirability as a place to live or retire.

Improved local economic stability.

Increased local tourism revenue.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural Country.

The RMZ is surrounded by county roads, and displays tracks from heavy off-road use. The area is on or near primary highways, but still within a rural area.

Naturalness:

Rural Country.

The area's natural setting from the intense off-road use as well as the industrial activities is culturally modified to the point that it is dominant to the sensitive travel route observer, Pedestrians or other slow moving observers are constantly within view of culturally changed landscape.

Facilities and Structures:

Rural Country.

Paved, improved, and/or primitive roads/highways dominate the landscape. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Middle Country settings.

Usually 7-14 encounters/day off travel routes (e.g., staging areas), and 15-29 encounters/day en route. Usually group size is small to moderate.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Rural Country.

On site controls and services are obvious and numerous. Largely harmonize with the man-made environment (dominantly from the oil and gas extraction activities and the ROW projects).

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, and user safety.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated routes, trailheads, docking stations, designated areas tailored for different degrees of riding experience (novice areas to experienced areas).

Make information available to the surrounding communities.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop areas for novice riders to highly experienced riders.

Develop trailheads containing loading dock stations, kiosks, comfort stations, and adequate parking.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Administrative

Visual Resource Management:

Class IV.

Comprehensive Trails and Travel Management:

Motorized use open to off-road/cross-country use.

Lands and Realty:

Open to all ROW (including alternative energy realty actions).

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Open to oil and gas, to mineral entry and, other mineral leasing subject to standard protection measures.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding communities including but not limited to Worland, Thermopolis, Manderson, Basin, and Greybull; Wyoming State Trails Program, surrounding land users and industry, NOHVCC, Sagehoppers, and other interested groups and OHV clubs.

Other Administration:

No glass containers and pallets (burning, etc.) allowed.

Noise constraints are enforceable via 43 CFR 8343.1.

Basin Gardens Play Area ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

This area is located between the Communities of Greybull and Basin, Wyoming. This area is currently being used for off-road hill climbs used by both ATVs and motorcycles, dominantly motorcycles. Visitors are from within the communities, as well as from outside the area, particularly Billings, Montana. The area is composed of bentonite and mostly devoid of vegetation. The Basin Gardens area provides for exceptional motorized hill climbing opportunities ranging from novice riders to very challenging climbs for the experienced riders. The communities from RMP Scoping opportunities had identified this area as highly desired for motorized recreational opportunities.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Manage the Basin Gardens Play Area as a separate ERMA for motorized recreationists to engage in ATV, motorbike, and other motorized hill climbing activities so as to address public health and safety, use and user conflicts, and resource protection in these Front Country settings.

MANAGEMENT ACTIONS & ALLOWABLE USE DECISIONS

Identify management action and allowable use decisions for R&VS and other programs necessary to: facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts; and, address the type(s), activities, and locations where special recreation permits would or would not be issued.

Physical

Remoteness:

Front Country.

The RMZ is surrounded by county roads, and displays tracks from heavy off-road use.

Naturalness:

Front Country.

The area's natural setting from the intense off-road use may have modifications which range from being easily noticed to strongly dominant to observers within the area. These alterations would remain unnoticed or visually subordinate from sensitive travel routes (Highway 16, 20) and use areas.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Middle Country settings.

Usually 7-14 encounters/day off travel routes (e.g., staging areas), and 15-29 encounters/day en route. Usually group size is small to moderate.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Front Country.

On site controls and services are present but harmonize with the natural environment.

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, and user safety.

Provide for a map with designated routes, trailheads, docking stations, designated areas tailored for different degrees of riding experience (novice areas to experienced areas).

Make information available to the surrounding communities.

Make available for special educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other OHV areas/ trails.

Management

Develop areas for novice riders to highly experienced riders.

Develop trailheads containing loading dock stations, kiosks, comfort stations, and adequate parking.

Signs present at key access points, but limited within the ERMA.

User ethics and informational signs at trailheads and parking areas.

Administrative

Visual Resource Management:

Manage visual resource objectives consistent with adjacent resource program prescriptions. Manage surface-disturbing activities so as to minimize visual contrasts.

Comprehensive Trails and Travel Management:

Motorized use open to off-road/cross-country use.

Lands and Realty:

Open the Basin Gardens Play area to new ROWs.

Minerals:

Pursue withdraw from appropriation under the mining laws for lands within the Basin Gardens Play Area ERMA.

Prohibit mineral material sales and/or free use permits in the Basin Gardens Play Area.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).

Open the Basin Gardens Play area to oil and gas and other mineral leasing subject to standard protection measures.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding communities including but not limited to Greybull, Basin, Manderson, and Worland, Wyoming State Trails Program, surrounding private land owners, NOHVCC, Sagehoppers, and other interested groups and OHV clubs.

Other Administration:

No glass containers and pallets (burning, etc.) allowed.

Noise constraints are enforceable via 43 CFR 8343.1.

Basin Gardens ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

The Basin Gardens RMZ area was identified through public scoping as a desirable area to enjoy motorized and non-motorized opportunities on BLM-administered public lands that are located close to the communities. Non-motorized opportunities, most especially mountain biking was identified as a highly popular activity. The area is located outside of Greybull, Wyoming. The hills west of the area is very popular for motorized hill climbing activities, as well as some identified mountain biking activities. Management focus for this RMZ will be for non-motorized recreation that would potentially be displaced by the motorized activities that dominate the adjoining RMZ.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Manage the Basin Gardens RMZ for motorized and non-motorized recreationists to engage in hiking, hunting, nature viewing, and wildlife viewing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these back to middle country settings.

MANAGEMENT ACTIONS & ALLOWABLE USE DECISIONS

Identify management action and allowable use decisions for R&VS and other programs necessary to: facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts; and, address the type(s), activities, and locations where special recreation permits would or would not be issued.

Physical

Remoteness:

Middle Country.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Naturalness:

Back Country.

Natural settings may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Trails may exist but do not exceed standard to carry expected use. Facilities and structures are rare and isolated.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services present but subtle. Minimum amount necessary to achieve planning objectives.

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, and user safety.

Provide stewardship information to help preserve the special landscape character.

Make information available to the surrounding communities.

Make available for special educational programs such as CORE and Take it Outside!

Monitoring

Monitor visitor use, visitor safety, and resource conditions through; BLM staff, volunteers and recreation-tourism partnerships (e.g., towns, outfitters, recreation organizations, etc.).

Vehicle counters with routine surveys, on-site patrols, and observation.

Management

Develop mountain biking trailheads and mountain biking routes.

Develop trailheads containing loading dock stations, kiosks, comfort stations, and adequate parking.

Signs present at key access points, but limited within the ERMA.

Interpretive signs at trailheads and parking areas.

Administrative

Visual Resource Management:

Manage visual resource objectives consistent with adjacent resource program prescriptions. Manage surface-disturbing activities so as to minimize the degree of visual contrast.

Comprehensive Trails and Travel Management:

Motorized use is limited to existing roads and trails.

Lands and Realty:

Open the Basin Gardens area to new ROWs.

Open the Basin Gardens area to alternative energy realty actions (i.e., wind, solar, etc.).

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Basin Gardens area.

Authorize mineral material sales and/or free use permits in the Basin Gardens area.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife).

Open the Basin Gardens Creek area to oil and gas and other mineral leasing subject to standard protection measures.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding communities including but not limited to Greybull, Basin, Manderson, and Worland, Wyoming State Trails Program, surrounding private land owners, IMBA, Backcountry Horsemen, and other interested groups.

ALTERNATIVES D AND F

Absaroka Mountain Foothills SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This SRMA is necessary to accommodate back to middle country recreational experiences in a recreational resource rich environment. The Absaroka Mountain Foothills area is a very popular destination for both local residents and out-or-region visitors due to the openness, and naturalness of the area. The area is abundant in a wide variety of wildlife including grizzly bears, major access into the Shoshone National Forest and the Washakie Wilderness, and dramatic scenery.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Absaroka Mountain Foothills as an undeveloped SRMA for non-motorized recreationists to engage in hiking, hunting, wildlife viewing, and nature viewing so that they realize a "moderate" level of the targeted experience and benefit outcomes listed below in these Back Country and Middle Country settings.

Activities:

Wildlife viewing, nature viewing, hiking, hunting, horseback riding.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Feeling good about solitude, being isolated, and independent.

Learning more about things here.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Improved mental well-being and physical fitness and health maintenance.

Heightened sense of satisfaction with our area as a place to live.

Positive contributions to local-regional economic stability.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back Country.

Implement/maintain road closures to maintain back country settings.

Naturalness:

Back Country.

Manage for back country and middle country settings where natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Allow for primitive motorized routes and non-motorized trails to exist. Facilities and structures are rare and often accessible via unimproved routes. Horse and hiking trailheads will be constructed at major key access points.

Social

Contacts and Group size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Back to Middle Country.

Main access roads are crowned and ditched gravel roads accessed by 2-wheel and 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use. Roads within the LU Sheep Company area are closed, but available for public access during hunting season. Trails for non-motorized use will be constructed so as to access public lands.

Management Controls and Visitor Services:

Middle Country.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails, and seasonal closures within the LU Sheep Company area.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the LU Ranch cooperative agreement.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

Visitor surveys will be available in register boxes at trailheads.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Develop trailheads for foot and horse travel. Potential locations will include the Blue Creek Trail, and sites along the South fork of the Owl Creek. Additional sites may be identified throughout the life of the plan.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Absaroka Mountain Foothills SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

For lands within the Absaroka Front Management Area, oil and gas leasing is subject to those management actions.

Outside of the Absaroka Front Management Area, allow surface-disturbing activities in the Absaroka Mountain Foothills SRMA such as geophysical exploration, salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.

A CSU will be stipulated within the SRMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Maintain cooperative agreement with Wyoming State Land Board, Wyoming State Game and Fish, and LU Sheep Company.

Seek other agreements and partnerships as appropriate.

Partners:

Surrounding private land owners, Shoshone National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, Rocky Mountain Elk Foundation, LU Sheep Company, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Pack goats are prohibited.

Absaroka ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

This separate ERMA is necessary to accommodate back to middle country recreational experiences in a recreational resource rich environment. The Absaroka Mountain Foothills area is a very popular destination for both local residents and out-or-region visitors due to the openness, and naturalness of the area. The area is abundant in a wide variety of wildlife including grizzly bears, major access into the Shoshone National Forest and the Washakie Wilderness, and dramatic scenery. However, despite the natural recreational resources, access is very challenging due to the scattered parcels of BLM-administered public land which invites user conflicts.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Manage the Absaroka Foothills as an ERMA for non-motorized recreationists to engage in hiking, hunting, wildlife viewing, and nature viewing these Back Country and Middle Country settings. Recreation management will focus on addressing resource protection, minimizing use and user conflicts, and public health and safety.

MANAGEMENT ACTIONS & ALLOWABLE USE DECISIONS

Identify management action and allowable use decisions for R&VS and other programs necessary to: facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts; and, address the type(s), activities, and locations where special recreation permits would or would not be issued.

Physical

Remoteness:

Middle Country.

Implement a Travel Management Plan so as to maintain the back to middle country settings. Maintain Back Country settings within the South Owl Creek Canyon.

Naturalness:

Back Country.

Manage for back country settings where natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Middle Country.

Allow for primitive motorized routes and non-motorized trails to exist. Facilities and structures are rare and often accessible via unimproved routes. Horse and hiking trailheads will be constructed at major key access points. Maintain primitive setting within the South Owl Creek canyons where trails may exist but do not exceed standard to carry expected use. Facilities and structures are extremely rare.

Social

Contacts and Group size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Back to Middle Country.

Main access roads are crowned and ditched gravel roads accessed by 2-wheel and 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use. Trails for non-motorized use will be constructed so as to access public lands.

Management Controls and Visitor Services:

Middle Country.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails.

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Use information and interpretation to lessen visitor conflicts, resource impacts, and to increase visitor awareness of wildlife habitat and wetland management.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, easements, trailheads, and surface ownership.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Monitor visitor use, visitor safety, and resource conditions through; BLM staff, volunteers and recreation-tourism partnerships (e.g., towns, outfitters, recreation organizations, etc.).

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present at key access points, but limited within the ERMA.

Interpretive signs at trailheads and parking areas.

Develop recreational facilities so as to address resource protection, use and user conflicts, and public health and safety.

Administrative

Visual Resource Management:

Manage VRM consistent with other resource objectives.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Absaroka ERMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

For lands within the Absaroka Front Management Area, oil and gas leasing is subject to those management actions.

Outside of the Absaroka Front Management Area, allow surface-disturbing activities in the Absaroka ERMA such as geophysical exploration, salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.

A CSU will be stipulated within the ERMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding private land owners, Shoshone National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups and stakeholders.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Pack goats are prohibited.

Bighorn River SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Bighorn River is a popular area known for river recreation such as boating/floating, fishing, hunting, and motor boating. The river contains scattered tracts of BLM-administered lands that provide for river access. From Greybull north to Bighorn Lake, there are three public access locations: Railroad, Greybull Bridge, and ML Dike Ramp. There may be opportunities in the future to provide additional access. The Bighorn River tracts are currently managed under the Bighorn River Habitat Management Plan and Recreation Area Management Plan (2/23/1989). The HMP/RAMP prescribes management for other resources such as wildlife, vegetation, fisheries, and invasive and noxious weed management.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Bighorn River SRMA for river recreation use for visitors to engage in sightseeing, hunting, photography, fishing, and floating so that they report realizing a "moderate" level of recreation experience and benefit outcomes in back, middle, and front country settings.

Activities:

Sightseeing, hunting, photography, fishing, and floating.

Experiences:

Enjoy going exploring on my/our own.

Enjoy the closeness of family.

Experiencing a greater sense of independence.

Testing endurance.

Enjoy risk taking adventure.

Benefits:

Improved mental well-being.

Closer relationship with the natural world.

Enhanced sense of personal freedom.

Improved physical fitness and health maintenance.

Improved skills for outdoor enjoyment.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Increased local job opportunities.

Increased local tourism revenue.

Improved local economic stability.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Front Country.

The tracts provide for main access points to the Bighorn River, which are on or near improved county roads, but at least 0.5 mile from any highway.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area. Some tracts along the Bighorn River are Front or Middle Country due to adjacent land uses.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Back Country settings.

Most of the Bighorn River Tracts are usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on travel routes. Usually group size is small. Most of the time, social settings will reflect primitive definition.

Visitor encounters can be high during peak use periods at the boat ramps. Encounters diminish the further downstream (north).

Operational

Mechanized Use:

Front Country.

Manage the majority of the river tracts for a Front Country setting where 2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Minimum amount necessary to achieve planning objectives.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs. Use information and interpretation to lessen visitor conflicts, resource impacts, and to increase visitor awareness of wildlife habitat and wetland management.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, boat ramps, hazards, and BLM-administered public land tracts.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Work closely with the gateway communities of Thermopolis, Worland, Basin, Lovell, and Greybull, and other partners in the region in marketing and outreach.

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other

river segments, institute fee areas, or limit river use.

Management

Continue to provide for a day use experience and associated facilities with an emphasis on maintaining a middle country recreation setting.

Continue to provide opportunities that contribute to meeting recreation demand while protecting resources.

Provide and maintain visitor facilities, services, signing, and programs.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

Motorized use is limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Bighorn River SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Avoid surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.

An NSO stipulation will be applied to the SRMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Communities of Thermopolis, Worland, Basin, Lovell, and Greybull, Wyoming Game and Fish, National Park Service, Friends of Bighorn Lake, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Bighorn River ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

The Bighorn River has been a very popular area known for river recreation such as boating/floating, diverse fishery, hunting, and even motor boating. The southern river segments (from Wedding of the Waters to Skelton Bridge) are managed as a blue-ribbon fishery with many Wyoming Game and Fish managed put-in and take-outs. The river contains BLM-administered islands, as well as other scattered tracts of land that provide for river access. Recently, the BLM acquired the Eggert tract which has enhanced user access to the river, as well as extend float trips from boaters putting-in upstream of the tract. The Bighorn River tracts are currently managed under the Bighorn River Habitat Management Plan and Recreation Area Management Plan (2/23/1989). The HMP/RAMP prescribes management from other resources such as wildlife, vegetation, fisheries, and invasive and noxious weed management. Most river access is via the Wyoming Game and Fish access points. Readily accessible BLM-administered public lands are located outside of the "blue-ribbon" section of the Bighorn River, and the tracts are scattered. Primary objectives for these tracts are to enhance wildlife habitat.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Manage access to the Bighorn River ERMA for river recreation use for visitors to engage in sightseeing, hunting, photography, fishing, and floating. Manage recreation use for enhanced recreational opportunities, as well as to manage for resource protection, and to minimize use and user conflicts, and public health and safety consistent with the HMP/RAMP.

MANAGEMENT ACTIONS & ALLOWABLE USE DECISIONS

Identify management action and allowable use decisions for R&VS and other programs necessary to: facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts; and, address the type(s), activities, and locations where special recreation permits would or would not be issued.

Physical

Remoteness:

Front Country.

The tracts provide for main access points to the Bighorn River, which are on or near improved county roads, but at least 0.5 mile from any highway.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area. Some tracts along the Bighorn River (Durkee Boat Ramp) are Front Country due to adjacent land uses.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Back Country settings.

Most of the Bighorn River Tracts are usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on travel routes. Usually group size is small. Most of the time, social settings will reflect primitive definition.

Visitor encounters can be high during peak use periods at the boat ramps located in the southern sections of the Bighorn River (Wedding of the Waters to Skelton Bridge). Encounters diminish the further downstream (north).

Operational

Mechanized Use:

Front Country.

Manage the majority of the river tracts for a Front Country setting where 2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Minimum amount necessary to achieve planning objectives.

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs. Use information and interpretation to lessen visitor conflicts, resource impacts, and to increase visitor awareness of wildlife habitat and wetland management.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, boat ramps, hazards, and BLM-administered public land tracts.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Work closely with the gateway communities of Thermopolis, Worland, Basin, and Greybull, and other partners in the region in marketing and outreach.

Monitoring

Vehicle counters at access points with routine surveys and observation.

Solicit partnerships and cooperative agreements to: Monitor recreation setting condition through on-site patrols. Informal visitor surveys and formal focus groups as funding allow.

Visitor reports of crowding. If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other river segments, institute fee areas, or limit river use.

Management

Continue to provide for a day use experience and associated facilities with an emphasis on maintaining a middle country recreation setting.

Continue to provide opportunities that contribute to meeting recreation demand while protecting resources.

Provide and maintain visitor facilities, services, signing, and programs.

Administrative

Visual Resource Management:

Manage visual resources consistent with adjacent resource prescriptions.

Comprehensive Trails and Travel Management:

Manage trails and travel management consistent with adjacent resource prescriptions.

Lands and Realty:

Lands within the Bighorn River ERMA are ROW avoidance areas. ROWs are collocated whenever possible.

The Bighorn River ERMA is an alternative energy avoidance area for realty actions (i.e., wind, solar, etc.).

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Bighorn River ERMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Apply an NSO restriction on lands within the Bighorn River ERMA.

Avoid surface-disturbing activities within the Bighorn River ERMA such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of

recreation facilities or wildlife habitat) on a case-by-case basis.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Communities of Thermopolis, Worland, Basin, and Greybull, Wyoming Game and Fish, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Badlands SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Tour de Badlands RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is contained within the Badlands SRMA, which is popular for motorized touring to explore the scenic desert basin. Natural recreational resources within the SRMA contain wildlife, open spaces, wild horses, and an erratic landscape which offers outstanding scenic quality.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Tour de Badlands RMZ for motorized recreationists to engage in motorized sightseeing touring, hunting, wildlife viewing, and nature viewing so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes in these Middle Country and Front Country settings.

Activities:

Driving for pleasure, hunting, wildlife viewing, nature viewing, sightseeing.

Experiences:

Enjoy having easy access to natural landscapes.

Enjoy having access to close-to-home outdoor amenities.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Benefits:

Improved mental well-being.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Positive contributions to local-regional economic stability.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle/Front Country.

On or near 4-wheeled drive and improved roads. Maintain main access roads through the area for 2-wheel and 4-wheel drive access into the Badlands area.

Naturalness:

Middle Country.

Natural setting may have moderately dominant alterations but would not draw the attention of the observers on trails and primitive roads within the area.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Front Country.

2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use. On site controls and services present but subtle.

Management Controls and Visitor Services:

Middle Country.

On site controls and services present but subtle. Signs present at key access points. Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM monitoring presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, wildlife, and wild horses resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the wild horse program, and surrounding WSAs.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Maintain a strong sign program so as to keep the access routes within the RMZ well marked.

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop one or more scenic interpretive sites and driving loops for motorized and mechanized travel in the Tour de Badlands area within the Badlands SRMA to highlight the area's scenic values. These could involve the Fifteenmile Creek and Dorsey Creek roads and The Murphy Draw Road with overlooks at the Painted Canyon of Elk Creek and at Bobcat Draw.

Identify routes to close and reclaim, construct new routes, and identify routes to remain open.

Develop trailheads for ATV unloading stations.

Interpretive signs at trailheads and parking areas.

Additional sites may be identified throughout the life of the plan.

Signs present at key access points, but limited within the RMZ.

Administrative

Visual Resource Management:

Manage VRM consistent with other resource management objectives.

Comprehensive Trails and Travel Management:

Limited to designated roads and trails.

Lands and Realty:

ROW exclusion area.

Alternative energy avoidance area for realty actions.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Tour de Badlands area.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Review mineral leases on a case-by-case basis and apply mitigation through activity level planning.

Allow surface-disturbing activities in the Tour de Badlands RMZ such as geophysical exploration (except casual use), saleable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Private landowners, Wyoming Department of Transportation, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, IMBA, community ATV organizations, and other clubs/organizations.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Badlands SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Wild Badlands RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is within the Badlands SRMA. This RMZ is rich in natural recreational resources such as erratic and dramatic landscapes, management to maintain the primitive to semi-primitive setting characteristics, wilderness characteristics, three WSAs, wildlife, and wild horses which caters to primitive and semi-primitive recreational experiences.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Wild Badlands RMZ exclusively for non-motorized recreationists to engage in hiking, hunting, wildlife viewing, and nature viewing so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country settings.

Activities:

Hiking, hunting, wildlife viewing, nature viewing, sightseeing.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Feeling good about solitude, being isolated, and independent.

Enjoy having easy access to natural landscapes.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Closer relationship with the natural world.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back Country.

Maintain road closures to maintain back country settings.

Naturalness:

Back Country.

Manage the natural setting so that they may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Primitive.

Trails may exist but do not exceed standard to carry expected use. Facilities and structures are extremely rare and

developed only in occasions where necessary to protect the back country settings.

Social

Contacts and Group Size:

Back Country.

Manage for a season average of fewer than 6 encounters/day on and off travel routes.

Operational

Mechanized Use:

Primitive.

Non-motorized and non-mechanized (foot and horseback) travel only.

Management Controls and Visitor Services:

Back Country.

On site controls and services present at key access points, but subtle.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM monitoring presence during hunting season.

Minimum amount of BLM facilitating outputs necessary to achieve planning objectives.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop educational signs at trailheads and parking areas on user ethics, geology, and wilderness.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with WSAs, access points, information regarding the wilderness program, and outdoor ethics messages such as Leave No Trace!

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with surveys and observation along perimeter of WSAs.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Identify routes to close and reclaim. Modify identified routes into non-motorized and non-mechanized trails.

Develop primitive trailheads at key access points.

Install kiosks and signs at trailheads and parking areas.

Signs present at key access points, but very limited within the RMZ.

Administrative

Visual Resource Management:

Class I.

Comprehensive Trails and Travel Management:

Closed to motorized and non-mechanized travel.

Lands and Realty:

ROW avoidance area.

Alternative energy exclusion area for realty actions.

Minerals, Oil and Gas Leasing, and Other Surface-Disturbing Activities:

Mineral uses, Oil and Gas and Geothermal leasing, exploration, and development will be guided by the Interim

Management Policy for Lands under Wilderness Review (IMP).

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Including, but not limited to: Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, Sierra Club, Wyoming Wilderness Association.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Badlands SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Tatman Mountain RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is within the Badlands SRMA. Much like the Wild Badlands RMZ, this RMZ is rich in natural recreational resources such as erratic and dramatic landscapes, dominant mountainous environment, and current management to maintain the primitive to semi-primitive setting characteristics, wildlife, and wild horses which caters to primitive and semi-primitive recreational experiences. The RMZ is located to the west of Sheep Mountain WSA and provides for exceptional wildlife resource opportunities, access, motorized and primitive forms of touring, and high scenic quality.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Tatman Mountain RMZ for non-motorized recreationists to engage in muscle-powered activities such as hiking, hunting, mountain biking, and horseback riding so that affected community residents report realizing a "moderate" level of recreation experience and benefit outcomes in these Back country to Middle country settings.

Activities:

Hiking, hunting, mountain biking, wildlife viewing, nature viewing, sightseeing.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Feeling good about solitude, being isolated, and independent.

Enjoy having easy access to natural landscapes.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Closer relationship with the natural world.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Naturalness:

Back Country.

Manage the natural setting so that they may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Trails may exist but do not exceed standard to carry expected use.

Facilities and structures are extremely rare and developed only in occasions where necessary to protect the back country settings.

Social

Contacts and Group Size:

Back Country.

Manage for a season average of fewer than 6 encounters/day on and off travel routes. In issuing SRPs, allow for a group size less than 5 participants.

Operational

Mechanized Use:

Middle/Back Country.

Middle country for the access routes acting as main portals into the RMZ. Manage for back country settings (non-motorized travel) outside of those corridors.

Management Controls and Visitor Services:

Middle Country.

On site controls and services present at key access points, but subtle.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM monitoring presence during hunting season.

Minimum amount of BLM facilitating outputs necessary to achieve planning objectives.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop educational signs at trailheads and parking areas on user ethics, geology, wild horses, and wilderness characteristics.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated routes and trails, key access points, private lands, and outdoor ethics messages such as Tread Lightly and Leave No Trace!

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Identify routes to maintain as open to motorized use. Reclaim routes identified as closed. Maintain open routes so as to sustain motorized use. Modify identified closed routes into non-motorized and mechanized trails for muscle-powered recreational activities.

Develop primitive trailheads at key access points.

Install kiosks and signs at trailheads and parking areas.

Signs present at key access points, but very limited within the RMZ.

Administrative

Visual Resource Management:

Manage VRM consistent with other resource management objectives.

Comprehensive Trails and Travel Management:

Motorized use is limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Acquire legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Tatman Mountain RMZ.

Minerals, Oil and Gas Leasing, and Other Surface-Disturbing Activities:

A CSU is stipulated within this zone.

Allow surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) on a case-by-case basis.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Including, but not limited to: Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Back Country Horsemen, Sierra Club, Wyoming Wilderness Association.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

West Slope of the Bighorns SRMA – Worland Field Office

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Canyons RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This RMZ is contained within the West Slope of the Bighorns SRMA. The Canyon RMZ attracts visitors from both the surrounding communities to outside the region. The Medicine Lodge State Park attracts many visitors who enjoy exploring the slope of the Bighorns. Such resources include the Medicine Lodge and Dry Medicine Lodge canyons, Paint Rock Canyon, Trapper Creek and White Creek canyons, Spanish Point ACEC, Red Gulch Dinosaur Tracksite and the Red Gulch Dinosaur Tracksite ACEC, the Hyattville Logging Road, the Red Gulch/Alkali Road Backcountry Byway, prominent wildlife habitat management areas, abundant wildlife and fishing, significant cave and karst resources, highly rated scenic quality and access into the Bighorn National Forest. These resources provide for excellent primitive non-motorized recreation to motorized (touring) recreation.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Canyons RMZ as a zone within the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hiking, wildlife viewing, hunting, fishing, nature viewing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes listed below in these Back Country and Middle Country settings.

Activities:

Hunting, wildlife viewing, fishing, nature viewing, hiking, photography, sightseeing, spelunking.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Developing skills and abilities.

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Enjoying the closeness of family.

Benefits:

Improved mental well-being and physical fitness and health maintenance.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Heightened sense of satisfaction with our area as a place to live.

Greater family bonding.

Positive contributions to local-regional economic stability.

Maintenance of community's distinctive recreation/tourism market niche or character.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back to Middle Country.

On land surrounding the Red Gulch/Alkali Road Back Country Byway, Cold Springs Road, Hyattville Logging Road, and the Black Butte road, maintain middle country settings on or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight. Maintain back country settings within the WSAs and canyons.

Naturalness:

Middle/Back Country.

Natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area and primitive motorized routes and non-motorized trails may exist. Maintain primitive naturalness settings for the WSAs and canyons where lands are essentially an unmodified natural environment. Evidence of humans is unnoticed by an observer wandering through the area.

Facilities and Structures:

Primitive/Back Country.

Facilities and structures are rare and often accessible via unimproved routes. Maintain primitive settings in the WSAs where trails may exist but do not exceed standard to carry expected use. Facilities and structures are extremely rare.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes for the majority of the zone. Usually group size is small. Areas such as Dry Medicine Lodge Canyon, Cold Springs Road, Hyattville Logging Road, and Paint Rock Canyon is middle country where 7-14 encounters/day off travel routes, and 15-29 encounters/day en route. Usually group size is small to moderate.

Operational

Mechanized Use:

Middle/Back Country.

Maintain Middle country settings along the Cold Springs Road, Black Butte Road, Hyattville Logging Road, and the Red Gulch/Alkali Road Back Country Byway where 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use are acceptable. Maintain Back Country settings within the Spanish Point ACEC where mountain bikes perhaps other mechanized use is allowed, but all travel is non-motorized.

Management Controls and Visitor Services:

Middle/Front Country.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails outside the Spanish Point ACEC. Motorized use within the ACEC is strictly prohibited.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Utilize adaptive management techniques to provide identified recreation opportunities (activities, experiences, and benefits) and reach desired future setting conditions.

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Red Gulch/Alkali Road Back Country Byway, Medicine Lodge Wildlife Habitat Area; Trapper Creek, Medicine Lodge, and Alkali Creek WSAs,

the Madison Recharge zone, and caving ethics.

Maintain the Red Gulch Dinosaur Tracksite.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Solicit partnerships and cooperative agreements to: Monitor outcome attainment and preferences through customer assessments (focus group interviews or visitor studies), Monitor recreation setting condition through on-site patrols throughout the year.

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailheads and parking areas.

Develop new and maintain trailheads for foot and horse travel. Potential locations will include the Webber Canyon area, White Creek, Black Mountain area, Wapiti Ridge Trail, Lone Tree Trail and trailhead, Black Butte, and along the Red Gulch/Alkali Road Back Country Byway. Additional sites may be identified throughout the life of the plan.

Upgrade access route to the Lone Tree trailhead and upgrade the Lone Tree Trail.

Develop hiking trails in the Wet and Dry Medicine Lodge Canyons.

Construct Trailheads to accommodate mountain bike users.

Construct Pull-offs along the Red Gulch/Alkali Road.

Back Country Byway.

Maintain the OHV route between the Medicine Lodge State Park and Cold Springs Road.

Designate motorized touring loops connecting with the Bighorn National Forest, the Canyons RMZ, and the Brokenback/Logging Road RMZ, which may include new construction.

Develop campgrounds if needed.

Work with local spelunking community and adjacent land management agencies to maintain cave and karst areas.

Administrative

Visual Resource Management:

Class I within the Medicine Lodge, Trapper Creek, and Alkali Creek WSAs. Class II and III for the remainder of RMZ.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails. Off road use within the WSAs is strictly prohibited.

Over-snow travel off of designated routes and ways is strictly prohibited.

All motorized travel is prohibited within the Spanish Point ACEC.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Consider the acquisition of legal and/or physical access for hunting, fishing, and camping. Consider acquiring areas such as Horse Mountain, Trapper Creek, and White Creek.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Canyons RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Avoid surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Apply CSU restriction for this zone.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Maintain cooperative agreement with Wyoming State Land Board, and Wyoming State Game and Fish.

Seek other agreements and partnerships as appropriate.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Medicine Lodge State Park, IMBA, surrounding private land owners, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

West Slope of the Bighorns SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

Brokenback/Logging Road RMZ

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This area exhibits exceptional scenic quality, wildlife resources, and exposed geologic formations. The Hyattville Logging Road is within this area and is proposed to be a backcountry byway for Alternative B. The Logging Road is a popular access point into the Bighorn Mountains. Two other routes, the North and South Brokenback Roads act as very popular access points into the RMZ, as well as the Bighorn National Forest, during the big game hunting seasons. Access into this area is in part due to a coordinated agreement between the Wyoming Game and Fish and surrounding private land holders, as well as a foot/horse trail developed by the BLM so as to access more of this area. This area is a very popular hunting area for both local and visiting hunters.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Brokenback/Logging Road RMZ as a zone within the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hiking, hunting, wildlife viewing, nature viewing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country and Middle Country settings.

Activities:

Hunting, hiking, wildlife viewing, nature viewing, driving for pleasure.

Experiences:

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoying the closeness of family.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Stronger ties with my family and friends.

Greater awareness that the Bighorn Basin is special.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country Settings.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Front Country settings along the Hyattville Logging Road.

On or near improved country roads, but at least 0.5 mile from any highway.

Naturalness:

Back Country Settings.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Front/Middle Country.

Front Country settings for lands along the South and North Brokenback Roads, and along the Hyattville Logging Road.

Primitive and improved routes/trails may exist. Facilities and structures are back country settings where they are rare and isolated.

Remainder of RMZ is Middle Country.

Primitive motorized and non-motorized trails may exist.

Social

Contacts and Group Size:

Back Country.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services present but subtle. Minimum amount necessary to achieve planning objectives.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Hyattville/Logging Road Back Country Byway, Carter Access area, and Wyoming Game and Fish Wildlife Habitat Management Areas.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop facilities to enhance recreation and visitor services for the following areas:

- Trailheads for North and South Brokenback areas, Laddie Creek, and the Hyatteville Logging Road.
- Pull-outs along the Hyatteville Logging Road.
- Improve Salt Lick trail and trailhead.
- Construct additional trailheads and trails on a case-by-case basis or as the needs arise.

Designate motorized touring loops within the Brokenback/Logging road RMZ as well as connecting with the Canyons RMZ and the Bighorn National Forest, which may include new construction.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Continue to implement current South Broken Back Travel Management Plan.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Consider the acquisition of legal and/or physical access for hunting, fishing, and camping for areas including but not limited to North and South Brokenback roads, Luman Creek Road, Military Creek Road, Dorn Draw Road.

Lengthen public access duration for the North and South Brokenback roads to yearlong access under terms of the related Travel Management Plan.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Brokenback/Logging Road RMZ.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Avoid surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Apply a CSU for this zone.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Pursue additional access agreement in the South Brokenback, and North Brokenback areas.

Maintain current easement agreement with local land owners in this zone.

Seek other agreements and partnerships as appropriate.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

West Slope SRMA – Cody Field Office

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The west slope of the Bighorn mountains attracts visitors from the surrounding communities and from outside the region due to the spectacular scenery, abundant wildlife, and exposed geologic formations. Nearby attractions which also draw visitors to the area include the Bighorn Canyon National Recreation Area, and the Medicine Wheel on the Bighorn National Forest. Also, some visitors traveling to or from Yellowstone National Park spend time in the area. The SRMA includes the Little Mountain, Five Springs, and Brown/Howe Dinosaur ACECs, several creeks found eligible for possible inclusion into the Wild and Scenic River system, and significant cave and karst resources. The Five Springs Falls Campground and the Cottonwood Creek Trailhead are BLM-managed sites within the SRMA. The west slope of the Bighorns provides important wildlife habitat and access into the Bighorn National Forest. These resources provide for excellent semi-primitive non-motorized recreation to motorized (touring) recreation.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the West Slope of the Bighorns SRMA for motorized and non-motorized recreationists to engage in hunting, hiking, horseback riding, wildlife viewing, sightseeing, fishing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back, Middle, and Front Country settings.

Activities:

Hunting, wildlife viewing, hiking, photography, sightseeing, driving for pleasure.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Developing skills and abilities.

Enjoy going exploring on my/our own.

Enjoying the closeness of family.

Benefits:

Improved mental well-being and physical fitness and health maintenance.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Heightened sense of satisfaction with our area as a place to live.

Positive contributions to local-regional economic stability.

Maintenance of community's distinctive recreation/tourism market niche or character.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country.

Maintain Middle Country settings on much of the SRMA where lands are on or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Back Country.

Maintain back country settings where lands are more than 0.5 mile from any road, but not as distant as 3 miles, and no road is in sight.

Naturalness:

Back/Middle Country.

Natural setting may have subtle to moderately dominant modifications that would be noticed but not draw the attention of the casual observer wandering through the area and primitive motorized routes and non-motorized trails may exist.

Facilities and Structures:

Middle Country.

Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country.

Usually 3-6 encounters/day off travel routes and campsites, and 7-15 encounters/day on travel routes. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

Maintain Middle Country settings where 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use are acceptable.

Management Controls and Visitor Services:

Middle Country.

Signs present at key access points.

Patrolled periodically by law enforcement officer, and other BLM employees. Spike in BLM presence during hunting season.

Some use restrictions, limit motorized travel to designated roads and trails.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, geology, and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, and camp sites.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Signs present to identify roads and provide directions.

Interpretive signs at trailheads, campgrounds, and parking areas.

Develop a recreation site at Rainbow Canyon.

Additional recreational developments may be done throughout the life of the plan, if warranted.

Administrative

Visual Resource Management:

Class II and III for the SRMA.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Lands and Realty:

Open to ROWs.

Open to renewable energy development.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities (including those related to development of recreation facilities or wildlife habitat).

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, National Park Service, Wyoming Game and Fish, private land owners, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

South Bighorns ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

The southern Bighorns are popular for visitors to explore, hike, and especially hunt. Outfitters and tour guides enjoy guiding clients here due to the impressive and exceptional scenic qualities, abundant wildlife, and alternative access points onto 33-Mile Road (Hazelton Road) which exhibits exceptional viewing opportunities of the surrounding mountain landscape, the Cloud Peak Wilderness, the Bighorn Basin, and the Powder River Basin to the east; as well as access into the Hole-in-the-Wall region, the Middle Fork of the Powder River, Casper, and the Bighorn National Forest. The South Bighorns contain a rich history including cattle and sheep operations, mining, and infamous outlaws including Billy the Kid. Currently, an impressive coordinated travel management effort improving access into the area as well as improving resource management exists between the BLM, Wyoming State Game and Fish, Wyoming State Land Board, and the Orchard Ranch. A coordinated resource effort once existed between the BLM, Wyoming State Land Board, and the Wyoming Game and Fish Department, which accomplished recreation, wildlife, and weed management goals. The impressive Deep Creek is a waterway segment identified as eligible and draft suitable for inclusion into the Wild and Scenic Rivers System, as well as a sought-after fishery for exceptional fishing and sightseeing opportunities. Due to the amount of and the spatial location of private lands within the Southern Bighorns, the most appropriate recreation management strategy of the area would be under a separate ERMA.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Manage the South Bighorns as an ERMA for motorized and non-motorized recreationists to engage in hiking, wildlife viewing, nature viewing, hunting, fishing, and driving for pleasure in these Back Country and Middle Country settings.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Physical

Remoteness:

Middle Country Settings.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Front Country settings along Rome Hill Road, Dry Farm Road, and Hazelton Road.

On or near improved country roads, but at least 0.5 mile from any highway.

Naturalness:

Back Country Settings.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Middle Country.

Primitive motorized and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Rural settings along Upper Nowood Road where people seem to be everywhere, but human contact remains intermittent.

Operational

Mechanized Use:

Front/Middle Country.

Front Country along Cherry Creek Road, Dry Farm Road, Spring Creek Road, Rome Hill Road, and Hazelton Road.

2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Middle Country for remainder of ERMA.

4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Some onsite visitor orientation (kiosk and trail markers) will be developed, which may include interpretive signs at trailheads and parking areas on history, user ethics, wildlife resources, etc.

Provide stewardship information to help preserve the special landscape character. Work with partners to provide additional interpretation of the historic events and buildings, ranches, and other remnants.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Hazelton Road Back Country Byway, and the Upper Nowood Travel Management Plan.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys, on-site patrols, and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Develop facilities necessary to maximize recreational opportunities at areas such as, but not limited to the Cherry Creek stock driveway crossing of Deep Creek, Otter Creek, and Split Rock.

Develop trailheads for Mahogany Butte, Deep Creek, Upper Nowood areas, and in other areas on a case-by-case basis so as to sustain recreational opportunities, as well as to address use and user conflicts, public health and safety, and to address resource protection.

Administrative

Visual Resource Management:

Manage VRM consistent with other resource management objectives.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Continue to implement Upper Nowood Travel Management Plan.

Lands and Realty:

ROW avoidance area.

Open to alternative energy development. Co-locate renewable energy ROW authorizations whenever possible.

Consider the acquisition of legal and/or physical access for hunting, fishing, boating, and camping. Areas to be considered for acquisition include Otter Creek, Deep Creek, Little Canyon Creek, public land tracts along the Nowood River area, Cherry Creek Road to Hazelton Road, Lysite Mountain, land parcels within Spring Creek, and Spring Creek Road to Rome

Hill Road.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the South Bighorns ERMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities.

Review mineral leases on a case-by-case basis and apply mitigation through activity level planning.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Pursue/revitalize cooperative agreement with Double-H Ranch, Wyoming State Land Board, and Wyoming Game and Fish.

Maintain cooperative agreement with Orchard Ranch, Wyoming State Land Board, and Wyoming Game and Fish.

Seek other agreements and partnerships as appropriate.

Partners:

Including, but not limited to the Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Orchard Ranch, Double-H Ranch, Back Country Horsemen, Rocky Mountain Elk Foundation, Ten Sleep, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Middle Fork of the Powder River SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

BLM manages a campground along the Middle Fork of the Powder River which is a destination area for visitors from within and outside the region. The Middle Fork of the Powder River is managed as a blue ribbon trout fishery, as well as identified as eligible and draft suitable for inclusion into the Wild and Scenic River System. The Buffalo Field Office had also identified the Middle Fork of the Powder River within their jurisdiction as eligible for inclusion into the Wild and Scenic River System. This area has received significant managerial support from both the Worland and Buffalo Field Offices in coordination with the Wyoming State Game and Fish in improving access into the area to support a variety of recreational activities, dominantly hunting and fishing.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Middle Fork of the Powder River as an SRMA with a destination strategy for motorized and non-motorized recreationists to engage in fishing, hunting, hiking, wildlife viewing, nature viewing, and driving for pleasure so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country and Middle Country settings.

Activities:

Fishing, hunting, hiking, camping, photography, nature viewing, general dispersed recreation, Driving for pleasure, snowmobiling, snowshoeing.

Experiences:

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoying the closeness of family.

Feeling good about solitude, being isolated, and independent.

Benefits:

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Stronger ties with my family and friends.

Greater awareness that the Bighorn Basin is special.

Greater spiritual growth.

Heightened sense of satisfaction with our area as a place to live.

Lifestyle improvement or maintenance.

Greater family bonding.

More well-rounded childhood development.

Increased desirability as a place to live or retire.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Middle Country Settings.

On or near 4-wheel drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.

Front Country settings along Hazelton Road and the Middle Fork of the Powder River Campground.

Naturalness:

Back Country Settings.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Middle Country Settings for lands within the Middle Fork of the Powder River Campground.

Natural setting may have moderately dominant alterations but would not draw the attention of the observers on trail and primitive roads within the area.

Facilities and Structures:

Middle Country.

Primitive motorized and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Manage the Middle Fork of the Powder River Campground as Front Country.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Middle country settings along Hazelton Road and Middle Fork of the Powder River Campground. Usually 7-14 encounters/day off travel routes (e.g., staging areas and campgrounds), and 15-29 encounters/day en route. Usually group size is small to moderate.

Operational

Mechanized Use:

Front Country along Hazelton Road.

2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Middle Country for remainder of SRMA.

4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Some onsite visitor orientation (kiosk and trail markers) will be developed. This may include orientation methods such as interpretive signs at trailheads and Middle Fork of the Powder River Campground on history, user ethics, and fish and wildlife resources.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads and trails, trailheads, camp sites, and information regarding the Hazelton Road

Back Country Byway.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys, on-site patrols, and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails or other campgrounds, reevaluating fee structure, etc.

Management

Maintain and improve the Middle Fork of the Powder River campground and associated so as to maximize identified beneficial outcomes.

Develop additional trailheads, campgrounds, or other recreational facilities on a case-by-case basis so as to meet identified beneficial outcomes, recreational setting character conditions, and resource maintenance.

Develop trailhead at the Middle Fork Campground, and in other areas on a case-by-case basis.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Consider the acquisition of legal and/or physical access for recreation related opportunities. Areas to be considered for acquisition include public land tracts along the Cherry Creek Road to Hazelton Road, and along Hazelton Road.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Middle Fork Powder River SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Apply a CSU stipulation for the Middle Fork Powder River SRMA.

Avoid surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Pursue MOUs with surrounding land owners, Wyoming State Land Board, Wyoming Game and Fish, and the Buffalo and

Casper BLM Field Offices.

Seek other agreements and partnerships as appropriate.

Partners:

Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, Buffalo and Casper BLM Field Offices, private land owners, Back Country Horsemen, Rocky Mountain Elk Foundation, and other sports groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Canyon Creek SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

Canyon Creek area is located within the southern Bighorns just south of Highway 16, which is a very popular highway over the Bighorn Mountains as well as a popular route to Yellowstone National Park. Canyon Creek exhibits exceptionally high scenic qualities from the exposed dolomite and Ten Sleep formation observed through the impressive canyon complemented by the perennial Canyon Creek which supports a blue-ribbon fishery and a healthy riparian zone through the canyon. A subdivision (Canyon Creek Village) is growing south of the area in which residents enjoy exploring, hiking, hunting, and fishing Canyon Creek. Canyon Valley Resort is located within the area which provides recreational opportunities such as guiding services for visitors, big game outfitting, and golfing opportunities. The scenic qualities as well as the wildlife resources establish the foundation for the tourism market in this area. Smilo Road (BLM Road 1416) provides access into BLM-administered public lands east of Canyon Creek as well as the Bighorn National Forest.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Canyon Creek SRMA for non-motorized recreationists to engage in hiking, hunting, fishing, nature viewing, and wildlife viewing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these Back Country settings.

Activities:

Fishing, hunting, hiking, nature viewing, wildlife viewing.

Experiences:

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Develop skills and abilities.

Enjoy going exploring on my/our own.

Enjoy having easy access to natural landscapes.

Enjoying getting some needed physical exercise.

Benefits:

Improved mental well-being.

Improved physical fitness and health maintenance.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Back Country.

More than 0.5 mile from any road, but not as distant as 3 miles, and no road is in sight. Smilo Road, the access route to

the Canyon Creek fishing access parking area, and few other two-tracks are observed along the edges of the area.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Trails may exist but do not exceed standard to carry expected use. Facilities and structures are rare and isolated.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Operational

Mechanized Use:

Back Country.

Mountain bikes perhaps other mechanize use but all is non-motorized. Smilo Road will remain open to motorized access into area.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on history, user ethics, non-native invasive weed species found within the area, geology, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails, and camp sites.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Solicit partnerships and cooperative agreements to: Monitor outcome attainment and preferences through customer assessments (focus group interviews or visitor studies), Monitor recreation setting condition through on-site patrols.

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

Management

Utilize adaptive management techniques to provide identified recreation opportunities (activities, experiences, and benefits) and reach desired future setting conditions.

Develop looping hiking trails in Canyon Creek, and off of Smilo Road.

Develop trailheads at Canyon Creek and Smilo Road.

Some onsite visitor orientation (kiosk and trail markers) will be developed.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Acquire legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Canyon Creek SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Avoid surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Apply a CSU stipulation.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Agreements:

Pursue a cooperative agreement with the Canyon Creek Estates.

Seek other agreements and partnerships as appropriate.

Partners:

Big Horn National Forest, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Canyon Creek Estates, community of Ten Sleep, Back Country Horsemen, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Red Canyon Creek ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

Red Canyon Creek is located along the slopes of the Owl Creek Mountains outside the community of Thermopolis. This area exhibits high scenic qualities, wildlife resources, and opportunities for primitive-type recreation. A subdivision is growing on the north side of the area, which the adjacent BLM-administered public lands provides for easy-to-access public lands for the local residents. The community of Thermopolis has been marketing its natural recreational resources (most especially its thermal resources located within the very popular Hot Springs State Park), as well as prioritizing primitive-type recreational opportunities such as hiking, and horseback riding within the State Park. Other uses exist within and around the area such as livestock grazing, and mineral development. Legal public access into the area is questionable, and there are private surface land parcels within the area.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Manage the Red Canyon Creek ERMA to maintain a back country setting, to address public health and safety, use and user conflicts, and resource protection. In addition, recreation management within the ERMA will manage for motorized and non-motorized recreationists to engage in hiking, hunting, wildlife viewing, and nature viewing.

MANAGEMENT ACTIONS & ALLOWABLE USE DECISIONS

Identify management action and allowable use decisions for R&VS and other programs necessary to: facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts; and, address the type(s), activities, and locations where special recreation permits would or would not be issued.

Physical

Remoteness:

Back Country.

Most of the SRMA is more than 0.5 mile from any road, but not as distant as 3 miles, and no road is in sight. Access routes (two-tracks and improved route) exist along the fringe of the SRMA, as well as within parcels of private lands within the area.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Primitive motorized routes and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small.

Operational

Mechanized Use:

Back Country.

Manage the SRMA for mountain bikes perhaps other mechanized use but all is non-motorized. The fringes will be managed for 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use so as to maintain current land uses.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop visitor orientation signs at trailheads and parking areas on user ethics, designated motorized routes, trails, non-native invasive weed species found within the area, geology, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and on-site patrols.

Monitor for resource degradation, user conflicts, health and safety, and prescribed settings.

Management

Develop hiking trail to Red Canyon Creek.

Develop trailheads at northern access point.

Signs present at key access points, but limited within the ERMA.

Interpretive signs and visitor orientation materials at trailheads and parking areas.

Engage local community, businesses, and other partners in the development and distribution of a brochure and/or area guide book.

Administrative

Visual Resource Management:

Manage VRM consistent with other resource management objectives.

Comprehensive Trails and Travel Management:

All motorized use (including over-snow travel) is limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Red Canyon Creek ERMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

On a case-by-case basis, allow surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Review mineral leases on a case-by-case basis, open Red Canyon Creek area to appropriations under the mining laws, and authorize mineral material sales and/or free use permits; apply mitigation through activity level planning.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Community of Thermopolis, Hot Springs State Park, Wyoming State Land Board, Wyoming State Trails Program, Wyoming Game and Fish, private land owners, Back Country Horsemen, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

The Rivers SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Rivers destination SRMA is made up of BLM-managed public lands on the North and South Forks of the Shoshone River, the main stem of the Shoshone River, and the Clarks Fork of the Yellowstone River. These rivers are very popular for fishing, floating, sightseeing, and hunting and are used by local residents as well as visitors from throughout the nation and from foreign countries. Many visitors traveling to or from Yellowstone National Park spend time in Cody. Several companies offer commercial fishing or floating trips on these rivers. BLM and the WGFD have an agreement which recognizes the high recreational value of various tracts of land along these rivers and provides for cooperative efforts to develop access and manage the sites. Many sites have been developed over the years. Several of the river access sites also serve as trailheads for hiking and horseback access to the Shoshone National Forest. In addition, there are access sites which have been developed by other parties. The North Fork of the Shoshone River and portions of the Shoshone River are considered blue-ribbon trout fisheries.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Rivers SRMA for motorized and non-motorized recreation opportunities such as fishing, floating, photography, hunting, hiking, and nature viewing so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes in these rural, front, and middle country settings.

Activities:

Fishing, floating, sightseeing, hunting, photography, and nature viewing.

Experiences:

Enjoy going exploring on my/our own.

Enjoy the closeness of family.

Experiencing a greater sense of independence.

Testing endurance.

Enjoy risk taking adventure.

Benefits:

Improved mental well-being.

Closer relationship with the natural world.

Enhanced sense of personal freedom.

Improved physical fitness and health maintenance.

Improved skills for outdoor enjoyment.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Greater family bonding.

Increased desirability as a place to live or retire.

Increased local job opportunities.

Increased local tourism revenue.

Improved local economic stability.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural Country.

On or near primary highways, but still within a rural area.

Front Country.

On or near improved county roads, but at least 0.5 mile from any highway.

Middle Country.

On or near 4-wheel drive roads, but at least ½ mile from all improved roads, though they may be in sight.

Naturalness:

Rural, Front, and Middle Country.

Natural setting is culturally modified to the point that it is dominant to the sensitive travel route observer in some locations. In other locations, natural setting may have moderately dominant alterations but would not draw the attention of the observers on trails and primitive roads within the area.

Facilities and Structures:

Rural and Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Front Country setting.

Usually up to 29 encounters/day off travel routes and 30 or more encounters/day en route.

Group size varies from small to large.

Visitor encounters can be high during peak use periods at the major boat ramps.

Operational

Mechanized Use:

Front Country.

Manage the majority of the river tracts for a Front Country setting where 2-wheel drive vehicles predominant, but also 4-wheel drive vehicles and non-motorized mechanized use.

Management Controls and Visitor Services:

Front Country.

On site controls and services are present but harmonize with the natural environment.

Personnel periodic.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs. Use information and interpretation to lessen visitor conflicts, resource impacts, and to increase visitor awareness of wildlife habitat and wetland management.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, boat ramps, hazards, and BLM-administered public land tracts.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Work closely with the gateway communities of Cody, Powell, Thermopolis, Worland, Basin, Lovell, and Greybull, and other partners in the region in marketing and outreach.

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other river segments, institute fee areas, or limit river use.

Management

Continue to provide for experiences and associated facilities with an emphasis on maintaining rural to front country recreation settings.

Continue to provide opportunities that contribute to meeting recreation demand while protecting resources.

In cooperation with WGFD and other partners, provide and maintain visitor facilities, services, signing, and programs.

Administrative

Visual Resource Management:

Class II and Class III.

Comprehensive Trails and Travel Management:

Motorized use is limited to designated roads and trails for the North and South Forks of the Shoshone River and the Clarks Fork of the Yellowstone River and is limited to existing roads and trails for the Shoshone River area.

Lands and Realty:

Manage lands within one mile of the Shoshone and Clarks Fork of the Yellowstone Rivers as avoidance areas for construction of above ground power lines except in designated utility corridors.

Alternative energy avoidance area for realty actions.

Retain recreational access to the North and South Forks of the Shoshone, the Shoshone, and the Clarks Fork of the Yellowstone Rivers plus increase emphasis on float access and facilities where appropriate.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Avoid surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat) within campgrounds, trailheads, day use areas, river access sites, and similar recreational sites and trails within The Rivers SRMA.

Apply an NSO restriction on areas within ¼ mile of campgrounds, trailheads, day use areas, river access sites, and similar recreational sites within The Rivers SRMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Communities of Cody, Powell, Lovell, Wyoming Game and Fish, Trout Unlimited, Shoshone Back Country Horsemen, Shoshone National Forest, Park County Recreation Board, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

On site controls and services are present but harmonize with the natural environment.

McCullough Peaks SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The McCullough Peaks SRMA lies east of Cody and north of U.S. Highway 14/16/20. This scenic, popular area is used by residents of Cody, Powell, Park and Big Horn Counties for uses such as viewing wild horses, sightseeing, hunting, horseback riding, mountain biking, hiking, photography, driving for pleasure (including ATVs and motorcycles), and wildlife viewing. Colorful badlands provide excellent photographic opportunities. Tourists traveling to or from Yellowstone National Park also use the area. Several commercial permittees provide wild horse viewing tours or interpretive tours in the area. The McCullough Peaks WSA lies within the SRMA as does the McCullough Peaks Wild Horse Herd Management Area (HMA).

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the McCullough Peaks SRMA for motorized and non-motorized recreation opportunities such as wildlife and wild horse viewing, nature viewing, horseback riding, hunting, and hiking so that recreationists report realizing a "moderate" level of recreation experience and benefit outcomes in these rural, front, middle and back country settings.

Activities:

Viewing wild horses and wildlife, sightseeing, hunting, mountain biking, hiking, photography, driving for pleasure, horseback riding.

Experiences:

Enjoy going exploring on my/our own.

Learn.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoy the closeness of family.

Learning more about things here.

Enjoy having easy access to natural landscapes.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural, Front, Middle, and Back Country.

The eastern and southern boundaries lie along major highways. There are several BLM roads and numerous two-tracks and ATV trails in the SRMA area.

Naturalness:

Front and Middle Country.

Natural setting may have modifications which range from being easily noticed to strongly dominant to observers within the area but not draw the attention of observers on trails and primitive routes.

Back Country.

Natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Rural and Front Country.

Primitive and improved motorized routes and non-motorized trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Middle Country.

Primitive motorized routes and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country settings.

Usually up to 6 encounters/day off travel routes and up to 15 encounters/day on travel routes. Usually group size is small.

Middle Country settings.

Usually up to 14 encounters/day off travel routes, and up to 29 encounters/day en route. Usually group size is small. Most of the time, social settings will reflect back country definition.

Operational

Mechanized Use:

Front and Middle Country.

Manage the SRMA for 2-wheel drive and 4-wheel drive vehicles, ATVs, dirt bikes and non-motorized mechanized use.

Management Controls and Visitor Services:

Middle Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Work with partners and other interested publics to determine road and trail maintenance and construction needs, signing needs, and access points.

Work with volunteers to develop and maintain limited facilities, as needed, in the area.

Signs present at key access points and to identify such items as travel routes, the WSA boundary, and the herd area boundary.

Interpretive signs at trailheads and parking areas, where appropriate.

Provide opportunities for the public to view wild horses in the McCullough Peaks HMA.

Administrative

Visual Resource Management:

Class I in the McCullough Peaks WSA and Class II elsewhere in the SRMA.

Comprehensive Trails and Travel Management:

Motorized vehicle use is limited to designated roads and trails in the entire SRMA.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Closed to surface-disturbing activities such as geophysical exploration (except casual use), salable minerals exploration and development, and construction activities (except those related to development of recreation facilities or wildlife habitat).

No leasing within the McCullough Peaks WSA and NSO elsewhere in the SRMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Prohibit organized SRPs using domestic horses in the McCullough Peaks HMA.

Partners:

City of Cody; Park County Recreation Board; private landowners; local mountain biking, hiking, equestrian, and motorized groups, FOAL, Wyoming State Trails Program, and other interested groups.

Basin Gardens Play Area SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

This area is located between the Communities of Greybull and Basin, Wyoming. This area is currently being used for off-road hill climbs used by both ATVs and motorcycles, dominantly motorcycles. Visitors are from within the communities, as well as from outside the area, particularly Billings, Montana. The area is composed of bentonite and mostly devoid of vegetation. The Basin Gardens area provides for exceptional motorized hill climbing opportunities ranging from novice riders to very challenging climbs for the experienced riders. The communities from RMP Scoping opportunities had identified this area as highly desired for motorized recreational opportunities.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Basin Gardens Play Area SRMA for motorized recreationists to engage in ATV, motorbike, and other motorized hill climbing activities so that visitors report realizing a "moderate" level of recreation experience and benefit outcomes in these Front Country settings.

Activities:

Driving for pleasure, motorcycle hill climbing.

Experiences:

Developing skills and abilities.

Enjoying risk-taking adventure.

Being around people I know and enjoy.

Benefits:

Improved physical fitness and health maintenance.

Improved outdoor recreation skills.

Enhanced sense of personal freedom.

More well-rounded childhood development.

Heightened sense of satisfaction with our area as a place to live.

Increased desirability as a place to live or retire.

Improved local economic stability.

Increased local tourism revenue.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Front Country.

The RMZ is surrounded by county roads, and displays tracks from heavy off-road use.

Naturalness:

Front Country.

The area's natural setting from the intense off-road use may have modifications which range from being easily noticed to strongly dominant to observers within the area. These alterations would remain unnoticed or visually subordinate from sensitive travel routes (Highway 16, 20) and use areas.

Facilities and Structures:

Front Country.

Primitive and improved routes/trails may exist. Facilities and structures are scattered.

Social

Contacts and Group Size:

Middle Country settings.

Usually 7-14 encounters/day off travel routes (e.g., staging areas), and 15-29 encounters/day en route. Usually group size is small to moderate.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Front Country.

On site controls and services are present but harmonize with the natural environment.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Ensure targeted experiences and benefits is included and explained in all visitor information.

Engage local sporting good businesses and other partners in the development and distribution of a brochure and/or area guide book.

Some onsite visitor orientation (kiosk and trail markers) will be developed. Orientation materials will include a map with designated routes/areas, trailheads, docking stations, and designated areas tailored for different degrees of riding experience (novice areas to experienced areas).

Make available for special educational programs such as CORE and Take it Outside!

Monitoring

Solicit partnerships and cooperative agreements to: Monitor outcome attainment and preferences through customer assessments (focus group interviews or visitor studies).

Monitor recreation setting condition through on-site patrols.

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails or areas or limiting carrying capacity at trailheads.

Management

Utilize adaptive management techniques to provide identified recreation opportunities (activities, experiences, and benefits) and reach desired future setting conditions.

Develop areas for novice riders to highly experienced riders.

Develop trailheads containing loading dock stations, kiosks, comfort stations, and adequate parking.

Administrative

Visual Resource Management:

Manage visual resource objectives according to adjacent resource program prescriptions.

Comprehensive Trails and Travel Management:

Motorized use open to off-road/cross-country use.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Basin Gardens Play Area SRMA.

Avoid mineral material disposals in the Basin Gardens Play Area SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Avoid surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Apply a CSU restriction for the Basin Gardens Play Area SRMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding communities including but not limited to Greybull, Basin, Manderson, and Worland, Wyoming State Trails Program, surrounding private land owners, NOHVCC, Sagehoppers, and other interested groups and OHV clubs.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

No glass containers and pallets (burning, etc.) allowed.

Noise constraints are enforceable via 43 CFR 8343.1.

Rattlesnake Ridge ERMA

ERMAs are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services (R&VS) program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

This area is located approximately 4 miles east of Worland, Wyoming. This area is currently being used for off-road hill climbs used by both ATVs and motorcycles, dominantly motorcycles; as well as oil and gas extraction activities, ROW projects including radio signal towers, and grazing. Most of the visitors are from within the Worland area, as well as from other areas outside of the Worland area, most especially from Thermopolis, Wyoming. The area is heavily used by motorized use enthusiasts, and is mostly devoid of vegetation. The Rattlesnake Ridge area provides for exceptional motorized hill climbing opportunities ranging from novice riders to very challenging climbs for the experienced riders. In addition, the surrounding communities had identified this area as highly desirable for motorized recreational opportunities during the RMP Scoping meetings. The other uses within the area expose visitors to potential health risks from elements such as hydrogen sulfide (H_2S), and active oil and gas extraction activities. Conflicts between users have been an issue and interim management between the oil and gas companies and recreationists has been established in this area, but without significant BLM management guidance.

ERMA OBJECTIVE(S) DECISION

ERMA objectives must define the recreation activities and the associated qualities and conditions which become the focus for R&VS management.

Objective Statement:

Manage the Rattlesnake Ridge ERMA for motorized recreationists to safely engage in ATV, motorbike, and other motorized hill climbing activities with a priority in addressing use and user conflicts, public health and safety, resource protection, and to maintain these front country to rural settings.

MANAGEMENT ACTIONS & ALLOWABLE USE DECISIONS

Identify management action and allowable use decisions for R&VS and other programs necessary to: facilitate visitor participation in the identified outdoor recreation activities; maintain particular recreation setting characteristics; address visitor health and safety, resource protection, and use and user conflicts; and, address the type(s), activities, and locations where special recreation permits would or would not be issued.

Physical

Remoteness:

Rural Country.

The RMZ is surrounded by county roads, and displays tracks from heavy off-road use. The area is on or near primary highways, but still within a rural area.

Naturalness:

Rural Country.

The area's natural setting from the intense off-road use as well as the industrial activities is culturally modified to the point that it is dominant to the sensitive travel route observer, Pedestrians or other slow moving observers are constantly within view of culturally changed landscape.

Facilities and Structures:

Rural Country.

Paved, improved, and/or primitive roads/highways dominate the landscape. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Middle Country settings.

Usually 7-14 encounters/day off travel routes (e.g., staging areas), and 15-29 encounters/day en route. Usually group size is small to moderate.

Operational

Mechanized Use:

Middle Country.

4-wheel drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Rural Country.

On site controls and services are obvious and numerous. Largely harmonize with the man-made environment (dominantly from the oil and gas extraction activities and the ROW projects).

IMPLEMENTATION DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop visitor orientation signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, other important land uses within the area, and user safety.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated routes, trailheads, docking stations, designated areas tailored for different degrees of riding experience (novice areas to experienced areas).

Make available for special educational programs such as CORE and Take it Outside!

Monitoring

Solicit partnerships and cooperative agreements to: Monitor outcome attainment and preferences through customer assessments (focus group interviews or visitor studies).

Monitor recreation setting condition through on-site patrols.

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails or areas or limiting carrying capacity at trailheads.

Management

Develop areas for novice riders to highly experienced riders with coordinated effort through other entities such as local OHV groups, and onsite oil and gas companies.

Develop trailheads containing loading dock stations, kiosks, comfort stations, and adequate parking.

Signs present at key access points, but limited within the ERMA.

Visitor orientation materials (kiosks and signs) at trailheads and parking areas.

Administrative

Visual Resource Management:

Manage visual resources according to other adjacent resource program prescriptions.

Comprehensive Trails and Travel Management:

Motorized use limited to existing roads and trails.

Lands and Realty:

Open to all ROW (including alternative energy realty actions).

Pursue legal and physical access to maximize recreational opportunities.

Minerals:

Open to oil and gas, to mineral entry and, other mineral leasing subject to standard protection measures.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities such as geophysical exploration (including casual use), salable minerals exploration and development, and construction activities.

(including those related to development of recreation facilities or wildlife)

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Surrounding communities including but not limited to Worland, Thermopolis, Manderson, Basin, and Greybull; Wyoming State Trails Program, surrounding land users and industries, NOHVCC, Sagehoppers, and other interested groups and OHV clubs.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Glass containers and pallets are prohibited.

Horse Pasture SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Horse Pasture SRMA is 144 acres of BLM-administered public land nestled along the foothills of Rattlesnake Ridge and surrounded by agriculture uses. This area was once used as an oil and gas staging area, complete with residential buildings. Currently, in coordination with Devon Energy Corporation, the BLM is in the process of reclaiming the area to pre-development landscape. The area is used by the community of Worland for uses such as walking, hunting (bird and big game), and nature viewing.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Horse Pasture SRMA for non-motorized recreationists to engage in photography, hunting, nature viewing, and sightseeing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these back to middle country settings.

Activities:

Hiking, wildlife viewing, nature viewing, photography, hunting (bird and big game), dog interaction (walking, training, hunting, etc.).

Experiences:

Enjoy going exploring on my/our own.

Learn.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoy the closeness of family.

Learning more about things here.

Enjoy having easy access to natural landscapes.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Front Country.

The south boundary is along an improved road used for agricultural purpose. Some primitive routes exist within the area

from past management. Within the SRMA, the desired remoteness setting will be middle country, the edge will, by default, be front country.

Naturalness:

Back Country.

Natural setting may have subtle modifications but not draw the attention of the casual observer wandering through the area.

Facilities and Structures:

Back Country.

Primitive motorized routes and non-motorized trails may exist. Facilities and structures are rare and often accessible via unimproved routes.

Social

Contacts and Group Size:

Back Country.

Usually up to 6 encounters/day off travel routes, and up to 15 encounters/day on trails. Usually group size is small. Most of the time, social settings will reflect primitive definition.

Operational

Mechanized Use:

Back Country.

Manage the SRMA for mountain bikes perhaps other mechanized use but all is non-motorized. The fringes will be managed for 4-wheel drive vehicles, ATVs, dirt bikes, or snowmobiles in addition to non-motorized mechanized use so as to maintain current land uses.

Management Controls and Visitor Services:

Back Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs and visitor orientation materials at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Solicit partnerships and cooperative agreements to: Monitor outcome attainment and preferences through customer assessments (focus group interviews or visitor studies), Monitor recreation setting condition through on-site patrols.

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

Management

Utilize adaptive management techniques to provide identified recreation opportunities (activities, experiences, and benefits) and reach desired future setting conditions.

If need arrives, develop interpretive/historic nature trail within the Horse Pasture.

Develop trailhead at western edge of SRMA. Facilities will include, but not limited to visitor orientation materials, adequate parking, comfort station, and other necessary facilities identified throughout the life of the plan.

Signs present at key access points, but limited within the SRMA, with exception to nature trail.

Interpretive signs at trailhead, and along trail.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

Motorized use within the SRMA is limited to designated roads and trails.

Lands and Realty:

ROW avoidance area.

Alternative energy avoidance area for realty actions.

Minerals:

Do not pursue withdraw from appropriation under the mining laws for lands within the Horse Pasture SRMA.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Avoid surface-disturbing activities such as geophysical exploration, salable minerals exploration and developments, and construction activities (except those related to development of recreation facilities or wildlife habitat).

Apply a CSU stipulation for the Horse Pasture SRMA.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

Community of Worland, Wyoming State Trails Program, Wyoming Game and Fish, Devon Energy Corporation, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Beck Lake Area SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Beck Lake Area SRMA contains about 6,473 acres of BLM-administered public land south of Beck Lake. The area is used by residents of Cody and Park County for uses such as mountain biking, hiking, hunting, driving for pleasure, and wildlife viewing. The City of Cody is seeking an R&PP lease for land in the northern portion of the SRMA. That land would complement the recreation facilities the City manages at Beck Lake Park. Management of the R&PP area would be governed by agreement(s) and operating plan(s) associated with its R&PP status.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Beck Lake Area community SRMA for non-motorized and motorized recreationists to engage in mountain biking, hiking, photography, wildlife viewing, driving for pleasure, and sightseeing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these rural and front country settings.

Activities:

Mountain biking, hiking, wildlife viewing, nature viewing, photography, hunting, driving for pleasure, dog interaction (walking, training, hunting, etc.).

Experiences:

Enjoy going exploring on my/our own.

Learn.

Enjoy the closeness of family.

Learning more about things here.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural and Front Country.

A major highway lies along the eastern boundary of the SRMA. Numerous primitive and developed roads lie within the area.

Naturalness:

Rural to Front Country.

Natural setting may have modifications which range from being easily noticed to strongly dominant to observers within the area.

Facilities and Structures:

Rural and Front Country.

Primitive and improved motorized routes and non-motorized trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Middle Country settings.

Usually up to 14 encounters/day off travel routes, and up to 29 encounters/day en route. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

Manage the SRMA for non-motorized mechanized use as well as 4-wheel drive vehicles, ATVs and dirt bikes.

Management Controls and Visitor Services:

Middle Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated routes, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Work with partners and other interested publics to determine trail maintenance and construction needs, signing needs, and access points.

Work with volunteers to develop and maintain limited facilities, as needed, in the area.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailhead.

Administrative

Visual Resource Management:

Manage VRM consistent with other resource objectives.

Comprehensive Trails and Travel Management:

Motorized vehicle use is limited to designated roads and trails.

Lands and Realty:

Open to ROWs.

Alternative energy avoidance area for realty actions.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities such as geophysical exploration, salable minerals exploration and development, and construction activities on a case-by-case basis.

Open to oil and gas leasing with a CSU restriction.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property.

The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

City of Cody, Park County Recreation Board, private landowners, local mountain biking and hiking groups, local motorized groups, Wyoming State Trails Program, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

Newton Lake Ridge SRMA

SRMAs are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness; especially compared to other areas used for recreation. For each SRMA: establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions and, if necessary, identify implementation decisions.

SUPPORTING INFORMATION

Briefly describe the rationale for designating the SRMA including the unique value, importance or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

The Newton Lake Ridge SRMA contains about 1,949 acres of BLM-administered public land north of Newton Lakes. The area is used by residents of Cody and Park County for uses such as mountain biking, hiking, hunting, and wildlife viewing.

SRMA/RECREATION MANAGEMENT ZONE (RMZ) OBJECTIVE(S) DECISIONS

SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences and benefits derived from those experiences) which become the focus of Recreation and Visitor Services (R&VS) management.

Objective Statement:

Manage the Newton Lake Ridge SRMA for non-motorized and motorized recreationists to engage in mountain biking, hiking, photography, hunting, wildlife viewing, and sightseeing so that they report realizing a "moderate" level of recreation experience and benefit outcomes in these rural, front, and middle country settings.

Activities:

Mountain biking, hiking, wildlife viewing, nature viewing, photography, hunting.

Experiences:

Enjoy going exploring on my/our own.

Learn.

Savoring the total sensory – sight, sound, and smell – experience of a natural landscape.

Enjoy the closeness of family.

Learning more about things here.

Enjoy having easy access to natural landscapes.

Benefits:

Enhanced awareness and understanding of nature.

Greater sensitivity to/awareness of outdoor aesthetics, nature's art and its elegance.

Increased appreciation of area's cultural history.

Improved mental well-being.

Heightened sense of satisfaction with our area as a place to live.

Greater community involvement in recreation and other land use decisions.

Increased desirability as a place to live or retire.

Maintenance of community's distinctive recreation/tourism market niche or character.

RECREATION SETTING CHARACTERISTIC (RSC) DESCRIPTIONS

Describe the physical, social and operational recreation setting qualities to be maintained or enhanced.

Physical

Remoteness:

Rural, Front, and Middle Country.

The northeastern boundary is along a major highway. Several short, primitive routes occur within the SRMA.

Naturalness:

Front and Middle Country.

Natural setting may have modifications which range from being easily noticed to strongly dominant to observers within

the area but not draw the attention of observers on trails and primitive routes.

Facilities and Structures:

Rural and Front Country.

Primitive and improved motorized routes and non-motorized trails may exist. Facilities and structures are readily apparent and may range from scattered to small dominant clusters.

Social

Contacts and Group Size:

Middle Country settings.

Usually up to 14 encounters/day off travel routes, and up to 29 encounters/day on trails. Usually group size is small.

Operational

Mechanized Use:

Middle Country.

Manage the SRMA for 4-wheel drive vehicles, ATVs, and dirt bikes in addition to non-motorized mechanized use.

Management Controls and Visitor Services:

Middle Country.

On site controls and services are present but subtle.

Personnel periodic. Rules clearly posted with some restrictions. Periodic enforcement, with an increase in BLM presence during big game hunting season.

IMPLEMENTING DECISIONS

Implementation decisions are actions to achieve or implement land use plan decisions. Implementation decisions include: management, administration, information and education and monitoring.

Information and Education

Develop interpretive signs at trailheads and parking areas on user ethics, non-native invasive weed species found within the area, history, hunting, and other current resource programs.

Provide stewardship information to help preserve the special landscape character.

Provide for a map with designated roads, trailheads, trails.

Make available for special outdoor educational programs such as CORE and Take it Outside!

Monitoring

Vehicle counters with routine surveys and observation.

Visitor reports of crowding.

Informal visitor surveys and formal focus groups as funding allow.

If trends show that use is over acceptable limits, additional action may be considered, such as encouraging use on other trails.

Management

Work with partners and other interested publics to determine trail maintenance and construction needs, signing needs, and access points.

Work with volunteers to develop and maintain limited facilities, as needed, in the area.

Signs present at key access points, but limited within the SRMA.

Interpretive signs at trailhead.

Administrative

Visual Resource Management:

Class II.

Comprehensive Trails and Travel Management:

Motorized vehicle use is limited to designated roads and trails.

Lands and Realty:

Open to ROWs.

Alternative energy avoidance area for realty actions.

Oil and Gas Leasing and Other Surface-Disturbing Activities:

Allow surface-disturbing activities such as geophysical exploration, salable minerals exploration and development, and construction activities on a case-by-case basis.

Open to oil and gas leasing with a CSU restriction.

Special Recreation Permits:

SRPs will be issued as a discretionary action. Issue SRPs for a wide variety of uses, that are consistent with resource/program objectives, and within budgetary/workload constraints.

Cost recovery procedures for issuing SRPs would be applied where appropriate.

If circumstances warrant, limitations on available SRPs may be developed and implemented.

If circumstances warrant, limitations on SRP group numbers may be developed and implemented.

To assist in the determination of whether an organized group activity or event would require an SRP, factors such as the following may be considered: resource concerns, user conflicts, need for monitoring, health and safety concerns, risk of damage to federal facilities or property. The following guidelines will be used in determining SRP status:

1-15 participants –
No SRP required, unless otherwise determined that an SRP will be needed.

16-30 participants –
Letter of Agreement, unless otherwise determined that an SRP will be needed.

Over 30 participants –
SRP required.

Partners:

City of Cody, Park County Recreation Board, private landowners, local mountain biking and hiking groups, Wyoming State Trails Program, and other interested groups.

Other Administration:

Limit the use of signing or other administrative controls unless and until monitoring supports an increase in education, signing, or enforcement to meet public recreation objectives for the area.

2.0 RECREATION MANAGEMENT MATRICES

The matrices that follow show recreation management areas across the Planning Area, as well as the management of key types of resource uses (e.g., ROWs and travel management) in these areas. To allow comparability across the alternatives, management is shown for the same areas under each alternative, regardless of whether that area is a distinct recreation management area (i.e., SRMA, RMZ, or separate ERMA) or is only managed as part of a larger ERMA.

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Alternative A Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Absaroka Foothills		■	■			72,130	☐	See Notes	See Notes			■	■		■	■	■			■			**NSO-**Portions of the area are NSO. **Mineral Withdrawal-**Mineral entry requires a Plan of Operations. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Bighorn River	■	■	■			15,256	■	■	☐		☐		■		☐	☐	☐			☐	☐		**Other Surface-disturbing Activities-**closed on a case-by-case basis. **ROW-**SRMA contains both ROW exclusion and avoidance areas. **VRM-**Class II, III, IV in BLM Cody Filed Office, Class II and III in BLM Worland Field Office. **Travel-***Limited to Designated* in BLM Cody Field Office, *Limited to Designated* and *Existing* in BLM Worland Field Office.
Badlands		■	■			213,981	See Notes		See Notes				■		■	■	■				■		**NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Tour De Badlands		■	☐				See Notes		See Notes			■	■		■	■	■				■		**Type-**Within Badlands SRMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Wild Badlands		■	☐															■	■				**Management discussed in WSA section.** **Type-**Within Badlands SRMA.
Tatman Mountain		■	☐				See Notes		See Notes			■	■		■	■					■		**Type-**Within Badlands SRMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities**-Allow on a case-by-case basis.
West Slope	■	■	■			375,888	☐		☐		☐	☐	■		■	■	■			■			**Management discussion for Five Springs Falls ACEC in ACEC section.** **NSO-**Five Springs Falls Campgrounds and known Caves. **ROW-**Avoidance areas exist along West Slope, remainder is open. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Trapper Creek		■	☐				See Notes	See Notes	See Notes		■		■		■	■	■	☐		■			**Type-**Within West Slope of Bighorn Mountains SRMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis. **VRM-**Trapper and Alkali Creek WSAs within the Trapper Creek area are managed under Class I objectives.

Alternative A Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Paint Rock		■	☐				See Notes		See Notes		■		■		■	■	■	☐	☐	■			**Type-**Within West Slope of Bighorn Mountains SRMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis. **VRM-**Medicine Lodge WSA within the Trapper Creek area are managed under Class I objectives. **Travel Management-**Spanish Point Karst ACEC within the Paint Rock area is closed to motorized travel.
Brokenback/ Logging Road Area		■	☐				See Notes		See Notes		■		■		■	■	■			■			**Type-**Within the boundaries of the existing West Slope of Bighorn Mountains SRMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
South Bighorns		■	☐				See Notes		See Notes		■		■		■	■	■			■			**Type-**Within the boundaries of the existing West Slope of Bighorn Mountains SRMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Canyon Creek		■	☐				☐		See Notes		■		■		■	■	■			■			**Type-**Contained within West Slope of Bighorns SRMA. **NSO-**Apply an NSO and review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Red Canyon Creek		■			☐		See Notes		See Notes			■	■				■			■			**Type-**Within Worland Field Office ERMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
The Rivers Area	■		■			18,247	☐		■		■		■			■	■			☐	☐		**NSO-**WGFD/BLM access areas on the Clarks Fork of the Yellowstone and the N and S Forks of the Shoshone Rivers. **VRM-**VRM Class II objectives (North and South Forks of the Shoshone, and the Clarks Fork of the Yellowstone Rivers) and managed for VRM Class III objectives (Shoshone River). **Travel-***Limited to Designated* (North and South Forks of the Shoshone and the Clarks Fork of the Yellowstone River), *Limited to Existing* (Shoshone River area).
Historic Trails	■		■			12,065																	**Management discussed in Cultural Resources and NHTs.**
Worland Caves	■		■			No defined acres																	**Management discussed in Cave and Karst Resources.**

Alternative A Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
McCullough Peaks	■				☐				See Notes			■	■		■	■	■	☐		☐	☐		**Type-**Within Cody Field Office ERMA. **Other Surface-disturbing Activities-**Allow on a case-by-case basis. **Travel-***Limited to Designated* in a portion and *Limited to Existing* in the remainder. **Note-**Refer to the Wilderness Study Areas section of Table 2-9 for management of the McCullough Peaks WSA. **VRM-**McCullough Peaks WSA within the McCullough Peaks area is managed under Class I objectives.
Basin Garden		■			☐																		**Type-**Within Worland Field Office ERMA.
Basin Gardens Play Area		■			☐		See Notes		See Notes		■		■		■	■					■		**Type-**Within Worland Field Office ERMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Basin Gardens		■			☐		See Notes		See Notes		■		■		■	■					■		**Type-**Within Worland Field Office ERMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Horse Pasture		■			☐		See Notes		See Notes			■	■			■					■		**Type-**Within Worland Field Office ERMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Rattlesnake Ridge		■																			■		**Note-**Rattlesnake Ridge area is managed consistent with management of other resource programs.
Beck Lake	■				☐				See Notes			■	■			■					■		**Type-**Within Cody Field Office ERMA. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Newton Lake Ridge	■				☐				☐			■	■			■				☐	☐		**Type-**Within Cody Field Office ERMA. **Travel-***Limited to Existing* in portions, *Limited to Designated* in remainder. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.

Alternative A Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	

[1]Cody Field Office
[2]Worland Field Office
[3]Geophysical, Salables
[4]Under existing management, areas not managed as Special Recreation Management Areas in the BLM Cody Field Office are managed as part of the Cody Extensive Recreation Management Area; in the BLM Worland Field Office, these areas are managed as part of the Worland Extensive Recreation Management Area.

ACEC Area of Critical Environmental Concern
C Bureau of Land Management Cody Field Office
CSU Controlled surface use
ERMA Extensive Recreation Management Area
NHT National Historic Trail
NSO No surface occupancy
R&PP Recreation and Public Purposes
RMZ Recreation Management Zone
ROW Rights-of-Way
SRMA Special Recreation Management Area
VRM Visual Resource Management
W Bureau of Land Management Worland Field Office
WSA Wilderness Study Area

Alternatives B and E Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities[3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Absaroka Foothills		■	■			72,130	■	■	■		■		■				■			■			**ROW-**Avoidance/mitigation area except to provide access to private property or demonstrated need; evaluate existing ROWs on a case-by-case-basis at renewal.
Bighorn River	■	■	■			15,113	■	■	■	■				■			■			■			
Badlands		■	■			220,687																	
Tour De Badlands		■		■		122,616	■	■	■		■		■				■			■			
Wild Badlands		■		■		51,158												■	■				**Management discussed in WSA section.**
Tatman Mountain		■		■		46,912	■	■	■		■		■				■			■			
West Slope	■	■	■			406,309	☐	■	■	■			■				■			■			**Management of Five Springs Falls ACEC discussed in ACEC section.** **NSO-**for portions of the West Slope SRMA.
Trapper Creek		■		■		83,806	■	■	■		■		■				■	☐		■			**VRM-**Trapper and Alkali Creek WSAs within the Trapper Creek area are managed under Class I objectives.
Paint Rock		■		■		45,017	■	■	■		■		■				■	☐	☐	■			**VRM-**Medicine Lodge WSA within the Trapper Creek area are managed under Class I objectives. **Travel Management-**Spanish Point Karst ACEC within the Paint Rock area is closed to motorized travel.
Brokenback/ Logging Road Area		■		■		63,725	■	■	■		■			■			■			■			
South Bighorns		■		■		83,991	■	■	■		■		■				■			■			
Canyon Creek		■	■			3,677	■	■	■		■		■				■			■			
Red Canyon Creek		■	■			8,435	■	■	■		■		■				■			■			
The Rivers Area	■		■			18,247	☐		■		■		■				■			☐	☐		**NSO-**WGFD/BLM access areas on the Clarks Fork of the Yellowstone and the N and S Forks of the Shoshone Rivers. **Travel-***Limited to Designated* (North and South Forks of the Shoshone and the Clarks Fork of the Yellowstone River), *Limited to Existing* (Shoshone River area).
Historic Trails	■																						**Management discussed under Cultural Resources and NHTs.**
Worland Caves	■				■	No defined acres																	**Management discussed under Cave and Karst Resources.**
McCullough Peaks	■		■			160,838	■	■	■		■		■				■	☐		■			**Note-**Refer to the Wilderness Study Areas section of Table 2-9 for management of the McCullough Peaks WSA. **VRM-**McCullough Peaks WSA within the McCullough Peaks SRMA is managed under Class I objectives.

Alternatives B and E Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities[3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Basin Garden		■	■			19,771																	
Basin Gardens Play Area		■		■		1,821	■	■	■		■		■			■						■	
Basin Gardens		■		■		17,949	■	■	■		■		■			■				■			
Horse Pasture		■	■			144	■	■	■	■			■				■		■				
Rattlesnake Ridge		■																			■		**Note**-Rattlesnake Ridge area is managed consistent with other resource programs.
Beck Lake	■		■			6,483	■	■	■		■		■				■		■				
Newton Lake Ridge	■		■			1,997	■	■	■		■		■				■		■				

[1]Cody Field Office
[2]Worland Field Office
[3]Geophysical, Salables

ACEC	Area of Critical Environmental Concern
C	Bureau of Land Management Cody Field Office
CSU	Controlled surface use
ERMA	Extensive Recreation Management Area
NHT	National Historic Trail
NSO	No surface occupancy
R&PP	Recreation and Public Purposes
RMZ	Recreation Management Zone
ROW	Rights-of-Way
SRMA	Special Recreation Management Area
VRM	Visual Resource Management
W	Bureau of Land Management Worland Field Office
WSA	Wilderness Study Area

Alternative C Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Absaroka Foothills		■										■	■		■	■	■				■		
Bighorn River	■	■										■	■		☐	☐	☐				■		**VRM-**Class II-IV in BLM Cody Field Office; Class II, III in BLM Worland Field Office.
Badlands		■																					
Tour De Badlands		■										■	■		■	■	■				■		
Wild Badlands		■																■		☐			**Management discussed in WSA section.**
Tatman Mountain		■										■	■		■	■					■		
West Slope	■	■										■	■		■	■	■				■		
Trapper Creek		■										■	■		■	■	■	☐		■			**VRM-**Trapper and Alkali Creek WSAs within the Trapper Creek area are managed under Class I objectives.
Paint Rock		■										■	■		■	■	■	☐	☐		■		**VRM-**Medicine Lodge WSA within the Trapper Creek area are managed under Class I objectives. **Travel Management-**Spanish Point Karst ACEC within the Paint Rock area is closed to motorized travel.
Brokenback/ Logging Road Area		■										■	■		■	■	■				■		
South Bighorns		■										■	■		■	■	■				■		
Canyon Creek		■										■	■		■	■	■				■		
Red Canyon Creek		■										■	■		■						■		
The Rivers Area	■											■	■			☐	☐				■		**VRM-**Managed for VRM Class II (North and South Forks of the Shoshone, and the Clarks Fork of the Yellowstone Rivers) and Class III (Shoshone River) objectives.
Historic Trails	■																						**Management discussed in Cultural Resources and NHT.**
Worland Caves	■																						**Management discussed in Cave and Karst.**
McCullough Peaks	■											■	■		■	■	■	☐			■		**Note-**Refer to the Wilderness Study Areas section of Table 2-9 for management of the McCullough Peaks WSA. **VRM-**McCullough Peaks WSA within the McCullough Peaks area is managed under Class I objectives.
Basin Garden		■																					
Basin Gardens Play Area		■			■	4,421						■	■		■	■						■	

Alternative C Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Basin Gardens		■			■	15,349						■	■		■	■					■		
Horse Pasture		■										■	■			■					■		
Rattlesnake Ridge		■	■			7,996																■	**Note-**Rattlesnake Ridge area is managed consistent with other resource programs.
Beck Lake	■							☐				■	■			■					■		**Mineral Withdrawal-**Only acreage under consideration for a withdrawal under R&PP lease.
Newton Lake Ridge	■											■	■			■					■		

[1]Cody Field Office
[2]Worland Field Office
[3]Geophysical, Salables

ACEC	Area of Critical Environmental Concern
C	Bureau of Land Management Cody Field Office
CSU	Controlled surface use
ERMA	Extensive Recreation Management Area
NHT	National Historic Trail
NSO	No surface occupancy
R&PP	Recreation and Public Purposes
RMZ	Recreation Management Zone
ROW	Rights-of-Way
SRMA	Special Recreation Management Area
VRM	Visual Resource Management
W	Bureau of Land Management Worland Field Office
WSA	Wilderness Study Area

Alternatives D and F Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Absaroka Foothills		■	■			42,615	■	See Notes	See Notes		■		■				■			■			**Mineral Withdrawal-**Mineral entry requires a Plan of Operations. **Other Surface-disturbing Activities-**Allow on a case-by-case basis outside of the Absaroka Front Management Area.
Absaroka (ERMA)		■			■	28,998	■	See Notes	See Notes		■		■							■			**Mineral Withdrawal-**Mineral entry requires a Plan of Operations. **Other Surface-disturbing Activities-**Allow on case-by-case basis outside of the Absaroka Front Management Area.
Bighorn River	■		■			2,496	☐		See Notes		■		■				■			■			**Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on a site-specific analysis.
Bighorn River (ERMA)		■			■	1,522	☐		See Notes		■		■										**Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on a site-specific analysis.
Badlands		■	■			211,561	See Notes		See Notes				■		■	■	■				■		**NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Tour De Badlands		■		☐		111,051	See Notes		See Notes		■		■							■			**Type-**Within the Badlands SRMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Wild Badlands		■		☐		51,155												■	■				**Management discussed in WSA section.** **Type-**Within the Badlands SRMA.
Tatman Mountain		■		☐		49,354	■		See Notes		■		■							■			**Type-**Within the Badlands SRMA. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
West Slope	■		■			320,704			See Notes		☐	☐	■			■	■			■			**Other Surface-disturbing Activities-**Allow in the West Slope SRMA. **ROW-**Avoidance/mitigation area on portions, remainder is open.
Trapper Creek		■		☐			■		See Notes		■		■				■	■	☐	■			**Type-**Within the Canyons RMZ in the West Slope of Bighorn Mountains SRMA. **Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on site-specific analysis. **VRM-**Trapper and Alkali Creek WSAs within the Trapper Creek RMZ area are managed under Class I objectives.
Paint Rock		■		☐			■		See Notes		■		■				■	☐	☐	■			**Type-**Within the Canyons RMZ in the West Slope of Bighorn Mountains SRMA. **Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on site-specific analysis. **VRM-**Medicine Lodge WSA within Paint Rock RMZ area is managed under Class I objectives. **Travel Management-**Spanish Point Karst ACEC within the Paint Rock RMZ area is closed to motorized travel.

Alternatives D and F Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Brokenback/ Logging Road Area		■		☐		49,325	■		See Notes		■			■			■			■			**Type-**Within the boundaries of the existing West Slope of Bighorn Mountains SRMA. **Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on site-specific analysis.
South Bighorns		■	☐		☐	69,325	See Notes		See Notes		■		■		■	■				■			**Type-**A portion is within the Middle Fork of the Powder River SRMA and a portion is within the Southern Bighorns ERMA. **NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on a site-specific analysis in the Middle Fork of the Powder River SRMA. Allow in the Southern Bighorns ERMA.
Middle Fork of the Powder River		■	■			14,644	■		See Notes		■		■							■			**Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on site-specific analysis.
Canyon Creek		■	■			3,675	■		See Notes		■		■				■			■			**Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on site-specific analysis.
Red Canyon Creek		■			■	8,435	See Notes				■		■							■			**NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning.
The Rivers Area	■		■			6,047	☐		See Notes		■		■			■	■			☐	☐		**NSO-**Apply NSO restriction within ¼ mile of campgrounds, trailheads, day use areas, river access sites and similar recreation sites. **Other surface-disturbing Activities-**Allow surface-disturbing activities if the effects can be avoided or mitigated based on a site-specific analysis. **Travel-***Limited to Designated* (N and S Forks of the Shoshone and the Clarks Fork of the Yellowstone River), *Limited to Existing* (Shoshone River area).
Historic Trails	■																						**Management discussed under Cultural Resources and NHTs.**
Worland Caves	■																						**Management discussed in Cave and Karst Resources.**
McCullough Peaks	■		■			160,838	☐				■		■				■	☐		☐	☐		**Travel-***Limited to Designated* in a portion and *Limited to Existing* in the remainder. **Note-**Refer to the Wilderness Study Areas section of Table 2-9 for management of the McCullough Peaks WSA. **NSO-**Apply a NSO restriction on 41,653 acres within the McCullough Peaks SRMA. **VRM-**McCullough Peaks WSA within SRMA is managed under Class I objectives.
Basin Garden		■																					
Basin Gardens Play Area		■	■			4,421	■		See Notes		■		■									■	**Other Surface-disturbing Activities-**Allow if the effects can be avoided or mitigated based on a site specific analysis.

Alternatives D and F Recreation Management Area Matrix

■ *= Management Proposed for these Alternatives* ☐ *= Management Proposed for these Alternatives; see Notes for exception(s)*

AREA	Field Office		Type			Acres	Minerals and Surface-disturbing Activity Restrictions			ROW			Renew-able Energy		VRM				Travel Management				NOTES
	C[1]	W[2]	SRMA	RMZ	ERMA		NSO/CSU for Oil and Gas Leasing	Locatable Mineral Withdrawal	Closed to Other Surface-disturbing Activities [3]	Exclusion	Avoidance/Mitigation	Open	Open/Avoidance	Closed	Class IV	Class III	Class II	Class I	Closed	Limited to Designated	Limited to Existing	Open	
Basin Gardens		■			☐		See Notes		See Notes		■		■								■		**NSO-**Review mineral leases on a case-by-case basis and apply mitigation through activity level planning. **Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Horse Pasture		■	■			144	■		See Notes		■		■							■			**Other Surface-disturbing Activities-**Authorize mineral material disposals if the effects can be avoided or mitigated on a site-specific basis.
Rattlesnake Ridge		■			■	7,982															■		**Note-**Rattlesnake Ridge area is managed consistent with other resource programs.
Beck Lake	■		■			6,473	■		See Notes			■	■							■			**Other Surface-disturbing Activities-**Allow on a case-by-case basis.
Newton Lake Ridge	■		■			1,949	■					■	■				■			■			**Other surface-disturbing Activities-**Allow on a case-by-case basis.

[1]Cody Field Office
[2]Worland Field Office
[3]Geophysical, Salables

ACEC	Area of Critical Environmental Concern
C	Bureau of Land Management Cody Field Office
CSU	Controlled surface use
ERMA	Extensive Recreation Management Area
NHT	National Historic Trail
NSO	No surface occupancy
R&PP	Recreation and Public Purposes
RMZ	Recreation Management Zone
ROW	Rights-of-Way
SRMA	Special Recreation Management Area
VRM	Visual Resource Management
W	Bureau of Land Management Worland Field Office
WSA	Wilderness Study Area

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix P

Livestock Grazing

LIST OF TABLES

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APPENDIX P

LIVESTOCK GRAZING ALLOTMENTS

This appendix consists of three tables that provide detailed information on grazing allotments in the Planning Area. Table P-1 summarizes basic characteristics of each grazing allotment, including current size, management, and use. Table P-2 summarizes the results of the most recent assessment of the *Wyoming Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management* for each grazing allotment. Table P-3 lists grazing allotments that are wholly or partially within Greater Sage-Grouse Priority Habitat Management Areas, and identifies the current management category for each. Grazing allotments in Table P-3 may be subject to additional restrictions under one or more of the alternatives, as described in Chapter 2, *Detailed Analysis of Alternatives*.

Table P-1. Current Livestock Grazing Allotment Information

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00001	Manderson Group	I	9,039	Non-growing Season Use	1	779	Cattle
00002	Weber Lower	I	32,156	Spring/Fall Deferment	6	2,762	Cattle
00003	Cold Springs	I	4,510	Rest Rotation		696	Cattle/Horses
00004	Gapen Hyatt	I	10,032	Non-growing Season Use and Restricted Growing Season Use	1	751	Cattle
00005	Southside Group	I	29,412	Rest Rotation	1	3,151	Cattle/Horses
00006	Sand Creek Group	I	7,874	Restricted Growing Season Use	1	713	Cattle
00007	Worland Cattle Group	I	13,241		1	1,110	Cattle
00008	Castle Gardens	M	17,887	Deferred Rotation	3	3,495	Cattle
00009	Kimball	I	6,909	Non-growing Season	1	811	Cattle/Sheep
00010	Gordon	M	3,209	Rest Rotation	1	863	Cattle
00011	Joe Henry	I	7,000		1	1,301	Cattle/Sheep
00012	Big Trails Group	M	24,356	Rest Rotation	3	5,309	Cattle
00014	Mileski Badlands	I	8,988		1	825	Cattle
00015	Lower Nowater	I	5,620	Deferred Rotation	1	577	Cattle
00016	Badlands	I	8,332		1	659	Sheep
00017	Billy Creek	M	240		1	80	Sheep
00018	Upper Nowater	I	5,650	Deferred Rotation	1	577	Cattle
00019	Double H	I	5,133	Deferred Rotation	4	1,071	Cattle/Horses
00021	Little Cottonwood	I	2,560	Spring Use in Non-consecutive Years	1	283	Cattle
00022	South Brokenback	I	599		1	48	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00023	Leikham	I	1,760	Spring Use in Non-consecutive Years Only	1	175	Cattle
00024	Beckley	I	2,130		1	485	Cattle/Sheep
00025	Nowood Individual	I	800	Non-growing Season Use	1	71	Cattle
00026	Cottonwood Draw	I	1,575		1	139	Cattle
00028	Upper Nowood	C	60		1	15	Cattle
00029	West Lost Creek	M	80		1	20	Cattle
00030	Big Cottonwood	I	5,055	Non-growing Season Use	1	366	Cattle
00031	Brokenback	I	10,669	Deferred Rotation	1	1,468	Cattle/Horses
00032	Hidden Dome	I	8,565	Deferred Rotation	2	718	Cattle
00033	Alkali	I	3,008	Deferred Rotation	2	264	Cattle/Horses
00034	Rattlesnake Ridge	I	11,885		1	1,243	Sheep
00035	Buffalo Canyon	I	3,463		2	719	Cattle
00036	Manderson	C	8,805	Non-growing Season Use	1	814	Cattle/Sheep
00037	North Butte	I	1,850	Deferred	1	139	Cattle
00039	Warner Draw	C	800		1	58	Cattle
00041	Fatty Allen	I	1,380		1	166	Cattle
00042	East Fork	I	8,888		1	900	Cattle
00043	North Tensleep	M	1,101		2	100	Cattle/Horses
00044	South Tensleep	M	400		2	49	Cattle/Horses
00045	South Pasture	I	280		1	67	Cattle
00046	Sand Springs	I	1,240		1	160	Cattle
00047	Hyattville Individual	I	2,400	Deferred	1	210	Cattle
00048	Neiber	I	17,055	Non-growing Season Use with Restricted Growing Season Use	1	1,860	Cattle
00049	Murphy Dome	I	2,540		1	423	Cattle
00050	Mud Creek	I	1,130		1	170	Cattle
00051	Farley	I	400		1	80	Cattle
00052	Prevo Individual	C	250	Non-growing Season Use	1	25	Sheep
00053	Ranch	C	280	Deferred	1	46	Cattle
00054	North Paintrock	I	920	Non-growing Season Use	1	101	Cattle
00055	Lost Pasture	C	100	Non-growing Season Use	1	25	Cattle
00056	Scott Mountain	I	560		1	177	Cattle/Sheep
00057	Blue Ridge	I	2,133		1	143	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00058	Mathews Ridge	I	1,398	Pasture 1 – Rest Rotation Pasture 2 – Summer/Fall Rotation	2	546	Cattle
00059	North House	C	360	Non-growing Season Use	1	26	Horses
00060	Mesa	M	80		1	22	Cattle
00061	Ainsworth Individual	M	44	Deferred	1	10	Cattle
00062	Ainsworth	I	900		1	130	Cattle/Horses
00063	Railroad Swamp	M	100	Unassigned	1	11	Cattle
00064	Spanish Point	I	707	Spring/Fall Deferment	1	185	Cattle
00065	Sheep Springs	I	1,186	Spring/Fall Deferment	1	501	Cattle/Horses/ Sheep
00066	Meyers Spring	I	1,542	Spring/Fall Deferment	1	416	Sheep
00067	Deeter	M	380		1	119	Cattle/Sheep
00068	Box Elder	I	1,000		1	423	Cattle
00069	Mahogany Butte	I	2,330		1	433	Cattle/Sheep
00070	S V	I	2,930		1	330	Cattle
00071	Chalk Butte	M	3,165		1	644	Cattle
00072	Helms	M	220		1	45	Cattle/Sheep
00073	Lower Sand Creek	I	11,884	Growing Season Deferment	1	1,462	Cattle
00074	Antelope Draw	I	15,786		3	1,776	Cattle/Sheep
00075	Battle Creek	M	283		1	109	Cattle
00076	Lower Walker	I	6,007		1	555	Cattle
00077	Middle Walker	I	2,618	Deferred	1	310	Cattle
00078	Upper Walker	I	1,300		1	173	Cattle
00079	Pack Saddle Creek	I	1,520	Non-growing Season Use	1	244	Cattle
00080	North Murphy Dome	I	6,385	AMP	1	888	Cattle
00081	Lower Arnold	I	1,600	Deferred Rotation	1	258	Cattle
00082	Upper Arnold	I	1,852	Deferred Rotation	1	213	Cattle
00083	K I S	I	1,991	AMP	1	449	Cattle
00084	Trapper Creek	I	1,227		1	153	Cattle
00085	Tower	C	50		1	2	Cattle
00086	Daugherty Dewitt	M	740	Deferred Rotation	2	148	Cattle
00087	Mountain Individual	M	170		1	34	Cattle
00088	Patras	I	843		1	332	Cattle
00089	Big Bend	I	8,847		1	1,429	Cattle
00090	Split Rock - V's	I	2,680	AMP	1	811	Cattle/Horses

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00091	Sand Creek	I	25,993	North Pasture – Non-growing Season Use Middle and South Pastures-Deferred Rotation	1	2,183	Cattle
00092	Paintrock Canyon	M	7,947	AMP	1	1,260	Cattle
00093	Long Point	I	646	Deferred Rotation	1	103	Cattle
00094	Red Hills	M	8,321	AMP	1	691	Cattle
00095	Forks	M	4,158	AMP	1	1,004	Cattle
00097	Deadline Draw	M	3,130	Non-growing Season Use	1	611	Cattle
00099	Schoolhouse Gulch	I	3,107	Non-growing Season Use with Restricted Growing Season Use	2	170	Cattle/Sheep
00100	Sand Creek Individual	I	1,865	Non-growing Season Use	1	159	Cattle
00101	Ranch Individual	M	840		1	153	Cattle
00102	Mountain Lost Creek	M	120		1	43	Cattle
00103	Little Lost Creek	M	121		1	12	Cattle
00104	Cottonwood	I	3,008		1	243	Sheep
00105	Nowater	I	7,958	Restricted Growing Season Use	1	732	Sheep
00106	Bald Ridge	M	317		1	51	Cattle
00107	Honey Combs	I	28,975		1	2,320	Cattle
00108	Dixon Canyon	I	740	Deferred Rotation	1	60	Cattle
00109	Coyote Springs	C	420	Deferred	1	75	Cattle
00110	Bud Kimball	I	7,275	Deferred	1	900	Cattle
00111	Otter Creek	I	600		1	134	Cattle
00112	Faure Nowater	I	3,542		1	471	Cattle/Sheep
00113	North Nowood	I	1,000	Non-growing Season Use	1	155	Cattle
00114	South Nowood	I	2,574	Non-growing Season Use	1	257	Cattle
00116	Brush Cabin	M	240		1	44	Cattle
00117	Pierson Mountain	M	40		1	5	Cattle
00118	Scorpion	I	14,182		1	1,497	Cattle
00119	Bluebank	M	7,600		1	1,267	Cattle
00120	Buffalo Creek	I	7,026		1	1,349	Cattle/Horses
00122	Harvard Individual	M	320	Deferred	1	37	Cattle/Sheep
00123	Buffalo Sand Point	I	29,046	Deferred Rotation	5	6,972	Cattle/Horses
00124	West Side Summer	I	2,945	Deferred Rotation	23	710	Cattle/Horses
00125	East Side Summer	I	1,880	Deferred Rotation	7	460	Cattle
00127	Otter Creek Pastures	I	2,820		3	575	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00129	Mazet	M	80		1	26	Cattle
00130	Lower V's	I	1,950		1	429	Cattle/Sheep
00131	High Camp	I	900		1	216	Cattle
00132	Big Cottonwood Creek	I	13,634	Deferred Rotation	5	1,270	Cattle/Sheep
00133	Potter Butte	I	4,480		1	678	Cattle
00134	Bonanza	C	1,550	Non-growing Season Use	1	141	Cattle
00135	Axtell Ditch Creek	M	320	Deferred	1	58	Cattle
00136	Black Hills	C	520		1	32	Cattle
00137	Paintrock South	I	800		1	57	Cattle/Horses
00138	Hurtig	I	1,720	Rest Rotation	1	258	Cattle
00141	Greet Individual	M	240	Deferred	1	52	Cattle
00142	Rannells	M	1,752	Rest Rotation	4	700	Cattle
00143	Medicine Lodge	I	9,332		1	1	Cattle
00144	Lower Nowood	C	11,700	Spring/Fall Deferment	1	984	Cattle/Sheep
00145	Cedar Ridge	M	9,811	Spring/Fall Deferment	1	1,321	Cattle/Horses/ Sheep
00146	East Allotment	I	610		1	130	Cattle
00147	West Allotment	I	3,042	Deferred Rotation	2	515	Cattle
00148	Renner Individual	I	11,782	Rest Rotation	8	383	Cattle
00149	Lost Creek	M	33		1	10	Cattle
00150	Juniper Hills	M	630		1	56	Cattle/Horses
00151	Homestead	C	400		1	20	Cattle
00153	Denver Jake Draw	C	10,856		1	1,358	Cattle/Sheep
00155	Mary's Creek	I	975		1	58	Cattle
00156	Rome Hill	I	5,300	Deferred	1	558	Cattle
00157	South Butte	M	2,180		3	502	Cattle
00158	Seaman	I	6,680	AMP	4	1,922	Cattle
00159	Tie Down	C	2,791	Non-growing Season Use	1	93	Cattle
00160	Spring Creek Common	I	1,557		1	152	Cattle/Sheep
00161	North Blue Ridge	C	2,703	Non-growing Season Use	1	211	Cattle
00162	Slick Water	I	12,368	Rest Rotation	3	1,388	Cattle
00163	Demer Nowater	I	7,000	Rest Rotation	2	234	Cattle
00164	Cottonwood-North Butte	I	10,299	Non-growing Season Use	1	350	Cattle
00166	Jacobs Creek	I	745		1	51	Cattle
00167	Switchback	I	1,405		1	146	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00168	Lower Spring Creek	I	1,240		1	73	Cattle
00169	Bader Gulch	M	200		1	20	Sheep
00170	Oilfield	C	6,233	Spring/Fall/Rest 3-year Rotation	1	763	Cattle
00171	East Nowood	C	1,560	Non-growing Season Use	1	179	Cattle
00172	West Nowood	I	785	Non-growing Season Use	1	39	Cattle
00173	Tensleep	I	1,945	Spring/Fall/Rest 3-year Rotation	1	275	Cattle
00174	Lower Brokenback	I	1,062	Spring/Fall/Rest 3-year Rotation	1	107	Cattle
00175	Upper Brokenback	I	4,771	Spring/Fall/Rest 3-year Rotation	1	486	Cattle
00177	Red Springs Rock Butte	I	850	Spring/Fall/Rest 3-year Rotation	1	166	Cattle
00178	Dry Tensleep	I	1,196	Deferred Rotation	1	326	Cattle
00179	Tharp Individual	C	145	Non-growing Season Use	2	10	Cattle
00181	Torchlight	C	19,337	Non-growing Season Use	1	1,571	Sheep
00182	Buttes	I	2,800		3	700	Cattle/Sheep
00183	Onion Gulch	I	920		1	164	Cattle/Sheep
00184	Upper Sand Creek	C	5819	Non-growing Season Use	1	783	Cattle
00185	Healy	C	15,572		1	1,435	Cattle
00186	Rim	I	2,640	Non-growing Season Use	1	278	Sheep
00188	Small Pasture	I	767		1	114	Cattle/Horses
00189	Jolly Pasture	I	884		1	210	Cattle/Horses
00190	Turner Pasture	I	440	Deferred	1	67	Cattle
00191	Lower Black Mountain Draw	I	2,442	Deferred	1	407	Cattle
00192	Upper Black Mountain Draw	I	402	Deferred	1	80	Cattle
00193	Little Mud Creek	I	310	AMP	1	33	Cattle
00194	Upper Black Mountain	I	621		1	136	Cattle
00195	Lower Black Mountain	I	360		1	72	Cattle
00196	Lake Creek	I	360	Deferred Rotation	1	58	Cattle
00197	Duncan	M	415	Non-growing Season Use	1	37	Cattle
00199	Big Cedar	I	1,955		1	498	Cattle/Horses
00200	South Individual	M	1,470		1	161	Cattle/Horses

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00201	East Basin Draw	C	160	Non-growing Season Use	1	15	Cattle
00202	Airport	I	7,412	Spring/Fall Deferment	1	641	Cattle
00203	Tobes Pastures	I	1,020	Non-growing Season Use	1	231	Cattle
00204	North Of Ditch	I	720		1	30	Cattle
00205	West Black Mountain	I	885	Deferred	1	141	Cattle
00206	Bear Creek Common	I	1,503		1	263	Cattle
00210	Willow Creek	I	4,096		1	931	Cattle
00211	Wyman Draw	I	217	Growing Season Use Every Third Year	1	18	Cattle
00212	Signal Butte	I	111	Non-growing Season Use	1	12	Horses
00213	East Hyattville	C	80		1	12	Horses
00214	South Bank	C	20		1	5	Cattle
00215	Deeded	M	2,334	AMP	1	408	Cattle
00216	Mud Gulch	M	1,870	Non-growing Season Use	1	192	Cattle/Sheep
00217	East Alkali	I	4,192	Spring/Fall Deferment	1	314	Cattle/Horses/ Sheep
00218	West Alkali	I	12,696	Spring/Fall Deferment	1	814	Sheep
00219	Robson Mountain	M	240		1	50	Cattle
00220	East Flats	C	3,924		1	255	Cattle/Sheep
00221	Parker	I	1,846	Non-growing Season Use	1	126	Cattle
00222	Anthony Timber	I	870	Deferred Rotation	1	109	Cattle
00223	Wood's Split Rock	M	300		1	64	Cattle
00294	O'Brien Camp	C	363		1	105	Cattle
00501	Blue Springs	I	12,979		1	2,789	Cattle/Horses
00502	South Lucerne Group	M	5,077	Deferred Rotation	3	494	Cattle/Horses/ Sheep
00504	Hamilton Dome	I	11,125		1	799	Cattle/Horses
00506	Common Harvey	I	965	Non-growing Season Use	1	98	Cattle
00507	South Gooseberry Group	I	58,468		1	4,526	Cattle/Sheep
00508	North Gooseberry	I	113,805	Restricted Growing Season Use	1	8,519	Cattle/Sheep
00509	New Burlington Group	I	94,834	Rest Rotation	4	6,207	Cattle/Sheep
00510	Fernandez Blu-Jay	I	8,900	Dormant Season Use or Rest Rotation (Spring/Fall/Rest)	3	710	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00511	East Tanner	M	252	Non-growing Season Use	1	33	Cattle
00512	Coulter Group	I	11,516		1	666	Cattle/Horses
00513	Dockery Hammond	C	741	Post Seed-Ripe Use	1	80	Cattle
00515	Upper Gooseberry	M	3,301		6	864	Cattle
00516	Blue Creek	I	1,888	Deferred Rotation	4	84	Cattle
00517	Cedar Mountain	C	8,320		1	690	Cattle
00518	Home Place	M	1,250	Deferred	1	175	Cattle
00519	Middle Creek	I	545	AMP	1	126	Cattle
00520	Red Creek	C	124	AMP	1	21	Cattle
00521	Lower Cottonwood	I	6,566	Deferred Rotation	1	411	Cattle
00522	Grass Creek	I	8,994	Deferred Rotation	1	949	Cattle
00523	Highway Junction	I	5,590	Non-growing Season Use	1	663	Cattle
00524	Cottonwood Creek	I	1,202	Deferred Rotation	3	233	Cattle/Horses
00525	Rock Creek	I	4,311		1	_[2]	
00526	Rimrock Basin	I	3,331	Rest Rotation	1	665	Cattle
00527	Blackstone	C	797	Rest Rotation	1	171	Cattle
00528	Six Mile	I	1,766	Non-growing Season Use	1	134	Sheep
00529	Prospect Common	I	7,832	Restricted Growing Season Use	1	1,207	Cattle
00530	Grass Creek Basin	C	1,819	Restricted Growing Season Use	1	300	Cattle/Horses
00531	Spring Gulch	I	1,982	Restricted Growing Season Use	1	295	Cattle
00532	Whisky Gulch	I	356	Deferred Growing Season Use	1	79	Cattle/Horses
00533	Home Ranch	I	938		1	132	Cattle/Horses
00534	East Cottonwood	C	3,413		1	_[1]	
00535	West Cottonwood	C	7,113		3	_[1]	
00536	Heifer	M	882		1	225	Cattle
00537	Padlock	I	2,257		1	510	Cattle
00538	East Waugh Dome	C	2,600	Non-growing Season Use	1	208	Cattle
00539	Buchanan Basin	I	339		1	125	Cattle
00540	Bridges	C	757	Deferred Rotation	1	190	Cattle
00541	Three Peaks	I	985	Deferred Rotation	1	60	Cattle
00543	Cannady Individual	I	928		1	58	Cattle
00544	Maller Individual	I	188	Rest Rotation (Spring/Fall/Rest)	1	13	Cattle
00545	Grass Point	I	4,138	Deferred Rotation	1	547	Cattle/Horses

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00546	Highway	I	1,149	Deferred	1	107	Cattle
00547	Red Farm	M	1,317	Non-growing Season Use	1	172	Cattle
00548	D & LM Individual	I	1,903	Non-growing Season Use	1	151	Sheep
00549	Greybull Bend	C	380	Non-growing Season Use	1	37	Cattle
00551	Coulee-Mill Iron	M	2,461		1	_[2]	
00552	Milk Creek	M	382		1	108	Cattle
00553	Richmond	I	3,934		1	599	Cattle/Horses
00554	Waugh Dome	C	2,255	Non-growing Season Use	1	138	Cattle
00556	21 Creek	I	1,808	Deferred Rotation Spring/Summer/Fall	1	322	Cattle
00557	Ramul Individual	M	135	Deferred Rotation	1	18	Cattle
00558	Buck Creek	I	488		1	95	Cattle
00559	East Five Mile	C	1,888	Non-growing Season Use	1	400	Cattle
00560	Sfnf	I	1,086		1	82	Cattle
00561	Freudenthal Individual	C	1,935		1	268	Cattle
00562	Gardner Badlands	I	11,641		1	1,934	Cattle
00563	Winter Camp	I	2,310		1	490	Cattle
00564	Little Buffalo Basin	M	2,277	AMP	1	562	Cattle
00565	Red Hole	I	2,106		1	307	Cattle
00566	Meeteetse Draw	I	2,026	Deferred	1	218	Cattle
00567	Lucerne	C	2,460	Deferred	1	188	Cattle/Horses
00568	Basin	I	8,527		2	_[2]	
00569	Curtis	M	3,388		2	_[2]	
00570	Red Springs Draw	I	6,431	AMP	2	900	Cattle
00571	Zimmerman Buttes	I	4,059	AMP	1	503	Cattle
00572	Eagle Draw	M	1,882	AMP	2	440	Cattle
00573	Wagonhound Bench	I	3,478		1	_[2]	
00574	Coal Draw	M	6,551		1	_[2]	
00575	Slab Creek	I	1,016		1	_[2]	
00577	South Basin	I	42,331	Non-growing Season Use/Restricted Growing Season Use	1	3,123	Sheep
00578	North Basin Group	I	5,392		1	350	Cattle/Sheep
00579	Hillberry Rim	I	9,187	Deferred Rotation	3	1,452	Cattle/Sheep
00580	Coal Mine	I	469		1	97	Cattle
00581	Cherry Creek	I	670		2	164	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00582	Mill Iron-East	M	404		1	–[2]	
00583	Mud Creek Pasture	C	182		1	21	Cattle
00584	Jones Flat	M	121		1	0[2]	
00585	North Hart	I	561		1	0[2]	
00586	South Hart	C	85		1	0[2]	
00587	Typer Pasture	C	254		1	0[2]	
00588	Sandstone	C	536		1	–[2]	
00589	Kirby Creek	I	10,032		2	1,044	Cattle/Horses/ Sheep
00590	Little Sand Draw	I	7,372	Non-growing Season Use	1	304	Cattle
00591	Zimmerman Springs	I	4,779	Non-growing Season Use	1	476	Sheep
00592	Wild Horse Butte	I	1,325		1	443	Cattle/Sheep
00593	Hamilton Rim	M	570		1	59	Horses
00594	Buffalo Basin	M	1,369	Deferred Rotation	1	389	Cattle
00595	Iron Creek	M	1,312	Deferred Rotation	1	410	Cattle
00596	Wagonhound	I	8,198		6	–[2]	
00598	Powder River	I	3,374		1	921	Cattle/Sheep
00599	Gooseberry	M	3,108		1	555	Cattle
00600	Wall Rock	M	1,084		1	533	Cattle
00601	Mormon Creek	M	307		1	107	Cattle
00602	Rock Springs Draw	I	5,191		1	869	Cattle/Horses
00603	Pistol Draw	C	2,280	Non-growing Season Use	1	431	Cattle
00604	Lu	I	101,548	Deferred Rotation	35	16,031	Cattle/Horses/ Sheep
00607	Lake	I	3,621	Restricted Growing Season Use	1	734	Cattle
00608	Vass	I	693	Non-growing Season Use	1	100	Cattle
00609	Owl Creek	I	1,867	Cattle Grazing 1 Out of 3 Years	1	144	Cattle/Horses
00610	South Owl Creek	I	888	Growing Season Use 1 out of 3 Years	1	82	Cattle
00611	Neves Individual	I	67		1	7	Cattle
00612	South Tatman	I	2,241	Non-growing Season Use	1	176	Sheep
00613	Putney Flat	M	817	Deferred Rotation	2	180	Cattle
00614	Rattlesnake	I	789	Deferred Rotation	4	139	Cattle
00615	Lime Ridge	I	959	AMP	1	230	Cattle
00616	Home	M	3,851	Deferred Rotation	1	378	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00617	Gloyd Individual	M	119	Non-growing Season Use	1	10	Cattle
00618	North Blackstone	C	699	Non-growing Season Use	1	118	Horses
00620	Prospect	I	4,956	Deferred Rotation Spring/Summer/Fall	4	1,205	Cattle/Horses
00621	North Grass Creek	I	2,348	Restricted Growing Season Use	1	293	Cattle
00622	South Highway	I	8,977	Deferred Rotation	2	758	Cattle
00623	North Highway	C	6,655	Deferred Rotation	1	449	Cattle
00624	Black Willow Draw	I	3,500		3	596	Cattle
00625	Freeman Draw	C	1,100		1	134	Cattle
00626	Timber Creek	I	8,098	Rest Rotation	4	327	Cattle
00627	Rooster Creek	I	3,017	Deferred Rotation	4	640	Cattle/Horses
00628	Hole In The Ground	I	2,058	Rest Rotation (Spring/Rest)	1	252	Cattle
00629	Rankine	C	158	Deferred Rotation (Spring/Fall/Fall)	1	17	Cattle
00631	Ditch Creek	I	2,120		1	385	Cattle
00632	Dick Creek	M	182	Total Deferment	1	25	Cattle
00633	Upper Pastures	I	4,463	AMP	7	1,057	Cattle
00634	Lower Pastures	I	9,998	AMP	4	980	Cattle/Horses
00635	Plummer	I	1,320		1	268	Cattle
00636	Haynes	C	455		1	131	Cattle
00637	Adam Weiss Peak	I	3,681	AMP/Deferred Rotation	1	625	Cattle
00638	King Dome	M	4,741	Non-growing Season Use	1	519	Cattle
00639	Tatman Mt Common	I	29,104	Restricted Growing Season Use	1	2,423	Cattle
00641	Swing Individual	C	472	Deferred	1	35	Cattle
00642	Bear Trap	C	400		1	58	Cattle/Sheep
00643	Buchanan	M	3,358	Non-growing Season Use	1	545	Cattle
00644	Tanner	M	4,266	Non-growing Season Use	1	567	Cattle
00645	South Coal Draw	M	4,738	Non-growing Season Use	1	545	Cattle
00646	Back Of Rim	M	5,223	Non-growing Season Use	2	635	Cattle
00647	Steer	M	2,089	Non-growing Season Use	1	340	Cattle
00648	Shumway Individual	I	357		2	50	Cattle
00649	Maret	M	480		1	100	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00650	South Gebo Common	M	1,857	Non-growing Season Use	1	181	Cattle
00651	West Five Mile	M	39,870	Non-growing Season Use	1	1,000	Cattle
00652	Badger Gulch	I	18,864		1	2,136	Sheep
00653	Red Lane	C	636	Non-growing Season Use	1	63	Cattle
00654	Ayers Individual	I	609	Restricted Growing Season Use	1	125	Cattle
00655	Copper Mountain	I	560	Deferred Rotation	1	121	Cattle
00656	Sand Draw	I	5,953	Rest Rotation	1	839	Cattle
00657	West Lucerne	M	969	Non-growing Season Use	1	90	Cattle
00658	Red Springs	M	1,697	Deferred Rotation	1	385	Cattle
00659	Black Willow	M	1,902	Deferred Rotation	1	444	Cattle
00660	West	C	720	Non-growing Season Use	1	106	Cattle
00661	Three Peaks Anchor	I	6,714		1	–[2]	
00662	Enright	I	9,608	Non-growing Season Use	1	1,423	Cattle
00663	Cow Pasture	C	1,949		1	164	Cattle
00664	Alamo Creek	I	328		1	25	Cattle
00665	Nelson	M	14,266	Non-growing Season Use	1	861	Cattle
00666	Reclamation	I	6,722	Rest Rotation (Spring/Fall/Rest)	1	292	Cattle
00667	Turk	C	300		1	36	Cattle
00668	Dorsey Creek	C	10,076		1	505	Sheep
00669	Allen Basin	I	12,900	Non-growing Season Use	1	835	Sheep
00670	Upper 15 Mile	C	441		1	201	Cattle
00671	Ten Mile	I	24,199	Non-growing Season Use/Restricted Growing Season Use	1	1,651	Sheep
00672	Mountain	I	1,002	AMP	1	187	Cattle
00673	Mountain West	C	179		1	26	Cattle
00674	North Tatman	C	9,463	Non-growing Season Use	1	752	Cattle
00675	Cheever Flat	C	160		1	7	Cattle
00676	Pitchfork	I	12,733	Non-growing Season Use	1	1,187	Sheep
00678	South Grass Creek	I	9,068	AMP	6	1,489	Cattle/Horses
00679	North Rim	M	921	AMP	1	111	Cattle/Horses
00680	Lake Creek Pasture	C	758		1	–[2]	

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
00681	Spring Creek	I	1,611		1	—[2]	
00682	Hunt Oil 15 Mile	I	16,692		1	1,420	Sheep
00683	South Sleeper	I	4,666		1	1,225	Cattle/Sheep
00685	Bramah	I	1,220	Non-growing Season Use	1	175	Cattle
00686	Middle Fork Powder River	C	99		1	13	Cattle
00720	Putney Place	C	454		1	109	Horses
00721	Urwin Homestead	C	167		1	25	Horses
00722	Wales Homestead	C	108		1	24	Horses
01001	Table Mountain	C	20,195	Rest Rotation (Spring/Fall/Rest)	1	730	Cattle/Sheep
01002	Whistle Creek	I	33,707	Rest Rotation (Spring/Fall/Rest)	1	1,165	Cattle
01003	Stateline	M	40,899	Deferred Rotation (Spring-Summer/ Summer-Fall)	3	1,642	Cattle
01004	Airport	C	995	Deferred Rotation (Spring/Fall/Fall)	1	45	Cattle
01005	Gravel Crossing	M	8,472	Rest Rotation (Spring/Rest)	2	455	Cattle
01006	Sand Draw	I	55,401	Deferred Rotation (Spring/Summer/ Fall)	1	2,301	Sheep
01007	Coon Creek	M	681	Total Deferment	8	68	Cattle
01008	Gyp Creek	M	11,628	Rest Rotation (Spring/Rest)	1	384	Cattle
01010	Mexican Hills	C	2,665	Deferred Rotation (Spring/Fall)	1	16	Cattle
01011	Petroglyph	C	2,661	Rest Rotation (Spring/Rest)	1	140	Cattle
01012	West River	M	20,929	Deferred Rotation (Spring/Summer/ Fall)	1	648	Sheep
01013	Bear Creek	I	19,463	Rest Rotation (Spring/Fall/Rest)	3	1,388	Cattle
01014	Sheep Mountain	I	13,662	Rest Rotation (Spring/Fall/Rest)	1	350	Cattle
01015	Lower Bear Creek	I	11,309	Rest Rotation (Spring/Fall/Rest)	1	600	Cattle
01017	Beaver Creek	M	1,742	Rest Rotation (Spring/Fall/Rest)	1	107	Cattle
01018	Individual	I	6,767	Rest Rotation	3	330	Cattle/Sheep
01019	North Beaver Creek	C	336	Rest Rotation (Fall/Rest)	1	18	Cattle/Horses/ Sheep
01020	Mckinnie Reservoir	C	1,696	Total Deferment	1	110	Sheep

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
01023	Crystal Creek	I	12,857	Rest Rotation (Spring/Fall/Rest)	2	300	Cattle
01024	Many Springs	M	1,327	Deferred Rotation (Spring/Fall)	1	67	Cattle
01025	Mills	I	3,941	Deferred Rotation (Spring/Fall)	1	173	Cattle
01026	Burnham	M	1,817	Rest Rotation (Spring/Fall/Rest)	2	190	Cattle
01027	Moss Ranch	I	14,628	Rest Rotation (Spring/Fall/Rest)	6	1,467	Cattle/Horses
01028	Little Mountain	I	19,926	Deferred Rotation (Spring/Fall)	4	575	Cattle
01029	Moncur Springs	C	2,562	Deferred Rotation (Spring/Fall)	1	129	Cattle
01031	Himes Group	I	18,989	Rest Rotation (Spring/Fall/Rest)	2	507	Cattle
01032	Lovell Group 1	C	10,436	Rest Rotation (Spring/Fall/Rest)	2	235	Cattle
01033	One Forty	M	1,882	Deferred Rotation (Spring/Fall)	1	145	Cattle
01034	Willow Creek	M	2,170	None	1	193	Cattle
01035	North Shoshone	M	3,487	Rest Rotation (Spring/Fall/Rest)	1	139	Cattle
01036	North Shoshone	I	14,827	Deferred Rotation (Spring/Fall)	1	365	Cattle
01037	Himes/Spence	M	24,940	Deferred Rotation (Spring/Fall)	1	1,303	Cattle
01038	Firing Range	M	5,616	Deferred Rotation (Spring/Fall)	2	308	Cattle
01039	Foster Gulch	I	32,935	Deferred Rotation (Spring/Fall/Fall)	1	1,504	Cattle
01040	Race Track	I	532	Deferred Rotation (Spring/Fall/Fall)	1	20	Cattle
01043	Sand Hills	I	15,084	Deferred Rotation (Spring-Summer/ Summer-Fall) except Mantua Draw Rest Rotation (Spring/Fall/Rest)	3	363	Cattle
01046	Bench Canal	M	644	Rest Rotation (Spring/Fall/Rest)	1	47	Cattle
01047	County Line	M	885	Deferred Rotation (Spring/Summer/ Fall)	1	52	Cattle/Horses
01048	Dry Creek	M	721	Deferred Rotation (Spring-Summer/ Summer-Fall)	1	64	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
01049	Individual	I	1,140	Rest Rotation (Spring/Rest)	2	101	Cattle
01050	Lovell Group 5	C	2,544	Rest Rotation (Spring/Fall)	1	78	Cattle
01051	Greybull Group	M	11,381	Rest Rotation (Early Spring/Fall/Rest)	1	467	Cattle/Sheep
01052	South Lovell Group	M	4,802	Total Deferment	2	154	Cattle
01053	Little Sheep Mountain	I	8,918	Deferred Rotation (Spring/Fall/Fall)	1	742	Cattle
01054	Sand Hills	M	6,592	Season Long	1	575	Cattle
01055	Sidon Canal	M	1,043	Annual April/Fall	1	46	Cattle
01056	Kane	M	8,502	Rest Rotation (Spring/Rest)	1	176	Cattle
01057	Polecat Frannie	C	1,603	Season Long	1	155	Cattle/Horses
01058	Black Draw	C	610	Rest Rotation (Spring/Summer/ Rest)	1	37	Cattle
01059	Thumper	I	4,407	Deferred Rotation (Spring/Summer/ Fall)	1	2,775	Sheep
01060	East/West	I	49,092	Rest Rotation (Spring/Fall/Rest)	3	3,438	Cattle
01061	Individual	C	4,951	Rest Rotation (Spring/Summer/ Rest)	2	200	Cattle
01062	Dry Creek	M	4,224	Deferred Rotation (Spring/Summer/ Fall)	1	286	Sheep
01064	Peaks	I	14,914	Rest Rotation (Spring/Fall/Rest)	3	657	Cattle
01065	YU Bench	C	146	Deferred Rotation (Spring/Summer/ Fall)	1	18	Cattle/Horses
01066	Corbett Dam	M	3,789	Rest Rotation (Spring/Rest)	2	300	Cattle
01067	Fernandez	M	2,306	Deferred Rotation or Rest Rotation (Spring/Summer/Fall or Spring/Summer Rest)	2	331	Cattle
01069	Peaks	I	11,021	Deferred Rotation (Spring/Summer/ Fall/Winter)	3	1,519	Cattle
01070	Big Trap	I	8,052	Rest Rotation (Winter/Rest)	1	639	Cattle
01071	Polecat Bench	I	14,266	Total Deferment	2	1,797	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
01072	Sorensen	M	413	Rest Rotation (Spring/Summer-Fall/Rest)	2	112	Cattle/Sheep
01073	Sage Creek	I	12,238	Rest Rotation (Spring/Summer/ Fall/Rest)	3	1,465	Cattle
01074	Keystone	C	230	Deferred Rotation (Spring/Summer/ Fall/Winter)	3	27	Cattle
01075	Clarksfork	I	11,347	Rest Rotation (Spring/Rest)	6	1,089	Cattle
01076	Clark	C	1,792	Deferred Rotation (Spring/Summer-Fall/Winter)	2	288	Cattle
01078	Kane Stock Rest	M	901	Livestock Trailing	1	30	Trailing
01079	River	C	97	Total Deferment	1	15	Cattle
01080	Chapman Bench	I	6,434	Rest Rotation (Spring/Rest)	2	380	Cattle
01081	Big Horn River Wildlife Tracts	C	744	Wildlife	22	17	Wildlife
01082	Bennett Creek	M	389	Total Deferment	1	33	Cattle
01083	Yellowtail Wildlife Tracts	I	134	Wildlife	3		Wildlife
01085	Individual	C	21	None	1	10	Cattle/Horses
01086	Schlaf Common	M	3,278	Rest Rotation (Spring/Fall/Rest)	2	239	Cattle
01087	Badlands	I	20,385	Rest Rotation (Spring/Rest)	2	1,144	Cattle
01088	Heifer	I	7,888	Rest Rotation (Winter/Rest)	1	511	Cattle
01089	Natural Trap	I	16,370	Rest Rotation (3 Treatment)	3	1,217	Cattle
01090	Low Miller	C	3,484	Deferred Rotation (Spring/Fall)	2	150	Cattle
01091	Shoshone River Wildlife Tracts	I	423	Wildlife	20	0	Wildlife
01146	Lewis	C	37	Total Deferment	1	4	Cattle
01501	Cedar Creek	I	1,919	Rest Rotation (Spring/Fall/Rest)	1	200	Cattle
01502	East Jack Creek	I	440		1	47	Cattle
01503	Long Point Pasture	I	860		1	137	Cattle
01504	Wild Horse Flats	C	8,200		1	509	Sheep
01505	Clay Pits	I	4,413	Rest Rotation (Early Spring/Fall/Rest)	1	65	Cattle/Sheep
01506	Beaver Creek	I	362	Rest Rotation (Spring/Fall/Rest)	1	4	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
01507	Bush Butte	I	3,710		1	275	Cattle
01508	Chimney Rock	M	656		1	32	Horses
01509	Red Canyon	I	6,440	Rest Rotation (Spring/Spring/Rest)	3	192	Cattle
01510	Fox Mountain	I	9,946		1	582	Cattle/Sheep
01511	Lake Ridge	I	546		1	157	Cattle/Horses
01513	Black Mountain	I	5,393		1	295	Cattle
01514	White Creek	I	163		1	72	Cattle
01515	Dump Rivers Edge	C	4,470	Rest Rotation (Spring/Fall/Rest)	1	78	Cattle/Sheep
01516	Sunlight	I	4,529	Rest Rotation (Early Spring/Spring/Rest)	2	325	Cattle
01517	South Individual	C	233	Deferred Rotation (Spring/Fall)	1	14	Cattle
01519	South Shell	I	3,760	AMP/Deferred Rotation	1	289	Cattle
01520	Poverty Acres	C	1,740	Fall/Winter Use	1	54	Cattle
01521	Horse Mountain	M	595		1	21	Horses
01522	West Of Ranch	I	1,187	Rest Rotation (Early Spring/Spring/Rest)	1	92	Cattle
01523	Golf Course	C	480		1	20	Horses
01524	South Alkali	C	200		1	22	Horses
01525	Potato	I	27,940		2	2,544	Cattle
01526	Sabin	I	1,023	Non-growing Season Use	1	187	Cattle
01528	Cottonwood Creek Wildlife Tract	M	86	Spring/Fall Deferment	1	0	Wildlife
01529	West Beaver Creek	I	806	Rest Rotation (Spring/Fall/Rest)	1	21	Cattle
01532	Lost	I	5,353	Rest Rotation (Early Spring/Spring/Rest)	1	106	Cattle/Sheep
01533	Crandall	M	592	Rest Rotation (Early Spring/Spring/Rest)	1	12	Cattle/Sheep
01534	One-Twenty-One	I	5,243	Rest Rotation (Early Spring/Spring/Rest)	2	189	Cattle
01535	South Shell Group	I	11,862	AMP/Non-growing Season Use	2	1,160	Cattle/Horses
01536	Upper White Creek	I	5,496	AMP w/USFS Deferred Rotation	1	634	Cattle
01537	Potato Ridge	C	8,600		1	357	Sheep
01538	North Shell Group	C	17,890	Rest Rotation (Early Spring/Spring/Rest)	3	1,029	Cattle
01539	Lower White Creek	M	890		1	77	Cattle
01540	Paton/One-Eighth Acre	C	0	Relinquished	1		None

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
01541	Red	I	716	Rest Rotation (Spring/Fall/Rest)	1	64	Cattle/Horses
02001	Willow Springs	M	375	Deferred Rotation	1	94	Cattle
02003	Rose Mountain	M	80		1	20	Cattle
02005	Tallon V	I	1,240	Deferred	1	260	Cattle
02007	Otter Creek Mountain	I	1,730		1	329	Cattle
02008	Box Canyon	I	280		1	72	Cattle
02010	Dry Farm	M	496	Deferred	2	124	Cattle
02012	Natrona	M	4,028	Deferred Rotation	1	841	Cattle
02013	Harriet	M	800		1	163	Cattle/Sheep
02014	Cherry Creek Hill	M	159		1	26	Cattle
02015	Beaton Place	I	160		1	44	Cattle/Sheep
02016	S.F. Little Canyon Creek	M	240		1	60	Sheep
02017	Hall Butte	M	240		1	24	Cattle
02018	Warm Springs	I	1,387		2	215	Cattle
02019	Hazen Draw	I	400		1	80	Cattle
02020	Tanner-Mountain	I	600	AMP	2	154	Cattle
02342	Otter Creek Vee Rd	C	80		1	20	Cattle
02501	Arapahoe Ranch	C	465	Non-growing Season Use	1	161	Cattle
02502	Armstrong	C	372	None	1	42	Cattle
02503	Grider Basin	I	2,144		1	385	Cattle
02504	Carter Mountain	I	7,540	Rest Rotation (Summer/Rest)	1	200	Cattle
02505	Lower Red Canyon	I	2,261	AMP	2	450	Cattle
02506	Dye	I	2,758	Spring/Fall Deferment	2	460	Cattle
02507	Bridger Creek	I	1,680		1	244	Cattle
02509	Peak	I	3,742		2	716	Cattle
02510	Gould Individual	I	2,310	AMP	1	367	Cattle
02511	Gould North Individual	M	93	Non-growing Season Use	1	139	Cattle
02512	Billys Flats	M	80		1	31	Cattle
02514	V-H Draw	I	3,227		7	503	Cattle
02515	East Fork Jones Creek	M	240	AMP	1	48	Cattle
02516	Wood's Basin	I	400		1	67	Cattle
02519	Newell Springs	M	1,186	Total Deferment (River excluded)	2	156	Cattle
02522	Kruger Sec 15	M	80		1	16	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
02523	Kukla Sec. 15 (C)	C	1,191	Non-growing Season Use	1	144	Cattle
02524	Jack Creek	M	400	Deferred	1	40	Cattle/Horses
02525	Jones Creek Mountain	I	440		1	75	Cattle
02528	Cedar Mountain	C	1,098	Unassigned	1	24	Wildlife
02529	Jones Creek	I	320		1	51	Cattle
02530	Neilson	I	520		1	95	Cattle
02531	Jenks Creek	I	40		1	8	Cattle
02532	Pitchfork	M	5,929	Total Deferment	2	1,245	Cattle
02533	Sliver	I	566		1	43	Cattle
02534	Renner Section 15	I	183	Total Deferment	1	37	Cattle
02535	Meeteetse Rim	M	910	Deferred Rotation (Spring/Summer/ Fall/Winter); None	3	160	Cattle
02536	Blue Hill	I	2,227		2	404	Cattle/Horses
02538	Jones Creek Basin	I	2,342	Deferred Rotation	1	710	Cattle
02539	Red Canyon	I	6,480		10	795	Cattle
02541	M.F. Warm Springs	I	400		1	58	Horses
02542	Stump	I	437		1	96	Cattle/Horses
02543	Swallow	I	698		1	156	Cattle
02544	Tonopah Ridge	M	3,261	Deferred Rotation (Spring-Winter/ Winter)	2	399	Cattle
02545	91 Ranch	M	9,419	Rest Rotation (Spring/Rest)	6	1,632	Cattle
02546	Major Basin	I	4,324	Spring/Fall Deferment	1	876	Cattle
02547	V Pasture	I	2,304		1	396	Cattle/Horses
02549	Hawks Butte	I	720	Deferred	1	95	Cattle
02550	Melton Mountain	I	680		1	104	Cattle
02551	Cottonwood Creek	M	2,363	Deferred Rotation (Spring/Fall)	2	413	Cattle
02552	Twin Buttes	I	2,516	Deferred Rotation	1	454	Cattle
02553	Winniger	M	332	None	10	54	Cattle/Horses
02554	Reed Creek	I	2,000		1	349	Cattle
02555	Lawler Sec 15	C	1,194		1	115	Cattle
02559	Slope Pasture	I	2,220	AMP	1	563	Cattle
02560	Lysite Creek	I	160		1	32	Cattle
02561	Meeteetse Creek	M	506	Rest Rotation (Early Spring/Spring/ Summer/Fall)	1	62	Cattle/Horses
02562	Meeteetse-East	M	984		1	131	Cattle/Sheep

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
02563	Larsen Sec 15	M	515		1	78	Cattle
02564	Homestead/Avent	M	6,630	Rest Rotation (Winter/Rest)	2	702	Cattle
02565	Little Canyon Creek #2	C	680		1	160	Cattle/Horses/ Sheep
02566	Little Canyon Creek Med	C	40		1	11	Cattle/Sheep
02567	Sullivan Creek Valley	C	700		1	165	Cattle/Sheep
02806	South Y U Bench	I	1,972	Rest Rotation (Spring/Summer/ Rest)	1	200	Cattle
03001	Bennett Creek	M	3,038	Rest Rotation (Spring/Rest); Total Deferment	3	235	Cattle
03002	Stonewall Creek	M	41	None	1	8	Cattle/Horses/ Bison
03003	Lower Slope	M	3,345	Rest Rotation (Spring/Fall/Rest)	2	322	Cattle
03004	Stonebridge	I	4,517	Rest Rotation (Spring/Fall/Rest)	6	350	Cattle/Horses
03005	Natural Corral	C	189	Rest Rotation (Summer/Fall/Rest)	1	39	Cattle
03006	Coal Creek	M	1,730	None	1	185	Cattle
03007	Bennett Creek	M	4,264	Total Deferment and Rest Rotation (Spring/Rest)	3	216	Cattle/Horses
03008	Sage Creek Addition	I	132	Rest Rotation (Spring/Summer/ Fall/Rest)	1	18	Cattle
03009	Keystone	M	389	Deferred Rotation (Spring/Summer/Fall /Winter)	1	32	Cattle
03010	Osborne	M	928	Rest Rotation (Spring/Summer/ Fall/Rest)	1	94	Cattle
03011	Heart Mountain North	M	4,393	Deferred Rotation (Spring/Summer/Fall) and Rest Rotation (Spring/Fall/Rest)	5	429	Cattle/Horses
03012	Question Creek	I	1,090	None	1	115	Cattle
03013	Billy Goat	C	76	Trailing use only Goat Pasture. None on river pasture.	1	20	Horses
03014	Buchanan	C	267	Deferred Rotation (Early Spring/Spring/Fall)	2	14	Cattle/Horses
03015	Dunn Creek	C	24	Total Deferment	2	3	Horses

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
03017	Eagle Valley	C	41	None	1	4	Cattle/Horses
03018	Rock Creek	C	68	Deferred Rotation (Spring-Fall/Fall)	1	5	Cattle
03019	Te Ranch	C	180	Deferred Rotation (Spring-Fall/Fall)	1	21	Cattle
03020	Post Creek	C	449	Total Deferment	1	33	Horses
03021	Spirit Basin	C	514	Relinquished	1	30	None
03022	Fernandez	M	1,004	Deferred Rotation (Spring/Summer/Fall) and Rest Rotation (Spring/Summer/ Rest)	1	202	Cattle
03023	Diamond Creek	M	474	Rest Rotation (Spring/Summer/ Rest)	2	42	Cattle/Horses
03024	Four Bear	C	570	Rest Rotation (1 year in 4 use)	1	12	Cattle/Horses
03025	Jim Creek	C	1,058	Rest Rotation (1 year in 4 use)	3	81	Cattle/Horses
03026	Hill	C	350	None	1	31	Cattle
03027	Bunn	C	876	Rest Rotation (Spring/Summer/ Fall/Rest)	1	120	Cattle
03029	Oregon Basin	I	9,654	Deferred Rotation (Spring-Fall/Spring-Fall/Summer-Fall)	3	2,489	Cattle
03030	Diamond Basin	C	638	Rest Rotation (Spring/ Summer/Rest)	2	70	Cattle
03031	Meeteetse Creek	C	24	None	1	3	Sheep/Cattle/ Horses
03032	River Pasture	C	274	Rest Rotation (Spring/Fall/Rest)	1	12	Cattle
03033	Hogg	C	1,132	None	2	80	Cattle
03034	Spring Creek	C	362	None	1	46	Cattle
03035	Eagle Pass	I	25,616	Deferred Rotation (Spring/Summer/ Fall/Winter)	3	2,018	Cattle
03036	Lakeshore	C	1,233	Deferred Rotation (Spring/Summer-Fall or Summer-Fall)	2	32	Horses
03037	River	C	40	None	1	4	Cattle/Horses
03038	New Highway	M	202	Rest Rotation	1	35	Cattle
03039	Palette	C	1,876	None	2	344	Cattle
03040	Lakeview	M	177	Rest Rotation (Spring/Summer/ Rest)	1	21	Cattle/Horses

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
03041	Twin Creek	C	187	None	1	13	Horses
03042	Mccarty	C	77	None	1	10	Cattle
03043	Diamond Bar Ranch	M	747	Deferred Rotation (Spring-Fall/Fall)		188	Cattle
03044	Sheep Mountain	M	1,374	Rest Rotation (Spring/Rest)	2	150	Cattle
03045	Greenwald	C	473	Deferred Rotation (Spring/Summer/ Fall)	1	38	Cattle
03046	Wall Creek	C	193	Deferred Rotation (Spring/Fall)	1	17	Cattle
03047	Timber Creek	I	1,340	Rest Rotation (Spring/Fall/Rest)	1	72	Cattle
03048	Hoodoo Base	M	3,186	None		313	Cattle
03049	Haffey Place	C	432	Deferred Rotation (Spring/Fall)	1	70	Cattle
03050	Bull Creek	C	75	None; Non-use	3	14	Cattle
03051	Cottonwood Creek	M	1,269	Deferred Rotation (Spring and Summer/Fall/Fall)	2	150	Cattle
03052	Lake	M	8,460	Rest Rotation (Winter/Rest)	2	866	Cattle
03053	Trail Creek	I	5,836	None	14	807	Cattle
03054	Dorrance	C	297	Deferred Rotation (Spring/Summer/ Fall)	3	20	Cattle/Horses
03055	Red Pole	M	1,326	Total Deferment	3	44	Horses
03056	Upton	C	96	Wildlife	1	8	Wildlife
03057	Ishawooa	M	14	Total Deferment	1	2	Horses
03058	Rand Creek	M	120	Rest Rotation (Spring/Summer/ Rest)	2	12	Horses
03059	Indian Pass	I	2,494	Deferred Rotation (Spring/Summer/ Fall)	2	206	Cattle
03060	Hidden Valley	M	1,667	Total Deferment	2	150	Horses
03061	Little Dry Creek	M	7,195	Rest Rotation (Spring/Summer/ Fall/Rest)	8	870	Cattle
03062	Upper Sage Creek	C	430	None	1	20	Cattle
03063	El	M	81	Total Deferment	1	5	Horses
03064	Lower Sage Creek	M	3,786	Annual Fall-May	2	365	Cattle
03065	Trailing Pasture	I	127	Trailing	1	13	Cattle
03066	Little Rock Creek	M	619	Early Spring and Fall	1	33	Buffalo/ Horses

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
03067	Red Point	I	14,016	Deferred Rotation (Spring/Summer/ Fall)	3	1,026	Cattle
03068	Oregon Coulee	I	4,423	Deferred Rotation (Summer/Fall)	1	851	Cattle
03069	Lower Yu Bench	I	4,385	Rest Rotation (Spring/Summer/ Rest)	1	396	Cattle
03071	Wiley Rim	M	1,235	Deferred Rotation (Winter/Spring)	2	117	Horses
03072	Red Creek	M	277	Rest Rotation (Spring/Summer-Fall/Rest)	1	20	Horses
03073	Rimrock	M	2,960	Rest Rotation (Winter/Winter/ Rest)	3	482	Horses
03074	Alexander	M	378	Rest Rotation (Spring/ Summer-Fall/Rest)	1	63	Horses
03075	Hardpan Creek	M	242	Total Deferment	1	30	Horses
03076	Ll Bar	M	1,028	None	1	68	Cattle
03077	Southfork Wildlife	C	121	Wildlife	3	7	Wildlife
03078	Lake Creek	I	412	Total Deferment	1	40	Cattle
03079	Red Cabin	M	5,680	Deferred Rotation (Spring/Summer/ Fall/Winter)	2	864	Cattle
03080	Sunshine Reservoir	C	104	None	1	9	Cattle/Horses
03082	Castle Rock	M	650	Rest Rotation (Spring/Summer/ Fall/Rest)	1	33	Horses
03083	Clarksfork Canyon	I	479	Rest Rotation (Spring/Fall/Rest)	3	40	Cattle/Horses
03084	Big Dipper	M	1,668	Deferred Rotation (Spring/Fall)	2	109	Cattle
03085	Sulphur Creek	C	55	Annual Spring	1	8	Horses
03086	Chapman Bench	I	16,098	Rest Rotation (Spring/Rest)	2	1,493	Cattle
03087	State	M	4,009	Rest Rotation (Spring/ Summer/Fall/Rest)	2	201	Cattle
03088	Reclamation 15	I	2,670	Deferred Rotation (Spring/Fall/Fall)	1	275	Cattle
03089	Newmeyer Creek	M	1,247	Rest Rotation (Fall/Rest)	3	74	Cattle/Horses
03090	Yu Bench East	I	8,412	Deferred Rotation (Spring/Fall)	3	1,112	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
03091	Yu Bench West	I	10,911	Deferred Rotation (Spring/Summer/ Fall/Winter)	3	885	Cattle
03092	Peterson	M	278	Rest Rotation (Spring/Summer/ Fall/Rest)	1	26	Cattle
03093	Mountain Slope	M	1,653	Deferred Rotation (Spring/Fall)	1	215	Cattle
03094	Dry Creek	M	2,166	Rest Rotation (Spring/Fall/Rest)	1	300	Cattle
03096	Meeteetse Rim	M	1,299	None	1	223	Cattle/Horses
03097	Isolated 40	M	40	None	1	3	Cattle/Horses
03098	Rawhide Pasture	C	1,299	Livestock Trailing	1	63	Trailing
03099	Heart Mountain South	C	4,954	Rest Rotation (Spring/Summer/ Fall/Rest)	4	628	Cattle
03100	Big Bend	C	752	Deferred Rotation (Early Spring/Winter)	7	130	Horses
03101	Devils Tooth	M	212	Rest Rotation (Spring/Summer/ Rest)	1	4	Cattle
03102	Bench	I	9,375	Deferred Rotation (Spring/Summer/ Fall)	3	1,182	Cattle/Horses
03103	Simpson	M	8,635	Rest Rotation	33	1,172	Cattle
03104	Lone Tree	I	1,654	Deferred Rotation (Spring/Summer/ Fall)	2	120	Cattle/Horses
03105	Pasture Number 4	C	19	Deferred Rotation (Summer/Fall)	1	2	Buffalo/Cattle
03106	Trout Creek	M	2,423	None	2	134	Horses
03107	Turnell	M	167	None	1	11	Cattle
03108	Rattlesnake Creek	M	2,816	Rest Rotation (Spring/Fall/Rest)	9	209	Cattle/Horses
03109	Southfork	C	23	Total Deferment	1	1	Horses
03110	Boundary Well	M	1,552	Total Deferment	1	197	Horses
03111	Canyon Pasture	M	3,133	Rest Rotation (Spring/Rest); Total Deferment	2	223	Cattle/Horses
03112	Stone Barn 15	I	8,449	Deferred Rotation (Spring/Summer/ Fall/Winter)	2	1,254	Cattle
03113	Oilwell	M	8,330	Rest Rotation (Winter/Rest)	2	843	Cattle
03114	Horse Center	M	5,474	Deferred Rotation (Spring/Summer/ Fall)	2	572	Cattle

Table P-1. Current Livestock Grazing Allotment Information (Continued)

Allotment Number	Allotment Name	Management Category	Total Federal Acres	Type Management	Number of Pastures	Active Use (AUMs)[1]	Type of Livestock
03115	Norquist	M	248	Deferred Rotation (Spring/Summer/ Fall)	1	31	Cattle
03116	Heart Mountain South	M	4,978	Deferred Rotation (Spring and Summer/ Winter/Winter)	6	695	Cattle
03117	Holding Pasture	C	158	Total Deferment	1	20	Cattle
03118	Rattlesnake Mountain	M	7,941	Deferred Rotation	1	850	Cattle
03119	Rush Creek	M	1,841	None	2	214	Cattle
03120	Bennett Butte	C	15	None	1	2	Cattle
03121	Close Pasture	C	1,589	Rest Rotation (Spring/Summer/ Fall/Rest)	1	185	Cattle
04110	Crooked Creek 1	C	720	Wildlife	1	32	Wildlife
04134	Crooked Creek 2	C	320	Wildlife	1	7	Wildlife
14243	Dry Creek Wildlife Tracts	I	241	Wildlife	1	16	Wildlife

[1]For the purposes of this table, active use is expressed in AUMs.
[2]No AUMs are currently assigned for this grazing allotment/permit/lease.

Note: Data in table derived from Bureau of Land Management Cody and Worland Field Offices internal databases accessed from 2010 to 2013.

AMP Allotment Management Plan
AUM Animal Unit Month
C Custodial
I Improve
M Maintain
USFS U.S. Forest Service

Table P-2. Standards and Guidelines Summary of Grazing Allotments

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Adam Weiss Peak	00637	2012		Y	N/A	Y	Y	U	Y
Alamo Creek	00664	1999		Y	N/A	Y	Y	U	Y
Alexander	03074	2000	Y	Y	Y	Y	Y	U	Y
Alkali	00033	1999	Y	Y	Y	N	Y	U	Y
Allen Basin	00669	2002		Y	N/A	Y	Y	U	Y
Antelope Draw	00074	1998		Y	N/A	Y	Y	U	Y
Anthony Timber	00222	1999		Y	Y	Y	Y	U	Y
Badger Gulch	00652	2002		Y	N/A	Y	Y	U	Y
Badlands	01087	2006	U	Y	N	N	Y	U	Y
Basin	00568	1999		Y	Y	Y	Y	U	Y
Beckley	00024	2011		Y	N/A	Y	Y	U	U
Bear Creek	01013	1999	Y	Y	Y	Y	Y	U	Y
Bench	03102	2002	U	N	N	N	Y	U	Y
Bench Canal	01046	2012	U	Y	Y	Y	Y	U	Y
Bennett Creek	03007	1999	U	N	Y	N	Y	U	Y
Bennet Creek	01082	2012	U	N	N	N	N	U	Y
Bennet Creek	03001	2012	U	N	N	N	N	U	Y
Big Bend	03100	2008	U	N	N	N	N	U	Y
Big Cottonwood Creek	00132	1999	U	Y	N/A	N	Y	U	Y
Big Dipper	03084	2013	Y	Y	N	Y	Y	U	Y
Big Trails Group	00012	1998	U	Y	Y	Y	Y	N	Y
Big Trap	01070	2001	Y	N	N	N	Y	U	Y
Billy Goat	03013	2011	U	N	N	Y	Y	U	Y
Black Mountain	01513	1999		Y	Y	Y	Y	U	Y
Black Willow	00659	1999	U	Y	N/A	Y	Y	U	Y
Black Willow Draw	00624	2009		Y	N/A	Y	Y	U	Y
Blue Creek	00516	2009	U	Y	Y	Y	Y	U	U
Blue Hill	02536	2009		Y	N/A	Y	Y	U	Y
Blue Springs	00501	2009		Y	Y	Y	Y	U	Y
Boundary Well	01068	2006	U	N	Y	N	Y	U	Y
Boundary Well	03110	2006	U	N	Y	N	Y	U	Y
Box Canyon	02008	2009		Y	Y	Y	Y	U	U
Box Elder	00068	2001		Y	Y	Y	Y	U	Y
Bramah	00685	1999		Y	Y	Y	Y	U	Y
Bridger Creek	02507	1999		Y	Y	Y	Y	U	Y
Bridges	00540	2009		Y	Y	Y	Y	U	U
Buchanan	03014	2000	Y	N	Y	N	Y	U	Y
Buchanan Basin	00539	1999	Y	N	N	N	Y	U	Y
Buck Creek	00558	1999		Y	Y	Y	Y	U	Y
Bunn	03027	1999	U	Y	Y	N	Y	U	Y
Burnham	01026	2001	Y	Y	N	Y	Y	U	Y
Buttes	00182	2000	U	Y	U	Y	Y	U	Y

Table P-2. Standards and Guidelines Summary of Grazing Allotments (Continued)

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Canyon Pasture	03111	1999	U	Y	N	N	Y	U	Y
Carter Mountain	02504	2012	U	Y	N	Y	Y	U	Y
Cedar Creek	01501	1998	Y	Y	Y	Y	Y	Y	Y
Cedar Ridge	00145	2010		Y	N/A	Y	Y	U	U
Chapman Bench	01080	2002	Y	N	N	N	Y	U	Y
Chapman Bench	03086	2002	Y	N	N	N	Y	U	Y
Clarksfork	01075	1999	U	Y	Y	N	Y	U	Y
Clarksfork Canyon	03083	2008	U	N	Y	N	N	U	Y
Close Pasture	03121	1999	U	Y	Y	N	Y	U	Y
Coal Creek	03006	2001	Y	Y	Y	Y	Y	U	Y
Corbett Dam	01066	1999	U	N	N	Y	N	U	Y
Cottonwood Creek	02551	2001	U	Y	N	Y	Y	U	Y
Cottonwood Creek	03051	2001	U	N	Y	N	N	U	Y
Cottonwood Creek	00524	2010		Y	N	Y	Y	U	Y
Cottonwood Draw	00026	2001		Y	Y	Y	Y	U	Y
Coulee-Mill Iron	00551	1999	U	Y	N/A	N	N	U	Y
County Line	01047	2000	Y	N	Y	N	Y	U	Y
Crystal Creek	01023	2003	Y	N	N	N	N	U	Y
Curtis	00569	1999		Y	Y	Y	Y	U	Y
Deadline Draw	00097	1998		Y	N/A	Y	Y	U	Y
Denver Jake	00153	2010		Y	Y	Y	Y	U	U
Demer Nowater	00163	2011	Y	N	N/A	N	Y	U	U
Devils Tooth	03101	1999	Y	Y	Y	Y	Y	U	Y
Ditch Creek	00631	2009		Y	Y	Y	Y	U	Y
Dockery Hammond	00513	2002		Y	N/A	Y	Y	U	Y
Dorrance	03054	2004	Y	Y	Y	Y	Y	U	Y
Double H	00019	2001		Y	Y	Y	Y	U	Y
Dry Creek	01048	2002	U	N	Y	N	N	U	Y
Dry Creek	01062	1998	U	Y	N	N	Y	U	Y
Dye	02506	2001		Y	N/A	Y	Y	U	Y
Eagle Pass	03035	2004	U	N	N	N	N	U	Y
East Alkali	00217	1999		Y	Y	Y	Y	U	Y
East Allotment	00146	2009		Y	Y	Y	Y	U	U
East Jack Creek	01502	1999		Y	Y	Y	Y	U	Y
Farley	00051	1999		Y	Y	Y	Y	U	Y
Faure Nowater	00112	1999	U	Y	Y	N	Y	U	Y
Fernandez	01067	2006	U	Y	N	Y	Y	U	Y
Fernandez	03022	2006	U	Y	N	Y	Y	U	Y
Fernandez Blu-Jay	00510	1999	U	N	N/A	N	Y	U	Y
Firing Range	01038	2000	U	N	Y	N	N	U	Y
Foster Gulch	01039	2003	Y	N	Y	N	N	U	Y
Fox Mountain	01510	1999		Y	Y	Y	Y	U	Y
Freeman Draw	00625	2010		Y	N/A	Y	Y	U	U
Gould Individual	02510	1998		Y	Y	Y	Y	U	Y

Table P-2. Standards and Guidelines Summary of Grazing Allotments (Continued)

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Gould North Individual	02511	1998		Y	N/A	Y	Y	U	Y
Grass Creek	00522	2001	U	Y	Y	N	Y	U	Y
Grass Creek Basin	00530	2000		Y	N/A	Y	Y	U	Y
Grass Point	00545	2010		Y	Y	Y	Y	Y	U
Gravel Crossing	01005	2011	U	N	N	N	N	U	Y
Greybull Group	01051	2010	Y	Y	N	Y	Y	U	Y
Gyp Creek	01008	2009	U	Y	N	N	N	U	Y
Haffey Place	03049	2000	Y	N	Y	N	Y	U	Y
Hall Butte	02017	2000	Y	Y	N	Y	Y	U	Y
Hamilton Dome	00504	1999		Y	Y	Y	Y	U	Y
Healy	00185	2000		Y	N/A	Y	Y	U	Y
Heart Mountain South	03116	2001	U	N	N	N	N	U	Y
Heifer	01088	2004	U	N	N	N	N	U	Y
Hidden Dome	00032	1999	U	Y	Y	N	Y	U	Y
Hidden Valley	03060	2008	U	Y	N	Y	Y	U	Y
High Camp	00131	2000		Y	N/A	Y	Y	U	Y
Hillberry Rim	00579	2010		Y	Y	Y	Y	U	U
Himes/Spence	01037	2001	U	N	Y	N	N	U	Y
Himes Group	01031	2009	U	N	N	N	N	U	Y
Holding Pasture	03117	2001	Y	Y	Y	Y	Y	U	Y
Hole In The Ground	00628	1999	Y	Y	Y	Y	Y	U	Y
Home	00616	1998		Y	N/A	Y	Y	U	Y
Homestead/Avent	02564	2000	Y	Y	N	N	N	U	Y
Horse Center	03114	2000	Y	Y	Y	Y	N	U	Y
Horse Mountain	01521	2001		Y	N/A	Y	Y	U	Y
Hunt Oil 15 Mile	00682	2002		Y	N/A	Y	Y	U	Y
Indian Pass	03059	2006	U	Y	N	Y	Y	U	Y
Individual	01018	1998	Y	Y	Y	Y	Y	U	Y
Individual	01049	2012	Y	Y	Y	Y	Y	U	Y
Individual	01061	2000	U	N	N	N	Y	U	Y
Joe Henry	00011	2011		Y	N/A	Y	Y	U	U
Jolly Pasture	00189	2011	Y	Y	N	Y	Y	U	U
Jones Creek Basin	02538	2001		Y	Y	Y	Y	U	Y
Jones Creek Mountain	02525	2001		Y	N/A	Y	Y	U	Y
K I S	00083	1998		Y	Y	Y	Y	U	Y
Keystone	01074	2000	U	N	N	N	Y	U	Y
Keystone	03009	2000	U	N	Y	Y	Y	U	Y
Kimball	00009	2011	U	Y	Y	Y	Y	U	U
Kirby Creek	00589	2011		Y	N	Y	Y	N	U
Lake	03052	2000	Y	Y	Y	Y	Y	U	Y
Lake	00607	1999		Y	Y	Y	Y	U	Y
Lake Creek	03078	1999	Y	Y	Y	Y	Y	U	Y
Lake Ridge	01511	2010		Y	Y	Y	Y	U	U
Lakeshore	03036	2010	U	N	N	Y	Y	U	Y

Table P-2. Standards and Guidelines Summary of Grazing Allotments (Continued)

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Lime Ridge	00615	1998		Y	Y	Y	Y	U	U
Little Buffalo Basin	00564	1998		Y	N/A	Y	Y	U	Y
Little Dry Creek	03061	2000	Y	Y	Y	Y	N	U	Y
Little Mountain	01028	2000	U	N	N	N	N	U	Y
Little Rock Creek	03066	2000	Y	N	Y	Y	Y	U	Y
Little Sand Draw	00590	2001	U	Y	Y	N	Y	U	Y
Little Sheep Mountain	01053	2007	U	N	N	N	N	U	Y
Lone Tree	03104	2001	Y	N	Y	N	Y	U	Y
Long Point Pasture	01503	2000		Y	Y	Y	Y	U	Y
Lost Creek	00149	2001	U	Y	N/A	Y	Y	U	Y
Lovell Group 1	01032	2003	U	N	N	N	Y	U	Y
Low Miller	01090	2000	U	Y	N	N	Y	U	Y
Lower Arnold	00081	1998	U	Y	Y	Y	N	U	Y
Lower Bear Creek	01015	1999	N	N	N	N	Y	U	Y
Lower Brokenback	00174	2011		N	N/A	Y	Y	U	U
Lower Cottonwood	00521	2001	U	Y	Y	N	Y	U	Y
Lower Nowood	00144	2010		Y	N/A	Y	Y	U	U
Lower Nowater	00015	2000		Y	N/A	Y	Y	U	Y
Lower Red Canyon	02505	2001		Y	Y	Y	Y	U	Y
Lower Sage Creek	03064	2004	U	Y	N	Y	Y	U	Y
Lower Sand Creek	00073	1998		Y	N/A	Y	Y	U	Y
Lower Slope	03003	1998	U	N	N	N	Y	U	Y
Lower V's	00130	1999	U	Y	N/A	N	Y	U	Y
Lower Yu Bench	03069	1999	U	N	Y	N	Y	U	Y
LU	00604	1998	Y	N	Y	N	Y	U	Y
M.F. Warm Springs	02541	2009		Y	N/A	Y	Y	U	Y
Mahogany Butte	00069	1998		Y	Y	Y	Y	Y	Y
Major Basin	02546	2011		Y	Y	Y	Y	U	U
Maller Individual	00544	2001	U	N	Y	N	Y	U	Y
Manderson	00036	1999	U	Y	N/A	Y	Y	U	Y
Many Springs	01024	2000	U	N	N	N	N	U	Y
Maret	00649	2001		Y	N/A	Y	Y	U	Y
Meeteetse Rim	02535	2001	U	Y	N	Y	Y	U	Y
Meeteetse Creek	02561	2000	Y	Y	Y	Y	N	U	Y
Melton Mountain	02550	2001		Y	N/A	Y	Y	U	Y
Mexican Hills	01010	2000	U	Y	N	N	Y	U	Y
Meyers Spring	00066	1999		Y	Y	Y	Y	U	Y
Middle Creek	00519	2000	U	Y	Y	Y	Y	U	Y
Milk Creek	00552	1999		Y	Y	Y	Y	U	Y
Mill Iron-East	00582	1999	U	Y	N/A	N	N	U	Y
Mills	01025	2000	U	N	N	N	N	U	Y
Moncur Springs	01029	2000	U	N	N	N	N	U	Y
Moss Ranch	01027	2002	Y	Y	Y	Y	Y	U	Y
Mountain	00672	2000	U	Y	Y	Y	Y	U	Y

Table P-2. Standards and Guidelines Summary of Grazing Allotments (Continued)

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Mountain Slope	03093	1998	U	N	N	N	Y	U	Y
Mud Creek	00050	1999		Y	Y	Y	Y	U	Y
Mud Creek Pasture	00583	2001		Y	N/A	Y	Y	U	Y
Mud Gulch	00216	1999		Y	N/A	Y	Y	U	Y
Murphy Dome	00049	1999		Y	N/A	Y	Y	U	Y
Natural Trap	01089	2001	Y	Y	N	Y	Y	U	Y
Neiber	00048	2000		Y	N/A	Y	Y	U	Y
New Highway	03038	1998	Y	Y	Y	Y	Y	U	Y
Newmeyer Creek	03089	2013	U	N	N	N	N	U	Y
Norquist	03115	2000	Y	Y	Y	Y	N	U	Y
North Beaver Creek	01019	1998	Y	Y	Y	Y	Y	U	Y
North Grass Creek	00621	1999		Y	N/A	Y	Y	U	Y
North Hart	00585	1999		Y	N/A	Y	Y	U	Y
North Highway	00623	1998		Y	N/A	Y	Y	U	Y
North Murphy Dome	00080	1998		Y	Y	Y	Y	U	Y
North Shoshone	01035	2003	Y	N	N	N	N	U	Y
North Shoshone	01036	2010	Y	N	N	N	N	N	Y
Nowood Individual	00025	2001		Y	N/A	Y	Y	U	Y
O'Brien Camp	00294	2010	Y	Y	N	Y	Y	U	U
Oil Field	00170	2009		Y	N	Y	Y	U	U
Oilwell	03113	2000	Y	N	Y	N	N	U	Y
One Forty	01033	2000	U	N	N	N	N	U	Y
One-Twenty-One	01534	2000	Y	Y	Y	Y	Y	U	Y
Onion Gulch	00183	2000		Y	Y	Y	Y	U	Y
Osborne	03010	1999	Y	Y	Y	Y	Y	U	Y
Otter Creek Pastures	00127	1999	U	Y	N	N	Y	U	Y
Owl Creek	00609	1999	U	Y	U	U	Y	U	Y
Parker	00221	2010	Y	Y	N/A	Y	Y	U	U
Pasture Number 4	03105	1999	U	N	Y	N	Y	U	Y
Patras	00088	1999		Y	Y	Y	Y	U	Y
Peak	02509	2009		Y	Y	Y	Y	U	Y
Peaks	01064	1999	U	N	N	N	Y	U	Y
Peaks	01069	2003	Y	Y	N	Y	Y	U	Y
Peterson	03092	2004	Y	Y	Y	Y	Y	U	Y
Pistol Draw	00603	2001		Y	N/A	Y	Y	U	Y
Pitchfork	00676	2002		Y	N/A	Y	Y	U	Y
Polecat Bench	01071	2005	Y	N	N	N	Y	U	Y
Potato	01525	1999		Y	Y	Y	Y	U	Y
Potato Ridge	01537	1999		Y	N/A	Y	Y	U	Y
Potter Butte	00133	1999		Y	N/A	N	Y	U	Y
Prospect Common	00529	1998		Y	Y	Y	Y	U	Y
Putney Flat	00613	2000		Y	Y	Y	Y	U	Y
Putney Place	00720	1999		Y	N/A	Y	Y	U	Y
Race Track	01040	2003	Y	N	Y	N	N	U	U

Table P-2. Standards and Guidelines Summary of Grazing Allotments (Continued)

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Ramul Individual	00557	1999		Y	N/A	Y	Y	U	Y
Rattlesnake	00614	1998		Y	Y	Y	Y	U	Y
Rattlesnake Creek	03108	2004	Y	Y	Y	Y	Y	U	Y
Rattlesnake Mountain	03118	2001	U	N	N	N	Y	U	Y
Reclamation	00666	2001	U	N	N	N	Y	U	Y
Reclamation 15	03088	2001	U	N	N	N	Y	U	Y
Red	01541	2002	U	N	Y	N	Y	U	Y
Red Cabin	03079	2005	U	Y	N	Y	Y	U	Y
Red Canyon	01509	1999	Y	Y	Y	Y	Y	U	Y
Red Creek	00520	2000		Y	Y	Y	Y	Y	Y
Red Creek	03072	2000	U	N	Y	N	Y	U	Y
Red Farm	00547	2000		Y	N/A	Y	Y	U	Y
Red Hole	00565	2009		Y	N/A	Y	Y	U	Y
Red Lane	00653	2002		Y	N/A	Y	Y	U	Y
Red Point	03067	1998	U	Y	Y	N	Y	U	Y
Red Pole	03055	1999	U	Y	N	Y	N	U	Y
Red Springs	00658	2009		Y	Y	Y	Y	U	Y
Red Springs Draw	00570	2010		Y	N	Y	Y	N	U
Red Springs/Rock Butte	00177	2011		Y	Y	Y	Y	U	U
Reed Creek	02554	2009		Y	N/A	Y	Y	U	Y
Renner Section 15	02534	2013	U	Y	N	Y	Y	U	Y
Richmond	00553	1999		Y	Y	Y	Y	U	Y
Rim	00186	2011	U	Y	Y	Y	Y	U	U
Rimrock	03073	2010	U	N	N	Y	Y	U	Y
River	01079	2001	U	Y	N	N	N	U	Y
Rivers Rest	03070	1999	Y	Y	Y	Y	Y	U	Y
Robson Mountain	00219	2001		Y	N/A	Y	Y	U	Y
Rock Springs Draw	00602	2009		Y	N/A	Y	Y	U	Y
Rooster Creek	00627	1999	Y	N	N	N	Y	U	Y
Rose Mountain	02003	1998		Y	N/A	Y	Y	U	Y
S V	00070	1998		Y	Y	Y	Y	Y	Y
Sage Creek	01073	2005	Y	Y	Y	Y	Y	U	Y
Sage Creek Addition	03008	2005	Y	Y	Y	Y	Y	U	Y
Sand Draw	01006	1998	U	Y	N	N	Y	U	Y
Sand Draw	00656	2000	U	Y	N/A	N	Y	U	Y
Sand Hills	01043	1998	U	N	Y	N	N	U	Y
Sand Hills	01054	2009	U	N	N	N	N	U	Y
Schoolhouse Gulch	00099	2001	Y	N	N/A	N	N	U	Y
Scorpion	00118	1999	U	Y	Y	N	Y	U	Y
Sheep Mountain	01014	1999	U	N	N	N	Y	U	Y
Sheep Mountain	03044	1998	U	N	N	N	Y	U	Y
Sheep Springs	00065	1999		Y	Y	Y	Y	U	Y
Sidon Canal	01055	2009	U	N	N	N	N	U	Y
Slab Creek	00575	1999	U	Y	N	N	Y	U	Y

Table P-2. Standards and Guidelines Summary of Grazing Allotments (Continued)

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Slick Water	00162	1999	U	Y	N/A	N	Y	U	Y
Small Pasture	00188	2011	Y	Y	N/A	Y	Y	U	U
Snyder	00640	2013		N[4]	N/A	N[4]	N[4]	Y	U
Sorensen	01072	2007	U	N	N	Y	N	U	Y
Sorensen	03081	2007	U	N	N	Y	N	U	Y
South Butte	00157	1999		Y	N/A	Y	Y	U	Y
South Gooseberry	00507	2010		Y	N	Y	Y	Y	U
South Highway	00622	1998	U	Y	N/A	Y	Y	U	Y
South Individual	00200	2001		Y	N/A	Y	Y	U	Y
South Lovell Group	01052	2000	U	N	Y	N	Y	U	Y
South Shell	01519	2000		Y	Y	Y	Y	U	Y
South Sleeper	00683	2011		Y	Y	Y	Y	U	U
South Tatman	00612	1999		Y	N/A	Y	Y	U	Y
South Y U Bench	02806	1999	Y	Y	Y	Y	Y	U	Y
Spanish Point	00064	1999		Y	Y	Y	Y	U	Y
Spring Gulch	00531	2012		Y	Y	Y	Y	U	U
State	03087	1999	U	Y	Y	N	Y	U	Y
Stone Barn 15	03112	2003	Y	N	N	N	Y	U	Y
Stonebridge	03004	2008	U	Y	N	Y	Y	U	Y
Stump	02542	2009	U	Y	N/A	Y	Y	U	Y
Sunlight	01516	2000	Y	N	Y	N	Y	U	Y
Swallow	02543	2012		Y	N/A	Y	Y	U	U
Tatman Mt Common	00639	2013		N[4]	N/A	N[4]	N[4]	U	U
Ten Mile	00671	1998		Y	Y	Y	Y	U	U
Ten Sleep	00173	2010		Y	N/A	Y	Y	U	U
Tharp Individual	00179	2000	Y	N	Y	N	N	U	Y
Thumper	01059	1998	U	Y	N	N	Y	U	Y
Timber Creek	03047	1999	U	N	N	N	Y	Y	Y
Timber Creek	00626	1999	Y	N	N	N	Y	U	Y
Tobes Pasture	00203	1998		Y	Y	Y	Y	U	Y
Tonopah Ridge	02544	2006	U	N	N	N	N	U	Y
Torchlight	00181	2000		Y	Y	Y	Y	U	Y
Tower	00085	2001		Y	N/A	Y	Y	U	Y
Trail Creek	03053	2001	U	N	N	N	Y	U	Y
Trailing Pasture	03065	2013	U	N	N	N	N	U	Y
Turner Pasture	00190	1998	Y	Y	Y	N	N	U	Y
Twin Buttes	02552	2001		Y	Y	Y	Y	U	Y
Upper Arnold	00082	1998		Y	N/A	Y	Y	U	Y
Upper Brokenback	00175	2010		Y	Y	Y	Y	U	U
Upper Gooseberry	00515	1999	U	Y	U	Y	Y	U	Y
Upper Nowater	00018	2000		Y	N/A	Y	Y	U	Y
Upper Sand Creek	00184	2000		Y	N/A	Y	Y	U	Y
Upper White Creek	01536	2000		Y	Y	Y	Y	U	Y
Upton	03056	2005	U	N	N	Y	Y	U	Y

Table P-2. Standards and Guidelines Summary of Grazing Allotments (Continued)

Allotment Name	Allotment Number	Year Completed	Progress[1]	Standard[2,3]					
				#1	#2	#3	#4	#5	#6
Urwin Homestead	00721	1999		Y	N/A	Y	Y	U	Y
V Pasture	02547	2008		Y	N/A	Y	Y	U	Y
Vass	00608	1999		Y	Y	Y	Y	U	Y
Wagonhound Bench	00573	1999		Y	Y	Y	Y	U	Y
Wales Homestead	00722	1999		Y	N/A	Y	Y	U	Y
Waugh Dome	00554	1999		Y	Y	Y	Y	U	Y
West	00660	2009		Y	N/A	Y	Y	U	Y
West Alkali	00218	1999		Y	N/A	Y	Y	U	Y
West Allotment	00147	2010		Y	N/A	Y	Y	U	U
West Black Mountain	00205	2000		Y	N/A	Y	N	N/A	Y
West Of Ranch	01522	2000	Y	Y	Y	Y	Y	U	Y
West River	01012	1998	U	Y	N	N	Y	U	Y
Wild Horse Butte	00592	2011	U	Y	N	Y	Y	U	U
Willow Creek	01034	2003	Y	Y	Y	Y	Y	U	Y
Willow Creek	00210	1999	U	Y	U	U	Y	U	Y
Willow Springs	02001	2001		Y	N/A	Y	Y	U	Y
Winter Camp	00563	2009		Y	Y	Y	Y	U	Y
Worland Cattle Group	00007	1999		Y	Y	Y	Y	U	Y
Yu Bench	01065	2002	U	N	N	N	Y	U	Y
Yu Bench West	03091	1999	Y	Y	Y	Y	Y	U	Y
Zimmerman Buttes	00571	2009		Y	N/A	N[4]	Y	U	U
Zimmerman Springs	00591	2012		Y	Y	N[4]	Y	U	U

[1]Codes in Progress and Standard columns are as follows: Y = Yes, meets standard, N = No, does not meet standard, U = Unknown.
[2]Codes in Progress and Standard columns are as follows: Y = Yes, meets standard, N = No, does not meet standard, U = Unknown.
[3]Standards 5 and 6 are dependent upon determinations made by the Wyoming Department of Environmental Quality (DEQ). Standard 5 is Unknown if allotment specific data is not available. Wyoming DEQ is researching whether any "impaired" waters have data showing impairment on BLM lands.
[4]Some acres within the allotment met standards, while others did not.

Note: Data in table derived from Bureau of Land Management Cody and Worland Field Offices internal databases accessed from 2010 to 2013.

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas

Allotment Number	Allotment Name	Management Category
01513	BLACK MOUNTAIN	I
01510	FOX MOUNTAIN	I
01535	SOUTH SHELL GROUP	I
01507	BUSH BUTTE	I
01525	POTATO	I
01519	SOUTH SHELL	I
00065	SHEEP SPRINGS	M
01526	SABIN	I
00189	JOLLY PASTURE	I
00002	WEBER LOWER	I
00143	MEDICINE LODGE	I
00674	NORTH TATMAN	C
00066	MEYERS SPRING	I
00188	SMALL PASTURE	I
00639	TATMAN MT COMMON	I
00094	RED HILLS	I
00218	WEST ALKALI	I
00217	EAST ALKALI	I
00640	SNYDER	I
00003	COLD SPRINGS	I
00095	FORKS	I
02527	UNALLOTTED	_[1]
00221	PARKER	I
00092	PAINTROCK CANYON	I
00669	ALLEN BASIN	I
00527	BLACKSTONE	C
00618	NORTH BLACKSTONE	C
00059	NORTH HOUSE	C
00652	BADGER GULCH	I
00136	BLACK HILLS	C
00005	SOUTHSIDE GROUP	I
00213	EAST HYATTVILLE	C
00047	HYATTVILLE INDIVIDUAL	I
00004	GAPEN HYATT	I
00526	RIMROCK BASIN	I
00004	GAPEN HYATT	I
00200	SOUTH INDIVIDUAL	_[1]
00148	RENNER INDIVIDUAL	I
02562	MEETEETSE-EAST	M
00682	HUNT OIL 15 MILE	I
00676	PITCHFORK	I

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
00025	NOWOOD INDIVIDUAL	I
00663	COW PASTURE	C
02701	STATE	_[1]
00508	NO. GOOSEBERRY	I
00670	UPPER 15 MILE	C
00662	ENRIGHT	I
00604	LU	I
00579	HILLBERRY RIM	I
00031	BROKENBACK	I
00171	EAST NOWOOD	C
00623	NORTH HIGHWAY	C
00579	HILLBERRY RIM	I
00545	GRASS POINT	I
00021	LITTLE COTTONWOOD	I
00132	BIG COTTONWOOD CREEK	I
SDW	W-T STOCK DRIVE	_[1]
00008	CASTLE GARDENS	I
00523	HIGHWAY JUNCTION	I
00009	KIMBALL	I
00215	DEEDED	I
00164	COTTONWOOD-N.BUTTE	I
00507	SO. GOOSEBERRY GROUP	I
00185	HEALY	C
00616	HOME	M
00622	SOUTH HIGHWAY	I
00007	WORLAND CATTLE GROUP	I
00107	HONEY COMBS	I
00168	LOWER SPRING CREEK	I
00122	HARVARD INDIVIDUAL	M
00153	DENVER JAKE DRAW	C
00042	EAST FORK	I
00110	BUD KIMBALL	I
00160	SPRING CREEK COMMON	I
00637	ADAM WEISS PEAK	I
00522	GRASS CREEK	I
00037	NORTH BUTTE	I
00580	COAL MINE	I
00678	SOUTH GRASS CREEK	I
00109	COYOTE SPRINGS	C
00048	NEIBER	I
02003	ROSE MOUNTAIN	M
00216	MUD GULCH	M
00129	MAZET	M

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
00127	OTTER CREEK PASTURES	I
00028	UPPER NOWOOD	C
00074	ANTELOPE DRAW	I
00531	SPRING GULCH	I
00163	DEMER NOWATER	I
00145	CEDAR RIDGE	M
00521	LOWER COTTONWOOD	I
00159	TIE DOWN	C
00011	JOE HENRY	I
00133	POTTER BUTTE	I
02008	BOX CANYON	I
00024	BECKLEY	I
00127	OTTER CREEK PASTURES	I
00535	WEST COTTONWOOD	C
00111	OTTER CREEK	I
00529	PROSPECT COMMON	I
00620	PROSPECT	I
00665	NELSON	M
00130	LOWER V'S	I
00014	MILESKI BADLANDS	I
00112	FAURE NOWATER	I
00019	DOUBLE H	I
02007	OTTER CREEK MOUNTAIN	I
00105	NOWATER	I
00633	UPPER PASTURES	I
00041	FATTY ALLEN	I
00590	LITTLE SAND DRAW	I
00060	MESA	M
00641	SWING INDIVIDUAL	C
00199	BIG CEDAR	I
00573	WAGONHOUND BENCH	I
00010	GORDON	M
00015	LOWER NOWATER	I
00120	BUFFALO CREEK	I
00061	AINSWORTH INDIVIDUAL	M
00603	PISTOL DRAW	C
00012	BIG TRAILS GROUP	I
00721	URWIN HOMESTEAD	C
00062	AINSWORTH	I
00141	GREET INDIVIDUAL	M
00076	LOWER WALKER	I
00557	RAMUL INDIVIDUAL	M
00722	WALES HOMESTEAD	C

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
00018	UPPER NOWATER	I
00634	LOWER PASTURES	I
00504	HAMILTON DOME	I
00596	WAGONHOUND	I
00656	SAND DRAW	I
00591	ZIMMERMAN SPRINGS	I
UNALL	UNALLOTTED (2009)	_[1]
00636	HAYNES	C
00157	SOUTH BUTTE	M
00193	LITTLE MUD CREEK	I
00571	ZIMMERMAN BUTTES	I
00119	BLUEBANK	M
00680	LAKE CREEK PASTURE	C
00553	RICHMOND	I
00524	COTTONWOOD CREEK	I
00556	21 CREEK	I
00080	NORTH MURPHY DOME	I
00097	DEADLINE DRAW	M
00558	BUCK CREEK	I
00118	SCORPION	I
00098	SLOPE	_[1]
00089	BIG BEND	I
00607	LAKE	I
00562	GARDNER BADLANDS	I
00720	PUTNEY PLACE	C
00661	THREE PEAKS ANCHOR	I
00685	BRAMAH	I
00589	KIRBY CREEK	I
00570	RED SPRINGS DRAW	I
00681	SPRING CREEK	I
00501	BLUE SPRINGS	I
00537	PADLOCK	I
00123	BUFFALO SAND POINT	I
00593	HAMILTON RIM	M
00071	CHALK BUTTE	M
00613	PUTNEY FLAT	M
00077	MIDDLE WALKER	I
00551	COULEE-MILL IRON	M
00582	MILL IRON-EAST	M
00147	WEST ALLOTMENT	I
00146	EAST ALLOTMENT	I
00540	BRIDGES	C
00191	LOWER BLACK MOUNTAIN DRAW	I

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
00608	VASS	C
00585	NORTH HART	I
00654	AYERS INDIVIDUAL	I
00614	RATTLESNAKE	I
00533	HOME RANCH	I
00210	WILLOW CREEK	I
00569	CURTIS	I
00205	WEST BLACK MOUNTAIN	I
00049	MURPHY DOME	I
00568	BASIN	I
00158	SEAMAN	I
00661	THREE PEAKS ANCHOR	I
00078	UPPER WALKER	I
00569	CURTIS	I
00587	TYPER PASTURE	C
00081	LOWER ARNOLD	I
00192	UPPER BLACK MOUNTAIN DRAW	I
00035	BUFFALO CANYON	I
00586	SOUTH HART	C
00182	BUTTES	I
00070	S V	I
00610	SOUTH OWL CREEK	I
00563	WINTER CAMP	I
00051	FARLEY	I
00583	MUD CREEK PASTURE	C
00082	UPPER ARNOLD	I
02547	V PASTURE	I
00067	DEETER	M
00572	EAGLE DRAW	M
02539	RED CANYON	I
00592	WILD HORSE BUTTE	I
00050	MUD CREEK	I
00069	MAHOGANY BUTTE	I
02546	MAJOR BASIN	I
00124	WEST SIDE SUMMER	I
00195	LOWER BLACK MOUNTAIN	I
02543	SWALLOW	I
00572	EAGLE DRAW	M
00088	PATRAS	I
00083	K I S	I
02512	BILLYS FLATS	M
02514	V-H DRAW	I
02509	PEAK	I

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
00648	SHUMWAY INDIVIDUAL	I
02506	DYE	I
02536	BLUE HILL	I
02549	HAWKS BUTTE	I
02542	STUMP	I
02507	BRIDGER CREEK	I
02505	LOWER RED CANYON	I
02559	SLOPE PASTURE	I
00206	BEAR CREEK COMMON	I
00223	WOOD'S SPLIT ROCK	I
00087	MOUNTAIN INDIVIDUAL	M
02020	TANNER-MOUNTAIN	I
02560	LYSITE CREEK	I
02531	JENKS CREEK	I
00655	COPPER MOUNTAIN	I
02503	GRIDER BASIN	I
00125	EAST SIDE SUMMER	I
00086	DAUGHERTY DEWITT	M
02554	REED CREEK	I
00053	RANCH	C
02017	HALL BUTTE	M
02012	NATRONA	M
02559	SLOPE PASTURE	I
00090	SPLIT ROCK - V'S	I
00204	NORTH OF DITCH	I
01517	SOUTH INDIVIDUAL (WRA)	C
02534	RENNER SECTION 15	I
03038	NEW HIGHWAY	M
03011	HEART MOUNTAIN NORTH	M
03026	HILL	C
03086	CHAPMAN BENCH 3086	I
00629	RANKINE	I
02535	MEETEETSE RIM 2535	M
01013	BEAR CREEK	I
01010	MEXICAN HILLS	C
01023	CRYSTAL CREEK	I
03084	BIG DIPPER	M
01026	BURNHAM	M
01089	NATURAL TRAP	I
03006	COAL CREEK	M
03049	HAFFEY PLACE	C
01080	CHAPMAN BENCH 1080	I
01076	CLARK	C

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
01085	INDIVIDUAL 1085	C
03094	DRY CREEK 3094	M
02561	MEETEETSE CREEK 2561	M
03079	RED CABIN	M
01027	MOSS RANCH	I
01072	SORENSEN	M
03008	SAGE CREEK ADDITION	I
03074	ALEZANDER	M
03010	OSBORN	M
03063	EL	M
03065	TRAILING PASTURE	I
03061	LITTLE DRY CREEK	M
01068	BOUNDARY WELL 1068	M
03110	BOUNDARY WELL 3110	M
01087	BADLANDS	I
01528	COTTONWOOD CREEK WILDLIFE EXCLOSURE	M
01067	FERNANDEZ	M
03022	FERNANDEZ 15	M
01028	LITTLE MOUNTAIN	I
02523	KUKLA SECTION 15	_[1]
01048	DRY CREEK 1048	M
03092	PETERSON	M
01047	COUNTY LINE	M
01084	THREE M	C
01522	WEST OF RANCH	I
01019	NORTH BEAVER	C
01018	INDIVIDUAL 1018	I
01017	BEAVER CREEK 1017	M
03062	UPPER SAGE PASTURE	C
01501	CEDAR CREEK	I
01509	RED CANYON	I
01016	HOME PLACE	C
01075	CLARKSFORK	I
03114	HORSE CENTER	M
03051	COTTONWOOD CREEK	M
03053	TRAIL CREEK	I
01005	GRAVEL CROSSING	M
03012	QUESTION CREEK	I
03117	HOLDING PASTURE	C
03116	HEART MOUNTAIN SOUTH 3116	M
03103	SIMPSON	M
03099	HEART MOUNTAIN SOUTH 3099	C
03071	WILEY RIM	M

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
03119	RUSH CREEK	M
02553	WINNIGER	M
03031	MEETEETSE CREEK 3031	C
02545	91 RANCH	M
03091	YU BENCH - WEST	I
02806	SOUTH Y U BENCH	I
03104	LONE TREE	I
01046	BENCH CANAL	M
01086	SCHLAF/COMMON	M
03068	OREGON COULEE	I
02551	COTTONWOOD	M
01516	SUNLIGHT	I
03048	HOODOO BASE	M
00628	HOLE IN THE GROUND	I
03100	BIG BEND	C
01534	ONE TWENTY ONE	I
03064	LOWER SAGE CREEK	M
02564	HOMESTEAD/AVENT	M
03029	OREGON BASIN	I
01074	KEYSTONE 1074	C
03069	LOWER YU BENCH	I
03035	EAGLE PASS	I
01065	YU BENCH	C
03009	KEYSTONE 3009	M
03090	YU BENCH – EAST	I
03102	BENCH	I
03052	LAKE	M
03113	OILWELL	M
03073	RIMROCK	M
01073	SAGE CREEK GROUP	I
01002	WHISTLE CREEK	I
01069	PEAKS 1069	I
03112	STONE BARN 15	I
03088	RECLAMATION 15	I
03067	RED POINT	I
00666	RECLAMATION	I
01060	EAST/WEST	I
01057	POLECAT-FRANNIE	C
01003	STATELINE	M
01061	INDIVIDUAL 1061	C
01071	POLECAT BENCH	I
03089	NEWMEYER CREEK	M

Table P-3. Current Livestock Grazing Allotments or Portions of Allotments in Greater Sage-Grouse Priority Habitat Management Areas (Continued)

Allotment Number	Allotment Name	Management Category
00683	SOUTH SLEEPER	_[1]
00510	FERNANDEZ BLU-JAY	_[1]

[1]Information not available for allotment.

Note: The determination of retirement of grazing privileges of allotments or portions of allotments in greater sage-grouse Priority Habitat Management Areas would be made upon site specific National Environmental Policy Act analysis.

C Custodial
I Improve
M Maintain

Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix Q

Economic Impact Analysis Methodology

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APPENDIX Q

ECONOMIC IMPACT ANALYSIS METHODOLOGY

1.0 INTRODUCTION

This appendix describes the methods and data that underlie the economic impact modeling analysis. Input-output models such as the Impact Analysis for Planning (IMPLAN) model, an economic impact analysis model, provide a quantitative representation of the production relationships between individual economic sectors. Thus, the economic modeling analysis uses information about physical production quantities and the prices and costs for goods and services. The inputs required to run the IMPLAN model are described in the following narrative and tables. The resulting estimates from the IMPLAN model, by alternative, can be found in the *Economic Conditions* section in Chapter 4. The first section of this appendix describes general aspects of the IMPLAN model and how it was used to estimate economic impacts. The remaining sections provide additional detailed data used in the analysis for oil and gas, livestock grazing, and recreation.

2.0 THE IMPLAN MODEL

IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the ripple effect (also called the "multiplier effect") of changes in economic sectors that may not be directly impacted by management actions, but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly impacted) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

This analysis used IMPLAN 2007; prior to running the model, cost and price data were converted to a consistent dollar year (2011) using regional and sector-specific adjustment factors from the IMPLAN model. The values in this appendix are expressed in year 2011 dollars so that the earnings and employment estimates can be easily compared to the latest (i.e., 2011) earnings and employment data available from the Bureau of Economic Analysis.

The IMPLAN model has 440 economic sectors, of which 188 are represented in the four Planning Area counties. This analysis involved direct changes in economic activity for 33 IMPLAN economic sectors, as well as changes in all other related sectors due to the ripple effect. The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the Planning Area. As a result, the calibrated model does a better job of generating multipliers and the subsequent impacts that reflect the interaction between and among the sectors in the Planning Area compared to a model using unadjusted national coefficients. For instance, worker productivity in oil and gas production is higher in Wyoming than the national average. Key variables used in the IMPLAN model were filled in using data specific to Wyoming, including employment estimates, labor earnings, and total industry output.

3.0 OIL AND GAS

The economic impacts analysis for oil and gas reflects drilling, completion, and production activities. The number of wells drilled and completed is based on the updated Reasonable Foreseeable Development (RFD) scenario (BLM 2009a; BLM 2014a) and the constraints applied under each alternative. Total well numbers for each alternative are presented in Table Q-1. Table Q-2 presents the projected quantity of oil and gas produced on federal surface, and Table Q-3 presents the projected quantity of oil and gas produced from federal, state, and private (fee) surface.

Table Q-1. Oil and Gas Well Numbers

Item	Conventional Infill	Exploratory Deep	Coalbed Natural Gas	Total
Federal Surface				
Alternative A – Wells Drilled	989	112	83	1,184
Alternative A – Wells Completed	854	32	75	961
Alternative B – Wells Drilled	396	45	16	457
Alternative B – Wells Completed	344	13	15	372
Alternative C – Wells Drilled	1,082	123	99	1,304
Alternative C – Wells Completed	934	36	90	1,060
Alternative D – Wells Drilled	954	108	79	1,141
Alternative D – Wells Completed	824	31	71	926
Alternative E – Wells Drilled	396	44	14	454
Alternative E – Wells Completed	344	13	13	370
Alternative F – Wells Drilled	955	107	79	1,141
Alternative F – Wells Completed	825	31	72	928
Federal, State, and Fee Surface				
Alternative A – Wells Drilled	1,407	160	128	1,695
Alternative A – Wells Completed	1,210	46	115	1,371
Alternative B – Wells Drilled	814	93	61	968
Alternative B – Wells Completed	700	27	55	782
Alternative C – Wells Drilled	1,500	171	144	1,815
Alternative C – Wells Completed	1,290	50	130	1,470
Alternative D – Wells Drilled	1,372	156	124	1,652
Alternative D – Wells Completed	1,180	45	111	1,336
Alternative E – Wells Drilled	814	92	59	965
Alternative E – Wells Completed	700	27	53	780
Alternative F – Wells Drilled	1,373	155	124	1,652
Alternative F – Wells Completed	1,181	45	112	1,338

Sources: BLM 2009a; BLM 2009b; BLM 2013; BLM 2014a

Table Q-2. Projected Oil and Gas Production (Federal Surface)

Year	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)
2009	12.1	7.3	4.9	2.9	13.3	8.0	11.7	7.0	4.8	2.9	11.7	7.0
2010	11.8	6.9	4.7	2.8	12.9	7.6	11.4	6.7	4.7	2.8	11.4	6.7
2011	11.4	6.6	4.6	2.6	12.5	7.2	11.0	6.3	4.6	2.6	11.0	6.3
2012	11.1	6.2	4.4	2.5	12.2	6.8	10.7	6.0	4.4	2.5	10.7	6.0
2013	10.8	5.9	4.3	2.4	11.8	6.5	10.4	5.7	4.3	2.4	10.4	5.7
2014	10.5	5.6	4.2	2.3	11.5	6.2	10.1	5.4	4.2	2.2	10.1	5.4
2015	10.2	5.3	4.1	2.1	11.1	5.8	9.8	5.2	4.1	2.1	9.8	5.2
2016	9.9	5.1	4.0	2.0	10.8	5.6	9.5	4.9	3.9	2.0	9.5	4.9
2017	9.6	4.8	3.8	1.9	10.5	5.3	9.3	4.7	3.8	1.9	9.3	4.7
2018	9.3	4.6	3.7	1.8	10.2	5.0	9.0	4.4	3.7	1.8	9.0	4.4
2019	9.1	4.4	3.6	1.7	9.9	4.8	8.7	4.2	3.6	1.7	8.7	4.2
2020	8.8	4.1	3.5	1.7	9.6	4.5	8.5	4.0	3.5	1.7	8.5	4.0
2021	8.5	3.9	3.4	1.6	9.3	4.3	8.2	3.8	3.4	1.6	8.2	3.8
2022	8.3	3.7	3.3	1.5	9.1	4.1	8.0	3.6	3.3	1.5	8.0	3.6
2023	8.1	3.5	3.2	1.4	8.8	3.9	7.8	3.4	3.2	1.4	7.8	3.4
2024	7.8	3.4	3.1	1.3	8.6	3.7	7.5	3.2	3.1	1.3	7.5	3.2
2025	7.6	3.2	3.0	1.3	8.3	3.5	7.3	3.1	3.0	1.3	7.3	3.1
2026	7.4	3.0	3.0	1.2	8.1	3.3	7.1	2.9	2.9	1.2	7.1	2.9
2027	7.2	2.9	2.9	1.2	7.8	3.2	6.9	2.8	2.9	1.2	6.9	2.8
2028	7.0	2.7	2.8	1.1	7.6	3.0	6.7	2.6	2.8	1.1	6.7	2.6

Sources: BLM 2009a; BLM 2009b; BLM 2013; BLM 2014a

BCF billion cubic feet
MMBO million barrels of oil

Table Q-3. Projected Oil and Gas Production (Federal, State, and Fee Surface)

Year	Alternative A		Alternative B		Alternative C		Alternative D		Alternative E		Alternative F	
	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)
2009	17.3	10.4	10.0	6.0	18.4	11.1	16.8	10.1	10.0	6.0	16.8	10.1
2010	16.8	9.9	9.7	5.7	17.9	10.5	16.3	9.6	9.7	5.7	16.3	9.6
2011	16.3	9.4	9.4	5.4	17.4	10.0	15.9	9.1	9.4	5.4	15.9	9.1
2012	15.8	8.9	9.2	5.1	16.9	9.5	15.4	8.7	9.1	5.1	15.4	8.7
2013	15.4	8.4	8.9	4.9	16.4	9.0	15.0	8.2	8.9	4.9	15.0	8.2
2014	14.9	8.0	8.6	4.6	15.9	8.5	14.5	7.8	8.6	4.6	14.5	7.8
2015	14.5	7.6	8.4	4.4	15.4	8.1	14.1	7.4	8.4	4.4	14.1	7.4
2016	14.1	7.2	8.1	4.2	15.0	7.7	13.7	7.1	8.1	4.2	13.7	7.0
2017	13.7	6.9	7.9	4.0	14.6	7.3	13.3	6.7	7.9	4.0	13.3	6.7
2018	13.3	6.5	7.7	3.8	14.1	7.0	12.9	6.4	7.7	3.8	12.9	6.4
2019	12.9	6.2	7.5	3.6	13.7	6.6	12.6	6.0	7.5	3.6	12.6	6.0
2020	12.5	5.9	7.2	3.4	13.3	6.3	12.2	5.7	7.2	3.4	12.2	5.7
2021	12.2	5.6	7.0	3.2	13.0	6.0	11.9	5.4	7.0	3.2	11.9	5.4
2022	11.8	5.3	6.8	3.1	12.6	5.7	11.5	5.2	6.8	3.1	11.5	5.2
2023	11.5	5.0	6.6	2.9	12.2	5.4	11.2	4.9	6.6	2.9	11.2	4.9
2024	11.1	4.8	6.4	2.8	11.9	5.1	10.9	4.7	6.4	2.8	10.9	4.7
2025	10.8	4.5	6.3	2.6	11.5	4.8	10.5	4.4	6.3	2.6	10.5	4.4
2026	10.5	4.3	6.1	2.5	11.2	4.6	10.2	4.2	6.1	2.5	10.2	4.2
2027	10.2	4.1	5.9	2.4	10.9	4.4	9.9	4.0	5.9	2.4	9.9	4.0
2028	9.9	3.9	5.7	2.3	10.6	4.2	9.7	3.8	5.7	2.3	9.7	3.8

Sources: BLM 2009a; BLM 2009b; BLM 2013; BLM 2014a

BCF billion cubic feet
MMBO million barrels of oil

The costs of drilling and completing wells and producing oil and gas, also are relevant for the economic impact analysis. Table Q-4 provides a summary of the costs of drilling, completion, and production for each well type (conventional infill, exploratory deep, and coalbed natural gas [CBNG]) used for the economic analysis.

Table Q-4. Assumptions for Analysis of Economic Impacts for Oil and Gas Well Drilling and Completion According to Well Type

Assumption	Well Type		
	Conventional Infill	***Exploratory Deep***	***Coalbed Natural Gas***
Drilling Impacts			
Drilling Cost ($/well)	$960,017	$9,372,267	$48,641
Local Drilling Costs[1]	85%	58%	83%
Local Direct Impact ($/well)	$812,044	$5,476,054	$40,594
Local Total Impact ($/well)[2]	$1,079,243	$6,991,360	$53,927
Multiplier (total impact/direct impact)	1.33	1.28	1.33
Completion Impacts			
Completion Cost ($/well)	$1,376,005	$4,338,189	$51,323
Local Completion Costs[1]	55%	37%	55%
Local Direct Impact ($/well)	$762,734	$1,614,992	$28,449
Local Total Impact ($/well)[2]	$1,011,420	$2,054,612	$39,957
Multiplier (total impact/direct impact)	1.33	1.27	1.40

Source: BLM 2009b; adjusted to year 2011 dollars using chain-type price indices from IMPLAN (Taylor 2010) and the Consumer Price Index (BLS 2014). Data are based on Authorizations For Expenditure provided by exploration and development companies, and include the assumption that approximately 40 percent of infill and deep wells will be directional or horizontal and the remainder will be vertical.

[1]The local cost shares were based on the percent of total drilling or completion costs that would be spent on goods and services purchased from the local economy.
[2]Total impacts estimated using Impact Analysis for Planning (IMPLAN) include direct, indirect, and induced impacts.

% percent
$ U.S. dollars

Table Q-5 provides the assumptions used to determine the economic impact associated with the production of oil and gas. For the analysis, the Bureau of Land Management (BLM) estimated a production cost (for gas) of $1.55 per thousand cubic feet (mcf), based on data from the Energy Information Administration (Taylor 2010) and updated to year 2011 dollars using the Consumer Price Index (BLS 2014).

Table Q-5. Assumptions for Analysis of Economic Impacts on Output for Oil and Gas Production

Economic Impact	Oil Production (per million barrels)	Gas Production (per billion cubic feet)
Direct Economic Impact[1]	$84,006,000[2]	$4,345,000[3]
Indirect Economic Impact[4]	$4,833,957	$250,024
Induced Economic Impact[5]	$2,166,767	$112,071
Total Economic Impact	$91,006,724	$4,707,095
Multiplier (total impact/direct impact)	1.08	1.08

Note: All dollar values are in year 2011 dollars.

[1]Direct economic impact is the market value of output.
[2]Based on an oil price of $84.006 per barrel, which is the forecast price for oil from 2015-2018 projected by the Wyoming Consensus Revenue Estimating Group (CREG 2013), adjusted from $87.00 (in 2013 dollars) to 2011 dollars.
[3]Based on a gas price of $4.345 per thousand cubic feet; this is the price forecast for gas from 2016 ($4.50 per mcf) projected by the Wyoming Consensus Revenue Estimating Group (CREG 2013), adjusted from 2013 to 2011 dollars. The 2016 forecast price was used because it is representative of the forecast range ($3.85-$4.95 per mcf) over 2014-2018.
[4]Indirect impacts from Impact Analysis for Planning (IMPLAN) reflect increased demand in sectors that directly or indirectly provide supplies to the oil and gas industry.
[5]Induced impacts from IMPLAN reflect increased demand in the consumer and government sectors.

The forecasted number of wells and production used for estimating employment impacts is the same as for estimating impacts on labor earnings and output. Table Q-6 shows the direct and total employment impacts attributable to drilling and completion.

Table Q-6. Assumptions for Employment Impact Analysis for Oil and Gas Well Drilling and Completion According to Well Type

Employment Impact	Well Type		
	Conventional Infill	***Exploratory Deep***	***Coalbed Natural Gas***
Drilling Impacts			
Direct Employment (jobs/well)	3.4	20.7	0.2
Total Employment Impact (jobs/well)	5.8	34.5	0.3
Multiplier (Total Impact/Direct Impact)	1.69	1.67	1.70
Average Earnings per Job (2011 dollars)	$64,779	$63,453	$54,795
Completion Impacts			
Direct Employment (jobs/well)	4.1	7.1	0.2
Total Employment Impact (jobs/well)	6.5	11.2	0.3
Multiplier (Total Impact/Direct Impact)	1.59	1.58	1.58
Average Earnings per Job (2011 dollars)	$59,699	$60,374	$58,360

Note: Direct and total employment impact and average earnings per job are calculated using Impact Analysis for Planning (IMPLAN).

Table Q-7 shows the direct and total employment impacts associated with production.

Table Q-7. Assumptions for Employment Impact Analysis for Oil and Gas Production

Employment Impact (annual number of jobs)	Oil Production (per million barrels)	Gas Production (per billion cubic feet)
Direct Employment	26.9	1.7
Indirect Employment	30.6	1.9
Induced Employment	18.7	1.2
Total Employment	76.2	4.8
Multiplier (Total Impact/Direct Impact)	2.83	2.83
Average Earnings per Job (2011 dollars)	$60,779	$74,439

Note: Direct, indirect, and induced employment impact and average earnings per job are calculated using Impact Analysis for Planning (IMPLAN).

The analysis of potential changes in tax revenues is based on tax rates of 12.5 percent of taxable value for federal mineral royalties, 6 percent of taxable value for state severance taxes (Wyoming Department of Revenue 2001), and 6.8 percent of taxable value for local ad valorem production taxes (based on average tax rates for the counties of Big Horn [7.2%], Hot Springs [6.3%], Park [7.0%], and Washakie [6.9%]) (Wyoming Department of Revenue 2014). Taxable value refers to value of sales minus allowable deductions, including certain costs of production and transportation. For purposes of estimating tax revenues, taxable value was estimated based on the average taxable value per unit sold from the counties in the Planning Area for production year 2010 using data from the Wyoming Department of Revenue (Wyoming Department of Revenue 2011). Taxable value was estimated as $63.01 per barrel for oil, and $3.40 per mcf for natural gas (2011 dollars).

4.0 LIVESTOCK GRAZING

Economic impacts due to changes in livestock grazing are a function of the amount of forage available and the economic value of the forage. For livestock grazing, long-term surface-disturbing actions from actions listed in Appendix T may affect available animal unit months (AUMs). BLM actions to withdraw certain lands for livestock grazing would also reduce the available forage on federal lands. In addition, land disposal actions may have economic impacts; however, those impacts were not analyzed quantitatively because it is difficult to predict the net change in AUMs. Subsequent landowners may continue to graze the land, leaving overall livestock production and output in the region unaffected.

The economic analysis of livestock grazing impacts is based on a long-term average (from 1988 to 2012) of authorized use as a proportion of active use. Based on data from the BLM's Rangeland Administration System (RAS), authorized use ranged from 43 percent to 79 percent of active use between 1988 and 2012, with an average value of 64 percent (BLM 2010a; BLM 2014b). Whereas permitted AUMs include active and suspended non-use AUMS, active use AUMs exclude suspended non-use AUMs. Authorized use represents AUMs billed for and paid for each year for a permit/lease. These AUMs are not the same as actual use AUMs (and may or may not be reasonably close to actual use AUMs), but are closer to what takes place on the ground each year, or the “actual use”, than the active use AUMs. Authorized use information is obtained from the RAS, while actual use represents the AUMs physically used on the ground. Actual use may be less than or equal to authorized use, but authorized use provides an upper bound for actual use. The BLM adjusts authorized use on an annual basis to account for the forage value

of the land in a given year, based on climatic conditions (e.g., drought), as well as taking into account the needs of the land and the ranch operators.

Whereas reductions in land available for livestock grazing (via long-term surface disturbance or grazing withdrawal) are based on active use AUMs, financial conditions on a given ranch operation are determined by actual use (i.e., the actual forage value of the land that is used for livestock) and authorized use (e.g., bank loans that are based on the available forage value of federal leases held by the ranch operator). Thus, authorized use is a more appropriate baseline than active use from which to measure reductions in available AUMs due to surface disturbance or restriction on grazing land. If reductions were measured from a baseline of active use, with no adjustment for actual use, economic impacts would be overstated (BLM 2010a).

Based on the historical analysis from 1988 to 2012 noted above, the economic analysis of livestock grazing impacts uses a baseline of 195,369 AUMs, which represents 64 percent of the active use of 305,264 AUMs. Reductions in AUMs due to long-term surface disturbance and grazing restrictions are also adjusted for the ratio of authorized to active use.

Table Q-8 provides a summary of initial AUMs and total AUMs lost by 2027 due to surface-disturbing activities. Based on current allocations of AUMs to cattle and sheep, 85 percent of the AUM reduction is allocated to cattle and the remainder is allocated to sheep, for the purpose of estimating changes in output and employment. (There are also some AUMs allocated to horse and buffalo grazing, but these comprise one percent and less than one percent, respectively.) Surface disturbance acres were converted to AUMs using a conversion factor of 10.5 acres per AUM (BLM 2009c).

Table Q-8. Estimated Animal Unit Month Losses

Item	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Active Use AUMs						
Initial AUMs (active use)	305,264	305,264	305,264	305,264	305,264	305,264
AUMs lost from surface-disturbing activities (total, long-term disturbance)	1,490	1,037	3,951	1,743	1,029	1,682
AUMs closed to grazing by BLM management actions	169	162,572	169	169	162,572	169
Total AUMs lost from surface-disturbing activities and withdrawn	1,659	163,609	4,120	1,912	163,601	1,851
AUMs lost from surface-disturbing activities and withdrawn (estimated annual)	83	8,180	206	96	8,180	93
Net AUMs in 2027 (active use)	303,605	141,655	301,144	303,352	141,663	303,413

Table Q-8. Estimated Animal Unit Month Losses (Continued)

Item	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
AUMs Authorized (64 percent of active use AUMs)						
Initial AUMs (authorized)	195,369	195,369	195,369	195,369	195,369	195,369
AUMs lost from surface-disturbing activities (total, long-term disturbance)	954	664	2,529	1,116	659	1,076
AUMs closed to grazing by BLM management actions	108	104,046	108	108	104,046	108
Total AUMs lost from surface-disturbing activities and withdrawn	1,062	104,710	2,637	1,224	104,705	1,185
AUMs lost from surface-disturbing activities and withdrawn (estimated annual)	53	5,235	132	61	5,235	59
Net AUMs in 2027 (authorized)	194,307	90,659	192,732	194,145	90,664	194,184

Sources: BLM 2009c; BLM 2014b

AUM Animal Unit Month
BLM Bureau of Land Management

Due to price fluctuations, average per-AUM values for cattle and sheep are based on a ten-year average value of production estimates from the Wyoming Agricultural Statistics Service, adjusted to year 2011 dollars (Taylor 2009; Taylor 2010; BLS 2014). The value for cattle is $48.38 per AUM and the value for sheep is $46.84 per AUM (in 2011 dollars). Including indirect and induced impacts, the value of one AUM for cattle is $99.95 and for sheep $109.67 (in 2011 dollars). Table Q-9 shows the economic impact assumptions for cattle and sheep. The direct economic impact is the estimated change in livestock output per AUM; IMPLAN generates the indirect and induced impacts.

Table Q-9. Assumptions for Analysis of Impacts on Output for Livestock Grazing

Economic Impact	Cattle	Sheep
Direct Economic Impact ($/AUM)	$48.38	$46.84
Indirect Economic Impact ($/AUM)[1]	$39.55	$47.06
Induced Economic Impact ($/AUM)[2]	$12.02	$15.78
Total Economic Impact ($/AUM)	$99.95	$109.67
Multiplier (Total Impact/Direct Impact)	2.07	2.34

Note: All dollar values are in year 2011 dollars.
Note: Detail may not add to total due to rounding.

[1]Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the livestock industry.
[2]Induced impacts reflect increased demand in the consumer and government sectors.

AUM Animal Unit Month

Table Q-10 provides a summary of the employment impacts assumed according to unit changes in livestock AUMs.

Table Q-10. Assumptions for Analysis of Employment Impacts for Livestock Grazing

Employment Impact	Cattle	Sheep
Direct Employment (Jobs/1,000 AUMs)	0.466	0.980
Indirect Employment (Jobs/1,000 AUMs)	0.233	0.542
Induced Employment (Jobs/1,000 AUMs)	0.121	0.165
Total Employment (Jobs/1,000 AUMs)	0.820	1.687
Multiplier (Total Impact/Direct Impact)	1.76	1.72
Average Earnings per Job (year 2011 dollars)	$36,126	$19,940

Note: Direct, indirect, and induced employment impacts and average earnings per job are calculated using Impact Analysis for Planning (IMPLAN).

AUM Animal Unit Month

5.0 RECREATION

The analysis of economic impacts considers only recreation expenditures of nonresidents of the Planning Area. This is based on the assumption that expenditures of residents would occur in the region regardless of the BLM's actions that impact recreational opportunities; however, changes in nonresident recreation patterns would alter the amount of money entering the local region.

Economic impacts from recreation are a function of recreation visitor days (RVDs) and expenditures per day. Future RVDs were estimated based on current RVDs, recent growth rates, and projected trends. Estimates of future RVDs were based on the professional judgment of BLM staff, as well as a United States Forest Service (USFS) study that provides forecasts of recreation activity for the Rocky Mountain region (Bowker et al. 1999) and contacts with neighboring BLM field offices. Table Q-11 provides a summary of estimated annual growth rates, and Figure Q-1 provides a graphical view.

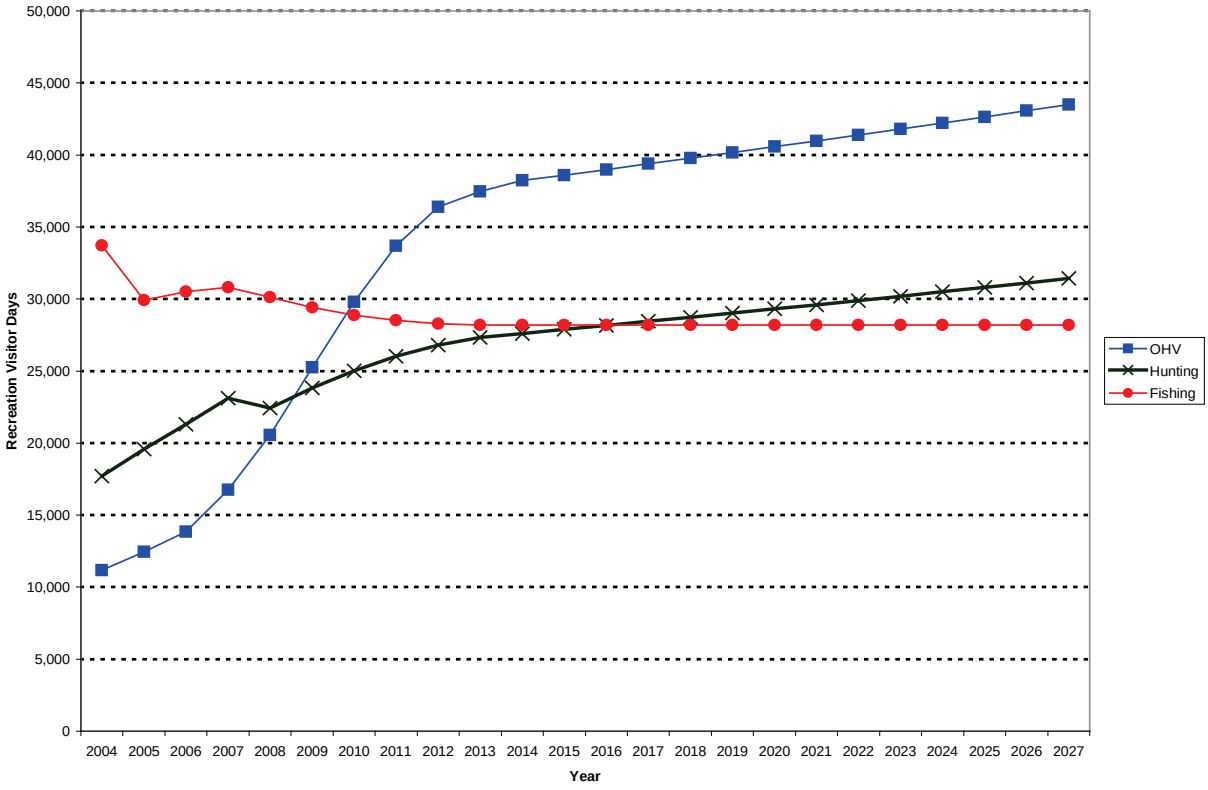
Table Q-11. Estimated Growth Rates for Nonresident Recreation Visitor Days

Year	OHV		Hunting		Fishing	
	RVDs this year	*Growth over previous year*	*RVDs this year*	*Growth over previous year*	*RVDs this year*	*Growth over previous year*
2004	11,177	-	17,707	-	33,725	-
2005	12,440	11.3%	19,579	10.57%	29,904	-11.33%
2006	13,846	11.3%	21,288	8.73%	30,523	2.07%
2007	16,753	21.0%	23,119	8.60%	30,822	0.98%
2008	20,573	22.8%	22,432	-2.97%	30,113	-2.30%
2009	25,264	22.8%	23,830	6.23%	29,420	-2.30%
2010	29,811	18.0%	25,021	5.0%	28,891	-1.8%
2011	33,687	13.0%	26,022	4.0%	28,515	-1.3%
2012	36,381	8.0%	26,802	3.0%	28,287	-0.8%
2013	37,473	3.0%	27,339	2.0%	28,202	-0.3%
2014	38,222	2.0%	27,612	1.0%	28,202	0.0%
2015	38,605	1.0%	27,888	1.0%	28,202	0.0%
2016	38,991	1.0%	28,167	1.0%	28,202	0.0%
2017	39,381	1.0%	28,449	1.0%	28,202	0.0%
2018	39,774	1.0%	28,733	1.0%	28,202	0.0%
2019	40,172	1.0%	29,020	1.0%	28,202	0.0%
2020	40,574	1.0%	29,311	1.0%	28,202	0.0%
2021	40,980	1.0%	29,604	1.0%	28,202	0.0%
2022	41,389	1.0%	29,900	1.0%	28,202	0.0%
2023	41,803	1.0%	30,199	1.0%	28,202	0.0%
2024	42,221	1.0%	30,501	1.0%	28,202	0.0%
2025	42,643	1.0%	30,806	1.0%	28,202	0.0%
2026	43,070	1.0%	31,114	1.0%	28,202	0.0%
2027	43,501	1.0%	31,425	1.0%	28,202	0.0%

Source: BLM 2009d. Data from 2009 through 2027 are projections.

OHV Off-highway vehicle
RVD Recreation visitor day

Figure Q-1. Recent Trends and Projected Future Change: Nonresident Recreation Visitor Days



Source: BLM 2009d

OHV Off-highway Vehicle

The estimates for average expenditure per visitor day, in year 2011 dollars, are $92.55 for fishing (Wyoming Game and Fish Department [WGFD] 2008; USFWS 2008); $140.73 for hunting (Responsive Management 2004); and $56.33 for off-highway vehicle (OHV) use (Foulke et al. 2006). Table Q-12 shows the direct, indirect, and induced output per RVD for each recreation activity, in year 2011 dollars.

Table Q-12. Assumptions for Analysis of Impacts on Output for Recreation Activities

Economic Impact	OHV (per RVD)	Hunting (per RVD)	Fishing (per RVD)
Direct Economic Impact[1]	$56.33	$140.73	$92.55
Indirect Economic Impact[2]	$8.30	$38.27	$12.28
Induced Economic Impact[3]	$5.94	$22.85	$10.74
Total Economic Impact	$70.57	$201.85	$115.57
Multiplier (total impact/direct impact)	1.25	1.43	1.25

Note: Detail may not add to total due to rounding.

[1]Direct economic impact is the average expenditure per visitor day.
[2]Indirect impacts from Impact Analysis for Planning (IMPLAN) reflect increased demand in sectors that directly or indirectly provide support for the recreation industry.
[3]Induced impacts from IMPLAN reflect increased demand in the consumer and government sectors.

OHV Off-highway vehicle
RVD Recreation visitor day

Table Q-13 provides a summary of employment impacts assumed according to unit changes in RVDs.

Table Q-13. Assumptions for Employment Impact Analysis for Recreation Activities

Employment Impact (annual number of jobs)	OHV (per 1,000 RVDs)	Hunting (per 1,000 RVDS)	Fishing (per 1,000 RVDS)
Direct Employment	0.69	2.45	1.24
Indirect Employment	0.07	0.33	0.10
Induced Employment	0.06	0.23	0.11
Total Employment	0.83	3.01	1.46
Multiplier (Total Impact/Direct Impact)	1.20	1.23	1.17
Average Earnings per Job (2011 dollars)	$18,640	$19,741	$19,253

Note: Direct, indirect, and induced employment impact and average earnings per job are calculated using Impact Analysis for Planning (IMPLAN).
Note: Detail may not add to total due to rounding.

OHV Off-highway vehicle
RVD Recreation visitor day

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix R

Comprehensive Travel and Transportation Management

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APPENDIX R

COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT

1.0 QUESTIONS AND ANSWERS

1. What are some of the basic premises of Comprehensive Travel and Transportation Management?

Public access shall be provided to public lands, but managed to protect the public resources as well. This appendix focuses on motorized travel. Routes that are open to motorized vehicle use are also open to non-motorized travel and, in general, cross-country travel using non-motorized modes. Pedestrian, equestrian, and mountain bike riding, or other non-motorized travel modes are generally not constrained, except that any proposal for construction of new trails would be subject to public review under the National Environmental Policy Act (NEPA). Emergency response (including firefighting), permitted use of motorized vehicles, and certain Bureau of Land Management (BLM) administrative uses are exceptions to specific Travel Management Plans (TMPs).

2. How will travel management designations be implemented?

Many Comprehensive Travel and Transportation Management (CTTM) decisions in this Resource Management Plan (RMP) revision remain unchanged. Several defined areas, specified in Chapter 2, will continue management under existing TMPs. Examples of existing TMP decisions include 1) defined areas under seasonal closures and 2) Wilderness Study Areas (WSAs) either closed to motorized vehicle use, or restricted to the routes identified during the WSA inventory process. Additionally, in many existing TMPs, routes have been designated as open or closed to motorized vehicle use and, in some cases, have been obliterated and reclaimed.

Areas not under these defined TMP decisions will be divided into additional geographic TMP areas. Each area will have its own plan with its own decisions describing routes open or closed to motorized vehicle use. Cooperating agencies, affected private landowners, and the general public will be involved in each travel planning effort prior to TMP decisions.

In depth travel management policy is found in BLM Manual 1626 – Travel and Transportation, available online at:
http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.38105.File.dat/1626.pdf

3. How will the public know if an area is open or closed? How will the BLM ensure the public is notified?

TMPs will include a public process to ensure involvement in route inventory efforts and discussion of goals and objectives of each TMP (public access, resource protection, private land considerations, etc.); these efforts will be announced in local newspapers and the Wyoming BLM website (www.blm.gov/wy/st/en.html). Following route management decisions for each TMP, maps will be available on the website or at the Cody and Worland Field Offices. In addition, newly affected areas will be signed at entry points, or portals, and information will be provided for distribution at community

venues (e.g., cooperating local stores serving remote areas). Public information and education of the public will precede enforcement. For example, as an area is undergoing TMP development, notices to the community using the area will be posted onsite to announce planning schedules and opportunities for involvement. Once decisions are made, onsite posting of decisions and maps will occur prior to enforcement actions.

4. What will be the schedule for TMP implementation?

Existing TMPs are expected to continue, unless a need for change is identified and assessed using a public process.

New CTTM guidance and policy now requires the BLM to designate all roads, primitive routes, and trails as either open or closed. The BLM will implement TMPs in areas high in priority to address resource concerns which can be found in Maps 69-74. The management designation of "existing" is an interim designation until a TMP designates the route as open for motorized use, or closed to motorized use. Limiting use to "designated" is an indication of high TMP priority. TMP efforts will be scheduled based on priorities established during RMP implementation planning (Appendix D). Priorities for implementation will be informed by cooperating agencies, affected private landowners and the general public, as well as by the level of resource management concerns identified by the BLM. It is expected that the identified future TMPs for areas Limited to Designated roads and trails will take at least five years to properly plan and implement, if each plan takes one year to complete, and if each Field Office initiates one new TMP each year.

The BLM will go through an inventory process to verify the existence of routes that are documented to exist at the date of the RMP Record of Decision (ROD). These inventory processes will also undergo public review to assure a complete understanding of motorized vehicle use in these TMPs. The BLM will conduct a route-by-route analysis using the minimization (designation) criteria (43 CFR 8342.1) to designate or close individual routes in the TMP.

Some areas may be closed immediately with the RMP. Depending on the selected RMP in the ROD, this implementation decision may close certain WSAs, Areas of Critical Environmental Concern (ACECs), or other areas completely to motorized vehicles.

Some areas will continue as Open Areas or become Open Areas depending on the selected RMP in the Record of Decision; and dependent upon completion of each Open Area TMP including required implementation procedures. Management of Open Areas is important for public safety and TMPs specific to each Open Area will be prioritized for completion in the RMP Implementation Planning process. Partners are particularly sought for Open Area TMP efforts.

5. What will the local TMP implementation process look like?

Public Involvement Details

The annual RMP Implementation Plans for each of the field offices will determine the initiation of planning efforts for any specific TMP. The schedule for the TMP will be announced in local newspapers and on the Wyoming BLM website (www.blm.gov/wy/st/en.html), and cooperating agencies and affected private landowners will be notified.

Minimum expected public involvement opportunities for each new TMP will include: posting notices of scoping and planning schedules (onsite, website, and newspaper); providing at least one public meeting during the scoping period; providing for public information and participation in the route inventory

review process, which will take place over at least one entire field season (spring, summer and fall); providing for at least one public meeting following completion of the NEPA document; and, prior to decision making, providing public notice of TMP decisions on the Wyoming BLM website, local newspapers, and onsite.

Revision of existing TMPs will involve the original stakeholders and will also include opportunities for public involvement, including NEPA review, but may not be as extensive as those provided for new TMPs as stated above, depending on the issues to be resolved with the TMP revision. (For example, an entire new route inventory would not be expected.)

Route Inventory Details

Approximately 80 percent to 90 percent of the travel network is expected to be already captured on the BLM's inventoried route network, and the BLM is acquiring additional route inventory information on an ongoing basis. This current inventory is available for review at BLM field offices. When the BLM conducts an inventory review for a new TMP, the public, cooperating agencies, and other stakeholders will be invited to review the known route inventory and to provide specific information on inventoried routes (maps will be provided) or additional routes yet to be inventoried. (The public is invited to provide global positioning system [GPS] data or other information to document other known routes.) During the route inventory review, the BLM will:

- Review and verify information provided by the public, cooperating agencies, and affected landowners.
- Continue to collect additional route data using aerial photos and verify data collected from aerial photos using GPS.
- Assess and define route condition (route by route analysis) and assign interim route category and expected maintenance level.
- Produce new maps.

Decision Criteria

Route designations provide for public access, protection of resources, public safety, and the minimization of user conflicts in accordance with the following criteria per 43 CFR 8342.1:

- Provide adequate public access using a variety of travel modes and appropriate routes.
- Minimize detriment to soil, watershed, vegetation, air, and other resources.
- Preserve wilderness characteristics for WSAs and areas defined specifically for such management in the RMP ROD.
- Minimize harassment of wildlife and disruption of wildlife habitats, giving priority to the protection of endangered or threatened species and their habitats.
- Minimize conflicts between motorized vehicle use and other recreational uses and ensure compatibility of uses with existing conditions in populated areas, taking into account noise and other effects.

6. How will permitted or authorized users be affected by the TMP?

Generally, permit holders will not be impacted by the TMP as permits may allow for use of areas or routes otherwise closed to public motorized travel. Exploration for locatable minerals may be impacted in areas closed to motorized use, where a plan of operations is required (43 Code of Federal Regulations [CFR] § 3809.11(5)).

7. How may permit holders provide information about necessary routes and uses?

Following requests by permit holders, specific permits may authorize motorized travel on routes or in areas not available to the general public (grazing use authorizations, seismic survey permits, approved rights-of-way (ROW), Applications for Permit to Drill or Sundry Notices, timber sale permits, fuel wood permits, etc.) All affected permit holders and users of public lands are encouraged to participate in the travel and transportation inventory efforts to assure full understanding of motorized vehicle use designations in any TMP.

8. Can permit holders restrict public or administrative access?

No, permit holders may not obstruct public use on any route of travel that is open to the general public without authorization by a BLM authorized officer. The BLM requires administrative access across private property and permitted allotments to manage and protect public lands (43 CFR 4130.3-2(h)).

9. When is motorized travel allowed off TMP routes?

Necessary tasks that support commercial or industrial uses of public lands are allowed by permit in the following cases:

- Maintenance of fences and range improvements, salt placement for livestock consumption, and tending to sick cattle.
- Surveying or staking work associated with filing a Notice of Intent (NOI) to conduct geophysical exploration activities, field reconnaissance, and survey work in advance of a ROW action such as a pipeline.
- Mineral activities defined as casual use (except in Closed areas).
- Other permits or authorizations which expressly allow for motorized vehicle travel off TMP routes.

Recreational or general public activities may be allowed off TMP routes (i.e., off-road or cross-country) for specific purposes, which are defined as those activities which generally require the use of a motorized vehicle, and that do not create resource damage. Examples of necessary tasks allowing off-route motorized (OHV) and mechanized (mountain bike) travel in the Bighorn Basin RMP include:

- Parking alongside a route to remove the vehicle from the traffic lane—depending on the RMP ROD, travel may be allowed up to 30 feet from the route edge in areas Limited to Designated roads and trails, and not allowed in Closed areas or in any WSAs.
- Travel for big game carcass retrieval—depending on the RMP ROD travel is allowed up to 300 feet from the route edge only in areas Limited to Designated routes, and not allowed in Closed areas or in any WSAs.
- Travel for dispersed campsite access—depending on the RMP ROD travel is allowed up to 300 feet from the route edge only in areas Limited to Designated roads and trails, and not allowed in Closed areas or in any WSAs.

Any motorized travel outside of these parameters or that causes resource damage is a violation of the RMP decisions and is subject to enforcement action including citation and fine.

10. How will BLM administrative actions be affected by the TMPs? In what cases may the BLM travel off road?

BLM administrative functions may require motorized travel off TMP routes for a variety of administrative purposes where a motor vehicle is required to accomplish the mission, some of which are listed below:

- wild horse management
- fish and wildlife monitoring
- noxious weed control
- fence repair
- restoration and enhancement
- fire suppression and fuels management
- law enforcement activities

The BLM may sign certain routes for administrative use only. As appropriate and necessary, the BLM may reclaim administrative routes and preclude further (non-emergency) use.

11. How will private landowners be affected by TMPs?

ROWs for access will not be affected by the TMPs although certain routes may be closed to public access and use. All affected ROW holders and private landowners are encouraged to participate in the route inventory efforts to assure full understanding of motorized uses in any TMP to minimize user conflicts.

12. If needed, how will local TMPs be changed?

Revision of existing TMPs will involve the original stakeholders and will also include opportunities for public involvement, including NEPA review, but may not be as extensive as those provided for new TMPs as stated above, depending on the issues to be resolved with the TMP revision. (For example, an entire new route inventory would not be expected.)

Issues requiring TMP revisions may include:

- cooperative travel management opportunities with landowners or other agencies
- construction of new access routes associated with permitted activities
- resource monitoring requiring opening or closing routes
- BLM-administered land tenure adjustments
- protecting public health and safety
- preventing unacceptable resource damage
- new issues that may require a change in the TMP
- re-designating routes as open if the cultural, biological, or physical resource has successfully recovered to where the OHV designation can be less restrictive and public demand for additional routes can be demonstrated

13. Does BLM always need to use an entire TMP to address routes?

No, the BLM may close specific roads to protect health and safety and prevent resource damage, or engage in temporary route closures consistent with IM 2010-028. As per 43 CFR 8341.2 (a), if the authorized officer determines that off-road vehicles are causing or will cause considerable adverse effects upon resources or other authorized uses, the BLM shall immediately close areas affected to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. Compliance with NEPA in the context of temporary closures may include:

- Categorical Exclusions
- Environmental Assessments
- Environmental Impact Statements
- A Determination of NEPA Adequacy (can be used to document that the contemplated action has been adequately covered in an existing NEPA document)

14. What if the BLM needs to change travel designations?

There are three OHV use designations in a TMP: Open, Closed, and Limited. Changing designations requires an RMP amendment. Under past guidance, existing roads and trails was a travel management designation under the limited category. New CTTM policy/guidance now defines existing as an interim management designation until a TMP designates it as open or closed for motorized travel. An RMP amendment is not required to designate routes (i.e., perform TMP) within areas identified in the RMP as managed on an interim basis as existing roads and trails.

15. Why would the BLM change travel designations?

- a new regulation or policy
- use trends, such as OHV recreational activities, requiring a responsive CTTM action to maintain desired settings, experiences, and beneficial outcomes (refer to Recreation Appendix O)
- to maintain desired physical, biological, or heritage resources

16. How will the BLM notify the public of revised travel designations?

- BLM website and local newspapers, at a minimum
- NEPA document scoping and comment periods will be announced

17. How will the BLM manage routes under a specific TMP?

Management of specific routes will be defined in each TMP. Routes may: remain open and receive a specific level of maintenance; be repaired or upgraded; be seasonally closed; be closed to motorized travel; be obliterated and reclaimed; be reconstructed or re-routed; or made available for ROW or landowner access or for administrative use only. New routes may be constructed. Signage will be defined in each TMP.

In specific TMPs, or in Recreation Area Management Plans, trails may be constructed for specific uses (e.g., hiking, mountain biking, and/or equestrian use).

18. How will the BLM close and reclaim additional roads and construct replacement roads?

Once a road inventory is complete, the BLM may close or construct roads through a TMP. Criteria for closing a road include (refer to 43 CFR 8342.1-Minimization Criteria):

- adverse impacts or threats to landowners or stakeholders
- threats to public safety
- adverse impacts to resources, including soil, water, or wildlife
- desired level of access
- redundant (parallel) routes

Criteria for constructing a road include:

- new authorized uses of public lands
- changes to land tenure
- resource protection
- rerouting a road for safety or resource protection
- approval through authorization, such as ROWs

19. Under what criteria would the BLM acquire access across private or state lands?

The BLM may acquire easements across non-federal lands as needed to meet resource objectives. Exclusive easements, which include public access, may be acquired under the following circumstances:

- Access to public lands is desirable.
- Substantial investment is planned on acquired property.
- Existing cooperative road agreements lack adequate rights for other parties.
- Where applicable in the case of the logging road permits issued or assigned after May 4, 1956, the BLM may obtain perpetual easements under the terms of 43 CFR 2812.6-2(a)(ll) for construction of roads with appropriated funds.
- Access restriction and exclusion.

Non-exclusive easements generally provide adequate administrative access for BLM management activities. They usually do not provide access for the general public.

20. Under what criteria will the BLM maintain roads? What are the maintenance levels?

Criteria to maintain routes will be site specific and dependent upon route-by-route analysis, the areas' resource objectives, use, and resource concerns. Primitive routes within WSAs are not maintained other than by the passage of vehicles, with certain exceptions. Exceptions are limited to the minimum mechanical maintenance necessary to provide access (1) as follows:

- For emergencies such as suppression activities associated with wildfire or search and rescue;
- To grandfathered grazing uses and facilities as defined by the Interim Management Plan (IMP) for Lands under Wilderness Review, and under specific authorizations;
- To sites where reclamation or stabilization is needed to protect or improve the lands' wilderness values; and
- to private inholdings.

In these exceptions, maintenance will occur using the "minimum tool concept" described in BLM Manual 6330, Management of Wilderness Study Areas. NEPA analysis is required to analyze maintenance alternatives except in the case of emergencies.

There are five maintenance levels assigned to a travel route ranging from low maintenance priority to high priority.

Level 1: Maintenance is limited to protecting adjacent land and resource values, which means that Level 1 roads are not maintained for motorized traffic. These roads are no longer needed and are closed to traffic. The objective is to remove these roads from the transportation system. Where appropriate, drainage and runoff patterns will be maintained to protect adjacent land. Closure and traffic restrictive devices will be maintained.

Level 2: Typically known as a 'two-track road', these routes are passable by high clearance vehicles and maintained dependent on funding levels. Seasonal closures or other restrictions may be imposed. When possible, drainage structures are inspected and maintained within a 3-year period. Grading as necessary to correct drainage problems. Slides may be left in place if they do not obstruct drainage.

Level 3: Natural or aggregate surface with a defined cross section, drainage structures such as rolling dips, culverts or ditches, and may normally be negotiated by passenger cars driven cautiously. User comfort and convenience are not a priority. When possible, drainage structures are inspected and maintained annually. Grading provides reasonable riding comfort at prudent speeds. Brushing to improve sight distance. Slides obstructing drainage receive high priority. Other slides are removed on a scheduled basis.

Level 4: Single or double lane with aggregate surface. Access for passenger cars driven at prudent speeds. When possible, roadway is maintained annually. Major repairs as needed.

Level 5: Highest traffic volume of the transportation system. Single or double lane with aggregate surface. Access for passenger cars traveling at prudent speeds. When possible, roads are maintained annually with preventive maintenance program. Level 5 roads are repaired as needed.

21. Under what criteria will maintenance levels change?

The BLM may adjust maintenance levels based upon use, available funding, and as needs arrive. Maintenance levels may be adjusted during a TMP if it is decided that a particular route would be more appropriately assigned a different maintenance level.

22. What are the Best Management Practices BLM intends to use?

Appendix L lists route management best management practices, and these are included in the Engineering Best Management Practices discussion.

23. What is the BLM's monitoring plan for the TMP?

On a priority basis BLM will monitor motorized vehicle use for:

- user pioneered roads or trails
- impacts on wildlife
- impacts on other recreation or resource uses

- user conflicts and complaints
- resource damage
- private land conflicts
- trends in violations and incidents

Monitoring methods include traffic counters, intercept surveys, aerial flights, remote sensing observation techniques, investigation of complaints from the public, and field observations.

24. How will the BLM assure that the TMPs are being implemented correctly?

The BLM seeks to inform the public of travel management planning, to educate public land users about TMP and route decisions, and use the lowest level of enforcement to achieve desired outcomes. Enforcement may include citations and fines if motorized use occurs outside of the specific constraints of TMPs or off-road in areas that are defined in the RMP as Closed or Limited. Regulations and maps/brochures will be made available at multiple locations, including the BLM website, BLM offices, local venues and onsite, as appropriate. Informative materials include:

OHV Signs

Standardized signs (i.e., type of substrate, layout, and design) will identify OHV designations in the field; however, the level of signing will be defined in specific TMPs. OHV signage includes:

- Portal signs: Portal signs provide travel designations for an area, such as, "Motorized vehicle use on public land in this area is limited to designated roads and trails." Portal signs will be posted accordingly:
    - For areas Limited to Designated roads and trails, portal signs will provide additional information. For example: "Motorized vehicle use on public land in this area is limited to roads and trails identified with a white arrow."
    - For areas managed as Open, portal signs will specify the boundaries, user ethics, and public safety messages.
    - For areas managed as Closed to motorized use, signs that state the reason for the closure will be posted.
- Route signs: All designated routes (routes that are open to motorized vehicle travel) will be identified with signs, including an open symbol, such as a white arrow. White arrows should be placed at entrances and intersections of all designated roads. All individual closed routes would not typically have signs.

Maps and Brochures

Maps and brochures can provide detailed information to the public about OHV designations. They are an excellent source of land ownership status and travel information. While maps and brochures cannot be the only source of information, they are an excellent aid.

Brochures can portray OHV designations for specific areas. They are easy to produce, inexpensive, and can be updated quickly and made available in printed or online versions. Brochures can assist enforcement activities to monitor and enforce designated roads and trails.

Education

The Tread Lightly and Operation Respect programs will be included in OHV implementation planning. The BLM will initiate programs in the Planning Area for the public that emphasize responsible motorized

vehicle use and respect for the land, resources, and private property rights. Tread Lightly! Inc. is a source of excellent educational materials that promote responsible OHV use.

The Wyoming BLM has used the Operation Respect program for over 20 years. This program is a public outreach initiative that promotes respect for both public and private land, provides information on access to public lands, encourages users to obtain permission from private landowners, and specifies where to get information. Additional programs such as the BLM's Environmental Education Program, the Game and Fish Department's Hunter Stewardship Program, the Hunter Safety Education Program, and the Annual Hunting and Fishing Heritage Exposition, will be utilized when possible for the BLM's OHV program public outreach. Outfitters and guides associations can also assist the BLM with educating the public about OHV ethics. These and other avenues that promote responsible OHV use should be strengthened.

The BLM will incorporate information about regulations, penalties, consequences for irresponsible behavior, and potential impacts to resources from inappropriate use into the outreach program. Methods of public outreach include information postings on the BLM's website, brochures, fact sheets, news releases, and radio talk shows.

Enforcement

All federal and state motor vehicle laws are subject to enforcement. Publication of TMP decisions in the *Federal Register* or made available through any completed NEPA process is sufficient for legal enforcement. Enforcement may include citations and fines if motorized use occurs outside of the specific constraints of TMPs, or off route in areas that are defined in the RMP as Closed or Limited. There are narrow exceptions for necessary tasks (see above). The BLM may enter into cooperative law enforcement agreements with state and local agencies such as the Wyoming Game and Fish Department or county law enforcement agencies.

25. How will the BLM address sage-grouse habitat management in TMPs?

Route by route analysis (referred also as minimization or designation criteria as stated in 43 CFR 8342.1) in sage-grouse Priority Habitat Management Areas will recognize sage-grouse habitat as a predominant management objective, as well as the priority resource to manage for. The route by route analysis will determine future travel management plans within sage-grouse Priority Habitat Management Areas, which would be designed to minimize impacts to sage-grouse habitat.

Travel management planning will include:

- Evaluate the need for closures of routes not desired for public purposes, including seasonal closures, and designate routes with current administrative/agency purpose or need to administrative access only;
- Routes designated as closed will be restored when necessary using appropriate seed mixtures for sage-grouse ecological conditions;
- Limit route construction to realignments of existing designated routes if that realignment has a minimal impact on sage-grouse habitat, eliminates the need to construct a new road, or is necessary for motorist safety;
- Use existing roads, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then new road construction would be designed to mitigate impacts to sage-grouse habitat consistent with the National Greater Sage-Grouse Conservation Measures/Planning Strategy (IM 2012-044);

- Upgrading of routes that would change route category (road, primitive road, or trail) or capacity would be allowed if it would have minimal impact on sage‑grouse habitat, if it is necessary for motorist safety, or eliminates the need to construct a new road;
- For new road proposals, consider an alternative that would locate new primary and secondary roads greater than 1.9 mi from the perimeter of occupied sage-grouse leks inside priority habitat areas. Additionally, for new proposals, consider and evaluate an alternative that would locate new tertiary roads greater than 0.6 mile from the perimeter of occupied leks; and
- Construct new roads to a minimum design standard needed for proposed activity.

Travel management will also evaluate the need for closures, including seasonal closures.

26. How will BLM consider cultural resources under TMPs?

BLM will comply with the requirements of Section 106 of the NHPA when designating OHV areas and a travel management network as part of future TMPs. Specific projects undertaken to improve, or rehabilitate, routes or areas are also undertakings subject to Section 106 of the NHPA. Compliance with Section 106 would be in accordance with the Wyoming State Protocol agreement between BLM and the Wyoming SHPO and BLM guidance relating to cultural resource considerations for OHV designations and travel management (BLM IM 2012-067 (Feb. 15, 2012)). BLM would consider as part of this process existing cultural resource information and potential impacts to historic properties. BLM would identify the geographic area or areas within which the character or use of any historic properties may be directly or indirectly affected by the designations, i.e., the Area of Potential Effect (APE). APEs should include areas that might suffer indirect effects from OHV use, such as access routes leading to at-risk sites vulnerable to vandalism and looting (e.g., historic or prehistoric structures, rock shelters, or rock art) or increased erosion to sites.

BLM also may close routes or roads or OHV designations to protect cultural resources. Evaluation of routes or areas to be designated as closed to protect cultural resources may be based on existing inventory information and may be implemented through appropriate level of National Environmental Policy Act analysis, including issuance of a temporary closure. There may be cases where continued use of an OHV management area or route prior to designation may not be authorized before Class III inventory and Section 106 compliance is completed.

Cultural resources inventory requirements, priorities, and strategies will vary depending on the quality of existing information, the extent of potential change to the location by OHV use, the expected density and nature of historic properties (see BLM Manual 8110), and the potential direct, indirect, and cumulative effects of proposed designations. Where there is a reasonable expectation that a proposed designation will shift, concentrate, or expand travel into areas where historic properties are likely to be adversely affected, a Class II or Class III inventory focused on areas where adverse effects are likely to occur is recommended prior to designation.

2.0 KNOWN ROAD AND TRAIL NETWORK

The Figure R-1 displays the travel management designations for the known road and trail network in the Planning Area. The known road and trail network in the Planning Area can be obtained from the local BLM office or downloaded from http://www.blm.gov/wy/st/en.html. Any future decisions to limit travel to designated roads would be based on updated, site specific inventories that would include public participation.

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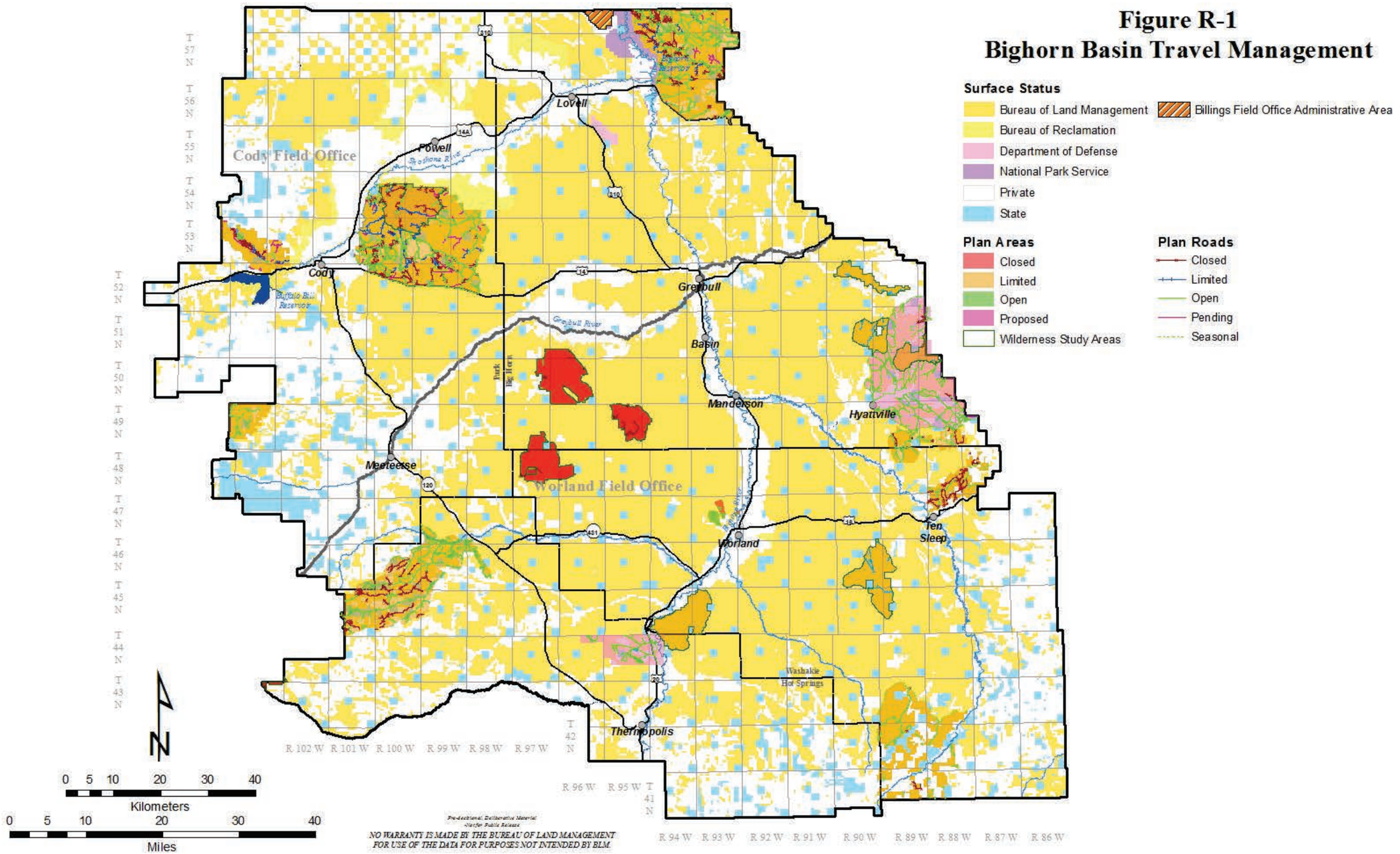
Figure R-1. Travel Management for the Known Road and Trail Network Bighorn Basin Planning Area



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3.0 TRAVEL MANAGEMENT MATRIX

The matrix that follows shows travel management designations in specific locations across the Planning Area by alternative. These locations have been grouped by type (e.g., ACECs or recreation management areas).

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Table R-1. Travel Management Matrix

AREA	Field Office		ALTERNATIVE A						ALTERNATIVES B AND E						ALTERNATIVE C						ALTERNATIVES D AND F					
	C[1]	W[2]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[6] Closure	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure[7]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow Closure
Areas of Critical Environmental Concern (ACECs)																										
Carter Mountain	•		■ (Seasonal closure November 15 – June 15)		■				■ (Seasonal closure November 15 – June 15)		■			■	■				■		■ (Seasonal closure November 15 – June 15)		■			
Little Mountain	•		■ (Seasonal closure December 1 – April 30)		■				■ (Seasonal closure December 1 – April 30)		■			■	■ (Seasonal closure December 1 – April 30)				■		■ (Seasonal closure December 1 – April 30)		■			
Clarks Fork Basin/Polecat Bench	•						■				■			■					■						■	
McCullough Peaks	•				■						■			■					■			■	■			
Foster Gulch	•						■				■			■					■						■	
Brown/Howe	•				■						■			■			■						■			
Rainbow Canyon	•						■				■			■					■						■	
Five Springs Falls	•				■						■			■					■				■			
Clarks Fork Canyon	•						■		■ (Closed on part)		■			■					■				■			
Rattlesnake Mountain	•				■				■ (Closed on part)		■			■					■						■	
Sheep Mountain	•						■				■			■					■				■			
Big Cedar Ridge		•		■						■				■					■			■				
Red Gulch Dinosaur Tracksite		•			■						■			■					■				■			
Sheep Mountain Anticline	•				■						■			■					■				■			
Spanish Point Karst Area		•	■						■					■	■						■					
Upper Owl Creek		•			■						■			■					■				■			
Chapman Bench	•						■			■				■					■						■	
Paleocene, Eocene Thermal Maximum (PETM)	•						■						■						■			■	■ (In McCullough Peaks Travel MGMT Area)			
National Historic Trails and Other Historic Trails																										
Nez Perce National Historic Trail	•						■				■ (Within 5 miles of NHT) (7191)						■ (Within ¼ mile of NHT)					■ (Within 5 miles of NHT)				
Other Historic Trails	•	•					■				■ (Within 5 miles of NHT) (7195)						■ (Within ¼ mile of NHT)								■	

Table R-1. Travel Management Matrix (Continued)

AREA	Field Office		ALTERNATIVE A						ALTERNATIVES B AND E						ALTERNATIVE C						ALTERNATIVES D AND F					
	C[1]	W[2]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[6] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure[7]	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow Closure
Recreation Management Areas (SRMAs, ERMAs)																										
Absaroka Foothills		•			■						■					■							■			
Bighorn River	•	•		■ (Portions in WFO)	■ (CYFO and portions in WFO)						■					■							■			
Badlands			■	■					■		■								■		■		■			
Tour De Badlands		•		■							■					■							■			
Wild Badlands		•	■						■								■				■					
Tatman Mountain		•		■							■					■							■			
West Slope of Bighorn Mountains	•		■ (Seasonal closure December 1 – April 30)		■				■ (Seasonal closure December 1 – April 30)		■				■ (Seasonal closure December 1 – April 30)	■	■				■ (Seasonal closure December 1 – April 30)		■			
Trapper Creek		•	■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)		■				■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)		■				■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)				■		■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)		■			
Paint Rock		•	■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)		■ (Continue to Implement Travel Management Plans in the Paint Rock area)				■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)		■				■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)	■ (Maintain implemented Travel Management Plans)					■ (Seasonal closure December 1 – June 30 within Medicine Lodge HMA) (Closed within Spanish Point Karst ACEC)		■			
Brokenback/ Logging Road Area		•			■ (Implement Travel Management Plans)						■					■ (Maintain implemented Travel Management Plans)							■			
South Bighorns		•			■ (Implement Travel Management Plans)						■					■ (Maintain implemented Travel Management Plans)							■			
Canyon Creek		•			■						■					■							■			
Red Canyon Creek		•			■						■					■							■			

Table R-1. Travel Management Matrix (Continued)

AREA	Field Office		ALTERNATIVE A						ALTERNATIVES B AND E						ALTERNATIVE C						ALTERNATIVES D AND F					
	C[1]	W[2]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[6] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure[7]	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow Closure
The Rivers Area	•			■ (For the Shoshone River area)	■ (For the N and S Forks of the Shoshone and the Clarks Fork of the Yellowstone River)					■ (For the Shoshone River area)	■ (For the N and S Forks of the Shoshone and the Clarks Fork of the Yellowstone River)					■							■ (For the N and S Forks of the Shoshone and the Clarks Fork of the Yellowstone River)			
Historic Trails	•	•					■				■ (Within 5 miles of Trail)						■ (Within ¼ mile of Trail)								■	
Worland Caves	•		■						■								■				■					
McCullough Peaks	•			■	■						■					■						■	■			
Basin Gardens		•		■							■	■				■		■				■		■		
Basin Gardens Play Area		•		■								■						■						■		
Basin Gardens		•		■							■					■						■				
Horse Pasture		•		■					■							■							■			
Rattlesnake Ridge		•		■						■								■				■				
Beck Lake	•			■					■							■							■			
Newton Lake Ridge	•			■ (In portions)	■ (In the remainder)				■							■							■			
Wilderness Study Areas (WSAs)																										
Alkali Creek	•				■				■					■			■						■			
Bobcat Draw Badlands	•		■ (Implement Travel Management Plans)						■					■			■				■					
Cedar Mountain	•			■					■					■			■						■			
Honeycombs	•			■					■					■			■						■			
McCullough Peaks		•			■ (Implement Travel Management Plans)				■					■			■						■ (Implement Travel Management Plans)			
Medicine Lodge	•		■ (Closed within Spanish Point ACEC)		■				■ (Closed within Spanish Point ACEC)					■	■ (Closed within Spanish Point ACEC)		■				■ (Closed within Spanish Point ACEC)		■			
Owl Creek	•		■ (Implement Travel Management Plans)						■					■			■				■					
Red Butte	•		■ (Implement Travel Management Plans)						■					■			■				■					

Table R-1. Travel Management Matrix (Continued)

AREA	Field Office		ALTERNATIVE A						ALTERNATIVES B AND E						ALTERNATIVE C						ALTERNATIVES D AND F					
	C[1]	W[2]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[6] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure[7]	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow Closure
Sheep Mountain	•		■ (Implement Travel Management Plans)						■					■			■				■					
Trapper Creek	•		■ (Closed within Spanish Point ACEC)		■				■ (Closed within Spanish Point ACEC)					■	■ (Closed within Spanish Point ACEC)		■				■ (Closed within Spanish Point ACEC)		■			
Lands with Wilderness Characteristics																										
All Lands with Wilderness Characteristics	•	•					■				■			■					■			■ (Alternative F)			■	
Wild and Scenic Rivers (WSRs)																										
Clarks Fork Yellowstone River	•				■				■					■	■						■					
Cottonwood Creek	•		■						■					■					■						■	
Cow Creek	•				■				■					■					■						■	
Deep Creek		•	■						■					■					■						■	
Deer Creek	•				■				■					■					■						■	
Dry Medicine Lodge Creek		•		■					■					■	■ (Closed [portions within Spanish Point Karst] ACEC; and seasonal closure dates December 1 – June 30 within Medicine Lodge HMA)		■ (portions within the WSA)		■		■ (Closed [portions within Spanish Point Karst]; and seasonal closure dates December 1 – June 30 within Medicine Lodge HMA)		■ (portions within the WSA)		■	
Medicine Lodge Creek		•	■						■					■					■						■	
Oasis Spring Creek	•				■				■					■			■		■				■		■	
Paint Rock Creek Unit		•		■	■				■					■		■	■		■				■		■	
Porcupine Creek	•				■				■					■			■		■				■		■	
Powder River (Middle Fork)		•		■	■						■			■			■		■				■		■	
Trapper Creek		•	■						■					■	■ Closed (portions within Spanish Point Karst ACEC)		■		■		■ Closed (portions within Spanish Point Karst ACEC)		■		■	
Trout Creek	•				■				■					■			■		■				■		■	
White Creek		•	■						■					■					■				■		■	

Table R-1. Travel Management Matrix (Continued)

AREA	Field Office		ALTERNATIVE A						ALTERNATIVES B AND E						ALTERNATIVE C						ALTERNATIVES D AND F					
	C[1]	W[2]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[6] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure[7]	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow Closure
Motorized Use Areas																										
Worland Off Highway Vehicle Area		•				■						■						■						■		
Bentonite Hills area						■							■					■						■		
Lovell Lakes "Motocross" area						■							■					■						■		
Hill climbing areas near Cowley				■		■	■						■					■							■	
Diamond Basin area near Cody	•			■		■	■		■				■					■					■		■	
Red Lakes area near Cody	•					■				■			■					■							■	
Areas near Powell and Greybull							■						■					■							■	
Area near Park County Landfill							■		■				■				■	■							■	
Other Areas with Identified Travel Management Designations																										
Visual Resources	•	•			■ (VRM Class I and II Areas)				■ (VRM Class I Areas)		■ (VRM Class II Areas)									■						■ (Not limited by VRM Class)	
Essential or Recovery Habitat for threatened or endangered species	•	•			■						■						■						■			
Threatened and endangered species habitat	•	•	■						■										■						■	
Areas with fragile soils	•	•			■								■						■						■	
Areas containing significant cultural and paleontological resources	•	•			■						■						■						■			
Areas over important caves or cave passages	•	•			■						■						■						■			
Red Canyon Creek area south of Thermopolis		•			■						■					■							■			
Lands along the Bighorn Slope, Bridger, Owl Creek, and Absaroka Foothills		•			■						■					■	■						■			
Gebo/Crosby area		•		■							■					■									■	
Cottonwood Creek Trail	•		■						■						■						■					
Five Springs Road	•		■						■						■						■					
Pete's Canyon Trail	•		■						■						■						■					
Gooseberry Trail		•	■						■						■						■					

Table R-1. Travel Management Matrix (Continued)

AREA	Field Office		ALTERNATIVE A						ALTERNATIVES B AND E						ALTERNATIVE C						ALTERNATIVES D AND F					
	C[1]	W[2]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[6] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure[7]	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow Closure
Canyon Creek Access Trail		•	■						■						■						■					
Salt Lick Trail		•	■						■						■						■					
Paint Rock Trail		•	■						■						■						■					
Lone Tree Trail		•	■						■						■						■					
Duck Swamp Environmental Educational Area		•	■						■						■						■					
Badlands Interpretive Trail		•	■						■						■						■					
Worland Shooting R&PP area		•	■						■						■						■					
The Lovell Shooting Range	•		■						■						■						■					
Cody Archery Range	•		■						■						■						■					
Areas with Travel Designations and Seasonal Travel Management Restrictions																										
Absaroka Front Management Area							■		■ (Partially closed)		■						■						■			
Carter Mountain	•		■ (Seasonal Closure November 15 – June 15)		■				■ (Seasonal Closure November 15 – June 15)		■				■ (Seasonal Closure November 15 – June 15)		■				■ (Seasonal Closure November 15 – June 15)		■			
Medicine Lodge Wildlife Habitat Management Area		•	■ (Seasonal Closure December 1 – June 30)		■				■ (Seasonal Closure December 1 – June 30)		■				■ (Seasonal Closure December 1 – June 30)		■				■ (Seasonal Closure December 1 – June 30)		■			
Upper Renner Wildlife Habitat Management Area		•	■ (Seasonal Closure December 1 – May 31)		■				■ (Seasonal Closure December 1 – May 31)		■				■ (Seasonal Closure December 1 – May 31)		■				■ (Seasonal Closure December 1 – May 31)		■			
Little Mountain Travel Management Plan area		•	■ (Seasonal Closure December 1 – April 30)		■				■ (Seasonal Closure December 1 – April 30)		■				■ (Seasonal Closure December 1 – April 30)		■				■ (Seasonal Closure December 1 – April 30)		■			
Bald Ridge area		•	■ (Season Closure January 1 – April 30)		■				■ (Season Closure January 1 – April 30)		■				■ (Season Closure January 1 – April 30)		■				■ (Season Closure January 1 – April 30)		■			
Twin Creek Trail		•	■ (Seasonal Closure January 1 – April 30)		■				■ (Seasonal Closure January 1 – April 30)		■				■ (Seasonal Closure January 1 – April 30)		■				■ (Seasonal Closure January 1 – April 30)		■			
Crucial big game winter range	•	•					■		■ (Seasonal Closure November 15 – April 30)		■			■						■ (On a case-by-case basis)	■ (Allow temporary closures)		■			

Table R-1. Travel Management Matrix (Continued)

AREA	Field Office		ALTERNATIVE A						ALTERNATIVES B AND E						ALTERNATIVE C						ALTERNATIVES D AND F					
	C[1]	W[2]	Closed	Interim Existing[3]	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[6] Closure	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow[5] Closure[7]	Closed	Limited to Existing	Limited to Designated	Open	No Separate Designation[4]	Over-Snow Closure
Sage-Grouse Priority Habitat Management Areas	•	•					■		■ (Seasonal Closure February 1 – June 30)		■			■ (In Sage-grouse Winter Concentration Areas)					■						■	
Lynx Analysis Units	•	•						■						■						■						■

[1]Cody Field Office
[2]Worland Field Office
[3]Areas limited to existing roads and trails on an interim basis until completion of travel management planning.
[4]Areas with no separate travel management designation are areas with no specific travel management designation under the alternative. Travel Management in these areas is managed consistent with other resource objectives. If no other travel management applies, motorized vehicle use is limited to existing roads and trails.
[5]Areas open to over-snow vehicle travel under alternatives A and C are considered on a case-by-case basis.
[6]Areas open to over-snow vehicle travel under Alternative B must have a minimum average of 12 inches of snow or be recognized as a groomed motorized trail. If these conditions do not exist then the over-land travel decisions regulate travel in the area.
[7]Areas closed to over-snow vehicle travel under Alternative C are considered on a case-by-case basis.

ACEC	Area of Critical Environmental Concern	S	South
ERMA	Extensive Recreation Management Area	SRMA	Special Recreation Management Area
N	North	VRM	Visual Resource Management
NHT	National Historic Trail	WSA	Wilderness Study Area
R&PP	Recreation and Public Purpose	WSR	Wild and Scenic River

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix S

Lands with Wilderness Characteristics

TABLE OF CONTENTS

LIST OF TABLES

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APPENDIX S

LANDS WITH WILDERNESS CHARACTERISTICS

When evaluating lands with wilderness characteristics, the Bureau of Land Management (BLM) utilizes BLM Manual 6310 - Conducting Wilderness Characteristics Inventory of BLM Lands and BLM Manual 6320 - Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process. The BLM is also currently referencing Instruction Memorandum (IM) No. 2013-106, Additional Guidance Regarding Public and Cooperating Agency Involvement in and Access to Wilderness Characteristics Inventory Information and the Land Use Planning Process. The BLM Cody and Worland Field Offices updated the Lands with Wilderness Characteristics Inventory in 2011 to respond to additional information. The current forms for evaluating Lands with Wilderness Characteristics are provided on the following pages.

Based on identified resource conflicts and the need to prioritize other resource uses*, the BLM has not* proposed to *manage inventoried lands with wilderness characteristics specifically* for naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation *under the Proposed Resource Management Plan (RMP)*. The rationale for these proposals by inventoried unit is available in Table S-1.

1.0 EVALUATION OF CURRENT CONDITIONS

1) Document and review any existing BLM wilderness characteristics inventory findings on file regarding the presence or absence of individual wilderness characteristics, using Form 1, below.

2) Consider relevant information regarding current conditions available in the office. Identify and describe any changes to the existing inventory information. Use interdisciplinary team knowledge, aerial photographs, field observations, maps, etc., and document the findings on Form 2, below. Document current conditions regarding wilderness characteristics, as opposed to potential future conditions.

3) Conduct field reviews as necessary to verify information and to ascertain current conditions. Reach conclusions on current conditions including boundaries, size of areas and presence or absence of wilderness characteristics. Fully explain the basis for each conclusion on Form 2, including any critical differences between BLM and citizen information.

4) Document the findings regarding current conditions for each inventoried area. Describe how the present conditions are similar to, or have changed from, the conditions documented in the original wilderness characteristics inventory. Document the findings on Form 2 for each inventory area. Cite to or attach data considered, including photographs, maps, GIS layers, field trip notes, project files, etc.

2.0 FORM 1

DOCUMENTATION OF BLM WILDERNESS CHARACTERISTICS INVENTORY FINDINGS FROM PREVIOUS INVENTORY ON RECORD

1. Is there existing BLM wilderness characteristics inventory information on all or part of this area?

No _____ (Go to Form 2) **Yes _____** (If yes, and if more than one area is within the area, list the unique identifiers for those areas.):

a) Inventory Source: _____

b) Inventory Area Unique Identifier(s): _____

c) Map Name(s)/Number(s): _____

d) BLM District(s)/Field Office(s): _____

2. BLM Inventory Findings on Record:

Existing inventory information regarding wilderness characteristics (if more than one BLM inventory area is associated with the area, list each area and answer each question individually for each inventory area):

a) Inventory Source: _____

Area Unique Identifier	Sufficient Size? Yes/No (acres)	Naturalness? Yes/No	Outstanding Solitude? Yes/No	Outstanding Primitive & Unconfined Recreation? Yes/No	Supplemental Values? Yes/No

3.0 FORM 2

CURRENT CONDITIONS: PRESENCE OR ABSENCE OF WILDERNESS CHARACTERISTICS

Area Unique Identifier_____ Acreage_____
(If the inventory area consists of subunits, list the acreage of each and evaluate each separately).

In completing steps (1)-(5), use additional space as necessary.

(1) Is the area of sufficient size? (If the area meets one of the exceptions to the size criterion, check "Yes" and describe the exception in the space provided below),

Yes _____ No _____
Note: If "No" is checked the area does not have wilderness characteristics; check "N/A" for the remaining questions below.

Description (describe the boundaries of the area--wilderness inventory roads, property lines, etc.):
_____
_____
_____
_____

(2) Does the area appear to be natural?

Yes _____ No _____ N/A _____
Note: If "No" is checked the area does not have wilderness characteristics; check "N/A" for the remaining questions below.

Description (include land ownership, location, topography, vegetation, and summary of major human uses/activities):
_____
_____
_____
_____

(3) Does the area (or the remainder of the area if a portion has been excluded due to unnaturalness and the remainder is of sufficient size) have outstanding opportunities for solitude?

Yes _____ No _____ N/A _____

Description (describe the area's outstanding opportunities for solitude):
_____
_____
_____
_____

(4) Does the area (or the remainder of the area if a portion has been excluded due to unnaturalness and the remainder is of sufficient size) have outstanding opportunities for primitive and unconfined recreation?

Yes _____ No _____ N/A _____

Note: If "No" is checked for both 3 and 4 the area does not have wilderness characteristics; check "N/A" for question 5.

Description (describe the area's outstanding opportunities for primitive and unconfined recreation):

_____

_____

_____

_____

(5) Does the area have supplemental values (ecological, geological, or other features of scientific, educational, scenic or historical value)?

Yes _____ No _____ N/A _____

Description:

_____

_____

_____

_____

SUMMARY OF ANALYSIS*

Area Unique Identifier: _____

Summary

Results of analysis:

(Note: Explain the inventory findings for the entirety of the inventory unit. When wilderness characteristics have been identified in an area that is smaller than the size of the total inventory unit, explain why certain portions of the inventory unit are not included within the lands with wilderness characteristics (e.g., the inventory found that certain parts lacked naturalness).

1. Does the area meet any of the size requirements? ___ Yes ___ No

2. Does the area appear to be natural? ___ Yes ___ No ___ N/A

3. Does the area offer outstanding opportunities for solitude or a primitive and unconfined type of recreation? ___ Yes ___ No ___ N/A

4. Does the area have supplemental values? ___ Yes ___ No ___ N/A

Check one:

___ The area, or a portion of the area, has wilderness characteristics and is identified as lands with wilderness characteristics.

___ The area does not have wilderness characteristics.

Prepared by (team members):

_____

_____

_____

_____

(Name, Title, Date)

Reviewed by (District or Field Manager):

Name: _____ Title: _____

Date: _____

_____

**This form documents information that constitutes an inventory finding on wilderness characteristics. It does not represent a formal land use allocation or a final agency decision subject to administrative remedies under either 43 CFR parts 4 or 1610.5-3.*

4.0 ROUTE ANALYSIS[1]

(Factors to consider when determining whether a route is a road[2] for wilderness characteristics inventory purposes.)

Wilderness Characteristics Inventory Area Unique Identifier: _____

Route or Route Segment3 Name and/or Identifier: _____

(Include Transportation Plan Identifier, if known, and include route number supplied by citizen information, when available.)

I. LOCATION

Refer to attached map _____ and BLM corporate data (GIS). List photo point references (where applicable) or reference attached photo log.

Describe: _____
_____
_____
_____
_____
_____

II. ROUTE CONTEXT

A. Current Purpose[4] (if any) of Route: (Examples: Rangeland/Livestock Improvements [stock tank, developed spring, reservoir, fence, corral], Inholdings [ranch, farmhouse], Mine Site, Concentrated Use Site [camp site], Recreation, Utilities [transmission line, telephone, pipeline], Administrative [project maintenance, communication site, vegetation treatment]).

---

[1] This form documents information that constitutes an inventory finding on wilderness characteristics. It does not represent a formal land use allocation or a final agency decision subject to administrative remedies under either 43 CFR parts 4 or 1610.5-3.

[2] Road: An access route which has been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road.

- *a. Improved and maintained – Actions taken physically by people to keep the road open to vehicle traffic. "Improved" does not necessarily mean formal construction. "Maintained" does not necessarily mean annual maintenance.*
- *b. Mechanical means – Use of hand or power machinery or tools.*
- *c. Relatively regular and continuous use – Vehicular use that has occurred and will continue to occur on a relatively regular basis. Examples are: access roads for equipment to maintain a stock water tank or other established water sources, access roads to maintained recreation sites or facilities, or access roads to mining claims.*

[3] If a portion of a route is found to meet the wilderness inventory road criteria (see Part III) and the remainder does not meet these criteria (e.g., a cherrystem road with a primitive route continuing beyond a certain point), identify each segment and explain the rationale for the separate findings under pertinent criteria.

[4] The purpose of a route is not a deciding factor in determining whether a route is a road for wilderness characteristics inventory purposes. The purpose of a route does provide context for factors on which such a determination may be based, particularly the question of whether maintenance of the route ensures relatively regular and continuous use. The purpose also helps to determine whether maintenance that may so far have been unnecessary to ensure such use would be approved by BLM when the need arises.

Describe: _____
_____
_____
_____
_____
_____

B. Right-of-Way (ROW):

1. Is there a ROW associated with this route?

   Yes ____ No ____ Unknown ____

2. If yes, what is the stated purpose of the ROW? _____

3. Is the ROW still being used for this purpose?

   Yes ____ No ____ Unknown or N/A ____

   Explain: _____
   _____

III. WILDERNESS INVENTORY ROAD CRITERIA

A. Evidence of construction or improvement using mechanical means:

   Yes _____ (if either A.1 or A.2 is checked "yes" below) No _____ (if both A.1 and A.2 are checked "no" below)

1. Construction: (Is there evidence that the route or route segment was originally constructed using mechanical means?)

   Yes _____ No _____

Examples: Paved___ Bladed___ Graveled___ Roadside Berms___ Cut/Fill___ Other___

Describe: _____
_____
_____
_____
_____
_____

2. Improvements: (Is there evidence of improvements using mechanical means to facilitate access?)

   Yes ____ No ____ If "yes": by Hand Tools ____ by Machine ____

Examples: Culverts___ Hardened Stream Crossings___ Bridges___ Drainage___ Barriers___ Other___

Describe: _____
_____
_____
_____
_____
_____

B. Maintenance: (Is there evidence of maintenance that would ensure relatively regular and continuous use?):

Yes ___ (if either B.1 or B.2 is checked "yes" below) No ___ (if both B.1 and B.2 are checked "no" below)

1. Is there Evidence or Documentation of Maintenance using hand tools or machinery?

Yes ____ No ____ If "yes": by Hand Tools ____ by Machine ____

Explain: _____
_____
_____
_____
_____
_____

2. If the route or route segment is in good[5] condition, but there is no evidence of maintenance, would mechanical maintenance with hand tools or machines be approved by BLM to meet the purpose(s) of the route in the event this route became impassable?

Yes ____ No ____

Explain: _____
_____
_____
_____
_____
_____

C. Relatively regular and continuous use: (Does the route or route segment ensure relatively regular and continuous use?)

Yes ____ No ____

Describe evidence (e.g., direct, vehicles or vehicle tracks observed, or indirect, evidence of use associated with purpose of the route such as maintenance of facility that route accesses) and other rationale for whether use has occurred and will continue to occur on a relatively regular basis (i.e., regular and continuous use relative to the purpose(s) of the route).[6]

_____
_____
_____
_____
_____
_____

[5] Good condition would be a condition that ensures regular and continuous use relative to the purposes of the route. Consider whether the route can be clearly followed in the field over its entire course and whether all or any portion of the route contains any impediments to travel.

[6] Include estimate of travel rates for the stated purposes, e.g., trips/day or week or month or season or year or even multiple years in some facility maintenance cases.

IV. CONCLUSION

Does the route or route segment[7] meet the definition of a wilderness inventory road (i.e., are items III.A and III.B and III.C all checked yes)?

Yes ____ = Wilderness Inventory Road

No ____ = Not a road for wilderness inventory purposes

Explanation[8]: _____
_____
_____
_____
_____
_____
_____

Evaluator(s): _____ Date: _____

[7] If part of the route meets the wilderness inventory road definition and the remainder does not, describe the segment meeting the definition and any remaining portion not meeting the definition and why.
[8] Describe and explain rationale for any discrepancies with citizen proposals.

Table S-1. Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit

Unit Containing Wilderness Characteristics	Rationale
Worland Field Office	
008 DH	Do not manage for wilderness characteristics in this area due to the current land uses present in the area. Active sand and gravel pit north of area, which may be predicted to head south into the area. There currently are mining claims present, and the potential for future coal bed methane extraction exists in the area.
0016 DH	Do not manage for wilderness characteristics in this area due to the current land uses present in the area. Bentonite potential exists surrounding and within proximity to the area. In addition, approximately 50% of the area is leased for oil and gas.
0048 PR	There is a development potential for Coal Bed Methane; The area is 20% leased, 77% coal. Oil and gas leases are very important for sustaining historic and current land uses, as well as the potential for future CBNG development. The current land uses will conflict with managing for wilderness characteristics.
1536 PR	Do not manage for wilderness characteristics within the area due to potential commercial timber; cultural and wildlife management will indirectly benefit wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.
Owl Creek Subunit 5 (formerly 661 TS)	Presence of Gypsum, uranium and timber in the area. 97% of the area is unavailable to oil and gas leasing. Potential for gypsum and uranium to be mined is low due to terrain and access to the area. The area does contain high quality timber but is not accessible or feasible to logging. However, there is no history of commercial timber in the area because of the access and the difficult terrain would require a cable yarding system. The timber is of high quality but it is not economically available unless the timber market substantially increases. Logging in this area is not foreseeable. However, because the area is 97% unavailable to leasing, is managed under the Owl Creek ACEC, within the Absaroka Front Management Area, has low development potential, and from public comments, the area will not be managed specifically for wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Absaroka Front Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation related resources, and visual resources which will directly benefit wilderness characteristics. Current and proposed management prescriptions from other resources management prescriptions will benefit wilderness characteristics.
Owl Creek Subunits 1-4 (Formerly Owl Creek CP)	41 % of the area has been identified as Commercial Forest Land, and 31% contains Uranium. Low potential for timber development because of the difficult access in the area as well as the terrain. It is estimated that only 50% of the timber in the area would be accessible because of the terrain. Cost of timber, access, and difficulty of using logging equipment in the area limits the potential of commercial timber. Uranium is a locatable mineral, not leasable. Potential for mining in the area is low due to the terrain and access. Because the area is 97% unavailable to leasing, is managed under the Owl Creek ACEC, within the Absaroka Front Management Area, has low development potential, and from public comments, the area will not be managed specifically for wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Absaroka Front Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation related resources, and visual resources which will directly benefit wilderness characteristics. Current and proposed management prescriptions from other resources management prescriptions will benefit wilderness characteristics.

Table S-1. Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit (Continued)

Unit Containing Wilderness Characteristics	Rationale
1535 PR	It is recommended not to manage for wilderness characteristics within the area. 16% of the area contains Gypsum, as well as 0.6% sand and gravel, 1.2 % limestone. Potential gypsum claims exist because Gypsum (and sand and gravel) are limited but are available. However, the area is identified as big game and sage grouse habitat. Oil and gas restraints encompass the entire area with TLS and CSU stipulations to address wildlife resources. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.
568 TS	7% of the area has been identified as Commercial Forest Land, 46% contains Limestone, and 8% Phosphate. The area has terrain which limits the development potential. Timber and limestone development are low and not foreseeable for the area. The only stand of Ponderosa Pine in the Grass Creek Resources Area (T. Stephens), Owl Creek ACEC, Absaroka Front Management Area (Draft EIS), 81% unavailable to leasing, .02% NSO, 14% CSU. Because of the very low potential for development, the area is managed as the Owl Creek ACEC, and 81% is unavailable. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Absaroka Front Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation related resources, and visual resources which will directly benefit wilderness characteristics. Current and proposed management prescriptions from other resources management prescriptions will benefit wilderness characteristics.
069 JW	33% of the area contains Gypsum, and 2% Uranium, 4% Limestone. A gravel pit is located approx. 1 mile to the northwest. The terrain of the area makes the development unlikely. There are many places located in the area that have a much better potential for mineral development. 96% of the area is under a CSU. CSU and TLS stipulations cover the entire area, which will adequately and indirectly maintain wilderness characteristics. Specific management for wilderness characteristics are not necessary.
130 JW	No extractive resources identified as available, the terrain will make any resource difficult to access. CSU (50%) and TLS stipulations cover the entire area, which will adequately and indirectly maintain wilderness characteristics. Specific management for wilderness characteristics are not necessary.
Medicine Lodge CP Subunit A and B (Formerly Medicine Lodge North CP)	Some potential exists for commercial timber, but remains low due to the ACEC and the emphasis on maintaining wildlife habitat. The difficult terrain and the Spanish Point Karst ACEC limit the availability of the resources. Most of the area overlaps with the Spanish Point Karst ACEC. In addition, groundwater recharge withdrawal, seasonal closure for wildlife, and archaeological resources requires management prescriptions which benefits wilderness characteristics. Due to existing ACEC management prescriptions, and overlapping TLS wildlife stipulations and CSU stipulations to maintain recreational resources, management to sustain or enhance wilderness characteristics within the area is not necessary. Wilderness characteristics will be adequately managed for within the area. In addition, upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.

Table S-1. Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit (Continued)

Unit Containing Wilderness Characteristics	Rationale
Paintrock CP	Paint Rock area is listed on the National Register of Historic Places. The area is one of the few areas that exposes the Hyattville member of Ten Sleep Sandstone making the area geologically unique. Overlapping CSU (to address recreational, cultural, and hydrological resources) and TLS stipulations (wildlife resources) cover the entire area, which will adequately and indirectly maintain wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics. Specific management for wilderness characteristics are not necessary.
Sheep Mountain CP	The area is adjacent to Sheep Mountain WSA. The northern portion of the area is within the 15-Mile MLP, and TLS stipulations to address wildlife resources underlay the area. These management prescriptions will benefit and aid in sustaining wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, some of the area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
669 AK	Upon development of the preferred alternative for the Bighorn Basin RMP revision, nearly the entire area is within the 15-Mile MLP, which stipulations are present to protect and manage for recreational resources, specific CSU stipulations to address recreation management, as well as overlapping TLS stipulations to address wildlife resources. These management prescriptions will benefit wilderness characteristics.
639 AK	Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics. In addition, CSU stipulations specific for recreation management, as well as overlapping TLS stipulations to address wildlife resources will further benefit wilderness characteristics. These management prescriptions will indirectly benefit wilderness characteristics.
31 PR	100% of the area is within a CSU. Because of the high potential for commercial harvest of timber, it is recommended not to manage for wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.
508 AK	69.11% leased for oil and gas; 12% of area contains sand and gravel, and active leases existing in the area. It is recommended to not manage for wilderness characteristics because of the existing leases for oil and gas. Upon development of the preferred alternative for the Bighorn Basin RMP revision, nearly the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
508 Tristate Gooseberry N Platte	45.89% of the area is leased for oil and gas, and the potential for mineral development exists judging by the amount of leases in the area. Recommended that managing the area for wilderness characteristics will conflict with current land uses. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
509 AK Dorsey Ck	The area has a high potential of oil and gas development (81% of area is under a lease) Recommended that managing the area for wilderness characteristics will conflict with current land uses. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.

Table S-1. Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit (Continued)

Unit Containing Wilderness Characteristics	Rationale
516 DH	69% of the area has been identified as Commercial Forest Land, 74% contains uranium; potential for timber harvest is high; the potential for uranium development is low. It is recommended not to manage to sustain the wilderness characteristics in the area due to the commercial harvest of timber. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Absaroka Front Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation related resources, and visual resources which will directly benefit wilderness characteristics.
577 AK	92.68% of the area is currently under a lease for oil and gas; with the high potential for oil and gas extraction. It is recommended not to manage to sustain the wilderness characteristics in the area due to the active leases and high potential for extraction.
622 AK	Potential for oil and gas extraction is present (41.84% under a lease for oil and gas), as well as coal resources in the area. It is recommended not to manage to sustain the wilderness characteristics in the area due to the active leases and high potential for extraction, and the presence of other resources.
651 AK	There is the high potential for oil and gas extraction (61.63% leased for oil and gas), which managing the area to sustain wilderness characteristics would conflict with current land uses. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
665 CW	The development potential exists in the area (12.4% leased for oil and gas). There are existing stipulations (6 % NSO, 50% CSU) which aids wilderness characteristics, but, it is recommended that managing for wilderness characteristics in the area will conflict with current land uses, and conflict with the potential of future mineral extraction.
668 AK	Do not manage for wilderness characteristics in the area because the majority of area (98%) is under lease. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the majority of the area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
676 AK, PR	The area currently has stipulations which will assist in managing for wilderness characteristics (9% NSO, 40% CSU). It is recommended not to manage for wilderness characteristics due to the potential for oil and gas extraction (32% of the area is leased). Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
Alkali Creek NW CP	The area is 100% CSU, high potential for archaeological resources, which specific resource management will benefit wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.
Bobcat Draw South II CP	Do Not manage the area for wilderness characteristics as it conflicts with oil and gas lease and potential for oil shale development. In addition, 66% of the area is within a CSU stipulation, which will benefit wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the majority area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
Bobcat Draw West CP	It is not recommended to manage for wilderness characteristics in the area due to the current land uses (72% leased for oil and gas). Some characteristics will benefit from CSU stipulations within the area. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.

Table S-1. Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit (Continued)

Unit Containing Wilderness Characteristics	Rationale
Honeycombs 164 CP	99% of the area is identified as containing Coal, with very low potential for development; the area is could have potential for exploration of coal bed methane. It is not recommended to manage for wilderness characteristics within the areas due to the potential for resource development.
Honeycombs NW 107 CP	70% of the area is identified as containing Coal, very low potential for development; the area could have potential for exploration of coal bed methane. It is not recommended to manage for wilderness characteristics within the areas due to the potential for resource development.
Honeycombs S CP	98% of the area is identified as containing Coal, which the potential to extract coal bed methane exists, as well as the oil and gas leases within the area. It is not recommended to manage for wilderness characteristics within the areas due to the potential for resource development.
Red Butte North CP	Do not manage for wilderness characteristics in the area because the majority of area (83%) is under lease. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the majority of the area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
Bobcat Draw South CP	It is not recommended to manage for wilderness characteristics due to the potential for oil shale development, and existing oil and gas leases. 90% of the area is under CSU stipulations to manage for paleontological and archaeological resources, which will benefit wilderness characteristics.
652 Upper, Lower AK	It is not recommended to manage for wilderness characteristics due to existing oil and gas leases. In addition, 53% of the area is under CSU stipulations, as well as other resources (wild horse HMA, sensitive watershed, paleo resources) which those resources management prescriptions will benefit wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
626 AK	The land status within the area will conflict with effective management prescriptions to maintain wilderness characteristics. NSO and CSU stipulations (14% and 33% respectively) within the area will benefit wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the majority of the area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
509 AK	Do not manage for wilderness characteristics due to the sand and gravel pits and the conflicts with land status within the area. In addition, Wild Horse management prescriptions may indirectly benefit some of the wilderness characteristics within the area (i.e., management actions that will maintain or enhance conformance with the Wyoming Standards for Healthy Rangelands, and not actively promoting the 15-Mile HMA and maintaining remote natural characteristics). Upon development of the preferred alternative for the Bighorn Basin RMP revision, the majority of the area will be within the 15-Mile Master Leasing Plan, which provides for stipulations that will sustain soil and visual resources which will directly benefit wilderness characteristics.
005 PR	The surrounding private lands may be developed for residential, or 2nd homes, therefore easements are more likely to be sought after and further developed; this is similar to what is being observed along the Hyattville Logging Road. Managing for wilderness characteristics may increase landowner conflicts and possible future easements. There are also commercial timber resources which may be recovered. In addition, NSO and CSU stipulations (2% and 80% of the area respectively) will benefit wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.

Table S-1. Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit (Continued)

Unit Containing Wilderness Characteristics	Rationale
Cody Field Office	
Carter Mountain	The area has an irregular land pattern and contains many inholdings. Secondary vehicle routes provide access to the nearest inholdings. Management actions for the Carter Mountain ACEC and the Absaroka Front SMA help protect naturalness. There are no current oil and gas leases in the area. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Absaroka Front Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation related resources, and visual resources which will directly benefit wilderness characteristics.
Painted Hills	Much of the area lies within the Sheep Mountain Anticline ACEC. Many of the management actions for the ACEC help protect naturalness.
Trout Creek	The area lies within the Craig Thomas Little Mountain SMA and the management actions for that area help protect naturalness. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire area will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.
Sheep Mountain	Management actions for the proposed Sheep Mountain ACEC and the Absaroka front SMA subsequently continue to maintain the integrity of naturalness. There are no current oil and gas leases in the area. A large parcel of private land owned by The Nature Conservancy is being held for possible acquisition by BLM. Nearly all of this land lies on top of the mountain. There is a small parcel on the southwest side of the area that is also part of the proposal. Private and state lands nearly surround the area, and in addition, the boundary is highly irregular, which may prove difficult or inefficient to manage solely for wilderness characteristics. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Absaroka Front Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation related resources, and visual resources which will directly benefit wilderness characteristics.
Rattlesnake Mountain	Area is highly developed. Rattlesnake Road, a dominant feature in the landscape, is the main access route into BLM and many of the spur routes within Rattlesnake Mountain are used primarily for logging and wood cutting activities. Managing for wilderness characteristics in this area will compromise these activities. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Absaroka Front Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation related resources, and visual resources which will directly benefit wilderness characteristics.
Cedar Ridge	Do not manage for wilderness characteristics in the area due to current oil and gas activity where approximately 68% of the area is under lease. Managing to sustain wilderness characteristics will conflict with current land uses.
Little Dry Creek	Do not manage for wilderness characteristics in the area because the majority of area (74%) is under lease, and new wells with associated development are currently proposed. Managing to sustain wilderness characteristics will conflict with current land uses.
North YU Bench	Do not manage for wilderness characteristics in the area because the majority of area (approximately 61%) is under lease. Managing to sustain wilderness characteristics will conflict with current land uses.
Crystal Creek	There is mineral potential (bentonite) present within the area, and mining claims are heading towards the interior of the area. Managing for wilderness characteristics will conflict with current and future land uses. Upon development of the preferred alternative for the Bighorn Basin RMP revision, the entire will be within the Bighorn Master Leasing Plan, which provides for stipulations that will sustain wildlife, recreation, and visual resources which will directly benefit wilderness characteristics.

Table S-1. Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit (Continued)

Unit Containing Wilderness Characteristics	Rationale
Rough Gulch	64% of the area is covered by oil and gas leases. One of the proposed PETM ACEC units lies within a portion of the area. Some of the management actions for the ACEC help protect naturalness. The area is highly valued for its scenery and recreational opportunities (motorized and non-motorized). The area will be designated as part of the McCullough Peaks Special Recreation Management Area, management actions for the SRMA would help protect naturalness (NSO).
Whistle Creek	Portions of the area, approximately 33% of the area, contain oil and gas leases. The area has high potential for oil and gas and moderate to high development potential. The area is highly valued for its scenery and recreational opportunities (motorized and non-motorized). The area will be designated as part of the McCullough Peaks Special Recreation Management Area, management actions for the SRMA would help protect naturalness (NSO).
Coon Creek	83% of the area is covered by oil and gas leases. A portion of the area lies within one of the proposed PETM ACEC parcels, which management actions will benefit wilderness characteristics.
Bald Ridge	Management actions for the ACEC, and Absaroka Front SMA help protect naturalness. The entire area is within the Absaroka Front Management Area, MLP, and nearly the entire area within the Clarks Fork ACEC. These protective management layers will benefit the wilderness characteristics.

Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix T

Surface Disturbance and Reasonable Foreseeable Actions

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LIST OF TABLES

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APPENDIX T

SURFACE DISTURBANCE AND REASONABLE FORESEEABLE ACTIONS

1.0 SUMMARY OF REASONABLE FORESEEABLE ACTIONS

This appendix includes information on surface disturbance and reasonable foreseeable actions within the Planning Area. Table T-1 provides projected acres of surface disturbance by resource. Table T-2 provides foreseeable development project assumptions by resource; the projected surface disturbances in Table T-1 are based on the project assumptions in Table T-2. The purpose of the Resource Management Plan (RMP) is to make land use allocations. The level of detail for impact analysis is to make informed land use allocations. This appendix on surface disturbance and reasonable foreseeable actions is a tool that was used to compare the impacts of land use allocations across the alternatives. Therefore, the estimated total number of individual activities and associated surface disturbance may be exceeded so long as the additional activities or location of the development would not change the land use allocations determined through the Record of Decision. These actions are subject to subsequent permitting and environmental analysis.

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Mineral Resources – Leasable Oil and Gas (includes CBNG)						
Acres Short-Term Disturbance from BLM Actions	3,552	1,506	3,912	3,429	1,497	3,423
Acres Reclaimed from BLM Actions	2,119	900	2,332	2,046	895	2,042
Acres Long-Term Disturbance from BLM Actions	1,433	606	1,580	1,383	602	1,381
Acres Short-Term Disturbance from Non-BLM Actions	1,533	1,398	1,533	1,527	1,398	1,533
Acres Reclaimed from Non-BLM Actions	913	833	913	909	833	913
Acres Long-Term Disturbance from Non-BLM Actions	620	565	620	618	565	620
Mineral Resources – Locatable						
Acres Short-Term Disturbance from BLM Actions	20,000	15,000	20,000	20,000	15,000	20,000
Acres Reclaimed from BLM Actions	10,000	10,000	10,000	10,000	10,000	10,000
Acres Long-Term Disturbance from BLM Actions	10,000	5,000	10,000	10,000	5,000	10,000
Acres Short-Term Disturbance from Non-BLM Actions	10,000	10,000	10,000	10,000	10,000	10,000
Acres Reclaimed from Non-BLM Actions	4,000	4,000	4,000	4,000	4,000	4,000
Acres Long-Term Disturbance from Non-BLM Actions	6,000	6,000	6,000	6,000	6,000	6,000

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Mineral Resources – Salable Minerals						
Acres Short-Term Disturbance from BLM Actions	2,000	800	2,000	1,800	800	1,800
Acres Reclaimed from BLM Actions	400	200	400	450	200	450
Acres Long-Term Disturbance from BLM Actions	1,600	600	1,600	1,350	600	1,350
Acres Short-Term Disturbance from Non-BLM Actions	2,800	2,800	2,800	2,800	2,800	2,800
Acres Reclaimed from Non-BLM Actions	1,200	1,200	1,200	1,200	1,200	1,200
Acres Long-Term Disturbance from Non-BLM Actions	1,600	1,600	1,600	1,600	1,600	1,600
Mineral Resources – Other Solid Leasables						
Acres Short-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Reclaimed from BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	200	200	200	200	200	200
Acres Reclaimed from Non-BLM Actions	40	40	40	40	40	40
Acres Long-Term Disturbance from Non-BLM Actions	160	160	160	160	160	160
Mineral Resources – Leasable Geothermal[1]						
Acres Short-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Reclaimed from BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Fire and Fuels Management[2,3]						
Prescribed Fire						
Acres Short-Term Disturbance from BLM Actions	40,000	20,000	80,000	40,000	18,000	40,000
Acres Reclaimed from BLM Actions	40,000	20,000	80,000	40,000	18,000	40,000
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Mechanical Fuels Treatment						
Acres Short-Term Disturbance from BLM Actions	30,000	5,000	60,000	30,000	5,000	30,000
Acres Reclaimed from BLM Actions	30,000	5,000	60,000	30,000	5,000	30,000
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Forest, Woodlands, and Forest Products						
Acres Short-Term Disturbance from BLM Actions	30,000	20,000	40,000	30,000	20,000	30,000
Acres Reclaimed from BLM Actions	30,000	20,000	40,000	30,000	20,000	30,000
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions[4]	3,000	3,000	3,000	3,000	3,000	3,000
Acres Reclaimed from Non-BLM Actions	3,000	3,000	3,000	3,000	3,000	3,000
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Invasive Species and Pest Management[3,5]						
Acres Short-Term Disturbance from BLM Actions	2,000	100	4,000	2,000	100	2,000
Acres Reclaimed from BLM Actions	2,000	100	4,000	2,000	100	2,000
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	200	200	200	200	200	200
Acres Reclaimed from Non-BLM Actions	200	200	200	200	200	200
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Fish and Wildlife Resources						
Fisheries and Stream Enhancement Activities						
Acres Short-Term Disturbance from BLM Actions	0	91	0	0	91	0
Acres Reclaimed from BLM Actions	0	91	0	0	91	0
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions[4]	38	38	38	38	38	38
Acres Reclaimed from Non-BLM Actions	38	38	38	38	38	38
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Watershed Enhancement Projects						
Acres Short-Term Disturbance from BLM Actions	781	1,562	391	781	1,562	781
Acres Reclaimed from BLM Actions	550	1,100	225	550	1,100	550
Acres Long-Term Disturbance from BLM Actions	231	462	166	231	462	166
Acres Short-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Health and Safety – Abandoned Facilities and AML						
Abandoned Facilities						
Acres Short-Term Disturbance from BLM Actions	200	200	200	200	200	200
Acres Reclaimed from BLM Actions	200	200	200	200	200	200
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	200	200	200	200	200	200
Acres Reclaimed from Non-BLM Actions	200	200	200	200	200	200
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Abandoned Mine Lands Restoration						
Acres Short-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Reclaimed from BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	2,000	4,000	2,000	2,000	4,000	2,000
Acres Reclaimed from Non-BLM Actions	2,000	4,000	2,000	2,000	4,000	2,000
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Paleontological						
Acres Short-Term Disturbance from BLM Actions	200	250	200	200	250	200
Acres Reclaimed from BLM Actions	150	150	150	150	150	150
Acres Long-Term Disturbance from BLM Actions	50	100	50	50	100	50
Acres Short-Term Disturbance from Non-BLM Actions	200	200	200	200	200	200
Acres Reclaimed from Non-BLM Actions	80	80	80	80	80	80
Acres Long-Term Disturbance from Non-BLM Actions	120	120	120	120	120	120

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Renewable Energy – Wind Energy Development						
Acres Short-Term Disturbance from BLM Actions	200	200	200	200	200	200
Acres Reclaimed from BLM Actions	150	150	150	150	150	150
Acres Long-Term Disturbance from BLM Actions	50	50	50	50	50	50
Acres Short-Term Disturbance from Non-BLM Actions	200	200	200	200	200	200
Acres Reclaimed from Non-BLM Actions	150	150	150	150	150	150
Acres Long-Term Disturbance from Non-BLM Actions	50	50	50	50	50	50
Rights-of-Way (ROW)						
Telephone and Fiber Optics						
Acres Short-Term Disturbance from BLM Actions	218	216	218	218	216	218
Acres Reclaimed from BLM Actions	218	216	218	218	216	218
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions[6]	168	168	168	168	168	168
Acres Reclaimed from Non-BLM Actions	168	168	168	168	168	168
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Pipelines (Mineral and Water)[7]						
Acres Short-Term Disturbance from BLM Actions	2,949	2,196	3,101	2,949	2,196	1,178
Acres Reclaimed from BLM Actions	2,949	2,196	3,101	2,949	2,196	1,178
Acres Long-Term Disturbance from BLM Actions	0	0	0	0	0	0
Acres Short-Term Disturbance from Non-BLM Actions	1,456	1,456	1,456	1,456	1,456	1,456
Acres Reclaimed from Non-BLM Actions	1,456	1,456	1,456	1,456	1,456	1,456
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Roads[8]						
Acres Short-Term Disturbance from BLM Actions	1,966	1,229	4,638	1,966	1,229	1,996
Acres Reclaimed from BLM Actions	983	614	2,319	983	614	672
Acres Long-Term Disturbance from BLM Actions	983	615	2,319	983	615	672
Acres Short-Term Disturbance from Non-BLM Actions	1,127	1,127	1,127	1,127	1,127	1,127
Acres Reclaimed from Non-BLM Actions	563	563	563	563	563	563
Acres Long-Term Disturbance from Non-BLM Actions	564	564	564	564	564	564

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Powerlines						
Acres Short-Term Disturbance from BLM Actions	338	229	359	338	229	165
Acres Reclaimed from BLM Actions	337	228	358	337	228	164
Acres Long-Term Disturbance from BLM Actions	1	1	1	1	1	1
Acres Short-Term Disturbance from Non-BLM Actions	200	200	200	200	200	200
Acres Reclaimed from Non-BLM Actions	199	199	199	199	199	199
Acres Long-Term Disturbance from Non-BLM Actions	1	1	1	1	1	1
Communication Sites						
Acres Short-Term Disturbance from BLM Actions[9]	10	10	10	10	10	10
Acres Reclaimed from BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from BLM Actions	10	10	10	10	10	10
Acres Short-Term Disturbance from Non-BLM Actions	7	7	7	7	7	7
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	7	7	7	7	7	7
Other Facilities[10]						
Acres Short-Term Disturbance from BLM Actions	210	95	233	210	95	181
Acres Reclaimed from BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from BLM Actions	210	95	233	210	95	181
Acres Short-Term Disturbance from Non-BLM Actions	155	74	180	155	74	155
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	155	74	180	155	74	155
Comprehensive Trails and Travel Management						
Motorized Vehicle Use						
Acres Short-Term Disturbance from BLM Actions	1,233	2,776	12,907	5,820	2,729	5,750
Acres Reclaimed from BLM Actions	398	1,708	172	1,879	2,664	1,879
Acres Long-Term Disturbance from BLM Actions	835	1,068	12,735	3,941	1,046	3,917
Acres Short-Term Disturbance from Non-BLM Actions	517	517	517	517	517	517
Acres Reclaimed from Non-BLM Actions	167	167	167	167	167	167
Acres Long-Term Disturbance from Non-BLM Actions	350	350	350	350	350	350

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Recreation						
Recreational Site Development						
Acres Short-Term Disturbance from BLM Actions	349.5	2,253	12,815	349.5	2,180	271
Acres Reclaimed from BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from BLM Actions	349.5	2,253	12,815	349.5	2,180	271
Livestock Grazing						
Spring Development						
Acres Short-Term Disturbance from BLM Actions	5	2.5	10	5	2.5	4.75
Acres Reclaimed from BLM Actions	4	2	5	4	2	3.8
Acres Long-Term Disturbance from BLM Actions	1	0.5	5	1	0.5	0.9
Acres Short-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Pipeline Development						
Acres Short-Term Disturbance from BLM Actions	60	30	120	60	30	57
Acres Reclaimed from BLM Actions	57.5	28.8	115	57.5	28.8	54.7
Acres Long-Term Disturbance from BLM Actions	2.5	1.2	5	2.5	1.2	2.37
Acres Short-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Acres Reclaimed from Non-BLM Actions	0	0	0	0	0	0
Acres Long-Term Disturbance from Non-BLM Actions	0	0	0	0	0	0
Reservoir/Pit Development						
Acres Short-Term Disturbance from BLM Actions	40	20	80	40	20	38
Acres Reclaimed from BLM Actions	35	17.5	70	35	17.5	33.2
Acres Long-Term Disturbance from BLM Actions	5	2.5	10	5	2.5	4.75
Acres Short-Term Disturbance from Non-BLM Actions	17	17	17	17	17	17
Acres Reclaimed from Non-BLM Actions	15	15	15	15	15	15
Acres Long-Term Disturbance from Non-BLM Actions	2	2	2	2	2	2

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Fence Development						
Acres Short-Term Disturbance from BLM Actions	250	125	500	250	125	237.5
Acres Reclaimed from BLM Actions	240	120	480	240	120	228
Acres Long-Term Disturbance from BLM Actions	10	5	20	10	5	9.5
Acres Short-Term Disturbance from Non-BLM Actions	105	105	105	105	105	105
Acres Reclaimed from Non-BLM Actions	100	100	100	100	100	100
Acres Long-Term Disturbance from Non-BLM Actions	5	5	5	5	5	5
Well Development						
Acres Short-Term Disturbance from BLM Actions	5	2.5	10	5	2.5	4.75
Acres Reclaimed from BLM Actions	4	2	8	4	2	3.8
Acres Long-Term Disturbance from BLM Actions	1	0.5	2	1	0.5	0.95
Acres Short-Term Disturbance from Non-BLM Actions	2	2	2	2	2	2
Acres Reclaimed from Non-BLM Actions	1.5	1.5	1.5	1.5	1.5	1.5
Acres Long-Term Disturbance from Non-BLM Actions	0.5	0.5	0.5	0.5	0.5	0.5
Reservoir Maintenance Development						
Acres Short-Term Disturbance from BLM Actions	10	5	20	10	5	9.5
Acres Reclaimed from BLM Actions	8	4	16	8	4	7.6
Acres Long-Term Disturbance from BLM Actions	2	1	4	2	1	1.9
Acres Short-Term Disturbance from Non-BLM Actions	4	4	4	4	4	4
Acres Reclaimed from Non-BLM Actions	3	3	3	3	3	3
Acres Long-Term Disturbance from Non-BLM Actions	1	1	1	1	1	1

Table T-1. Summary of Projected Acres of Surface Disturbance by Resource (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Cumulative Disturbance						
Total Acres Short-Term Disturbance from BLM Actions	136,252.5	73,940.0	245,642.0	140,174.5	71,829.3	137,065.4
Total Acres Reclaimed from BLM Actions	120,606.5	63,047.3	204,157.0	121,868.5	62,008.3	119,383.9
Total Acres Long-Term Disturbance from BLM Actions	15,646.0	10,892.7	41,485.0	18,306.0	10,802.0	17,663.4
Total Acres Short-Term Disturbance from Non-BLM Actions	24,129.0	26,183.0	24,154.0	24,135.0	26,183.0	24,129.0
Total Acres Reclaimed from Non-BLM Actions	14,493.5	16,573.5	14,493.5	14,497.5	16,573.5	14,493.5
Total Acres Long-Term Disturbance from Non-BLM Actions	9,635.5	9,609.5	9,660.5	9,637.5	9,609.5	9,635.5
Cumulative Long-Term Acres of Disturbance	25,282	20,502	51,146	27,944	20,412	27,299

[1]Based on the Reasonable Foreseeable Development for Geothermal (BLM 2009a), development is unlikely and would only occur on previously disturbed areas.
[2]Acres disturbed by mechanical fuels treatment and prescribed fire will naturally be reclaimed within 5 years.
[3]Includes range enhancements and other wildlife habitat restoration actions.
[4]Assumes 10 percent of the BLM actions acreages.
[5]Surface disturbance activities resulting from invasive species projects will be naturally reclaimed within 5 years. Therefore long-term disturbance from BLM actions will be zero.
[6]Based upon 58 percent BLM-administered surface; 42 percent private and state trust lands.
[7]Actions would likely be mostly oil and gas related, including CO_2 and energy pipelines.
[8]Approximately 50 percent of roads would be oil and gas related (based on the Reasonable Foreseeable Development Scenario for Oil and Gas [BLM 2009b; BLM 2013]), with the rest coming from local demand.
[9]20 sites at 0.5 acre each.
[10]Actions would likely be mostly oil and gas related.

AML Abandoned Mine Land
BLM Bureau of Land Management
CBNG Coalbed natural gas
CO_2 Carbon dioxide
ROW Rights-of-Way

Table T-2. Reasonable Foreseeable Development Assumptions

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Mineral Resources – Locatable						
Exploration (Number of Active Claims/Acres)	3,167/188,200	-	-	-	-	-
Acres Under Notice (common to all)	155/year	155/year	155/year	155/year	75/year (This number is decreased as ACEC designation in greater sage-grouse Key Habitat Areas precludes Notice submission – all 3809 exploration activities are submitted as Plans).	75/year (This number is decreased as ACEC designation in sage-grouse PHMAs precludes Notice submission – all exploration activities are submitted as Plans).
Acres Closed to Locatable Mineral Entry (surface/mineral estate)	65,090/174,354	271,370/325,102	23,916/47,846	48,728/72,031	1,148,232/ 1,375,585 (Estimate of all land that would be withdrawn from mineral entry. Takes into account acres already withdrawn in Alternative B and adds remaining fed surface/mineral acres included in all Key Habitat Areas).	48,728/72,031 (No locatable mineral withdrawals would be pursued in PHMAs so Alternative F = Alternative D).

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Acres Available for Locatable Mineral Entry (surface/mineral estate)	3,124,724/ 4,033,195	2,918,444/ 3,882,447	3,165,898/ 4,159,703	3,141,086/ 4,135,518	1,976,492/ 2,657610 (Alternative A – Alternative E closed) (federal surface and mineral estate acres).	3,141,086/ 4,135,518 (No locatable mineral withdrawals would be pursued in PHMAs so Alternative F = Alternative D).
Projected Additional Acres Closed to Locatable Mineral Entry (mineral estate)	21,000	45,000	21,200	21,000	876,862	21,000 (No mineral withdrawal within ACEC is being pursued under Alternative F).

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Assumptions	All BLM-administered mineral estate except in areas specifically withdrawn or closed to mineral entry would remain open for mining claim location, and exploration and development of locatable minerals. Any surface management operations proposed on claims that pre-date a withdrawal would require a validity examination.	Large acreages in ACECs and other special management areas are proposed for withdrawal from mineral entry under the Mining Laws. However, this would not significantly limit opportunities to explore for and develop locatable minerals, as many areas in the Planning Area where locatable minerals occur would remain open to locatable mineral entry. Any surface management operations proposed on claims that pre-date a withdrawal would require a validity examination.	Same as assumption under Alternative A, except less acreage would be proposed for withdrawal from mineral entry under the Mining Laws. Any surface management operations proposed on claims that pre-date a withdrawal would require a validity examination.	Same as assumption under Alternative A, except less acreage would be proposed for withdrawal from mineral entry under the Mining Laws. Any surface management operations proposed on claims that pre-date a withdrawal would require a validity examination.	Locatable mineral exploration would be conducted under a plan of operation and not a notice under Alt E with a Greater Sage-Grouse Key Habitat Areas ACEC designated in the Planning Area; Acres remain the same as Alternative B. Any surface management operations proposed on claims that pre-date a withdrawal would require a validity examination.	Locatable mineral exploration would be conducted under a plan of operation and not a notice under Alt F with a Greater Sage-Grouse PHMAs ACEC designated in the Planning Area; Acres remain the same as Alternative D. Any surface management operations proposed on claims that pre-date a withdrawal would require a validity examination.

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Development (Number of Sites/Acres)	23/31,500	-	-	-	23/31,500	23/31,500
Projected New Acres of Surface Disturbance	1000/year	1000/year	1000/year	1000/year	500/year	1000/year
Assumptions	Assumes 700 acres/year new mining disturbance in the CYFO for bentonite and gypsum and 300 acres/year new mining disturbance in the WFO for bentonite. New closures or withdrawals would not take place in areas where there are active bentonite, gypsum, or uranium mining claims. Assumes no new surface disturbance for uranium development.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Assumes 400 acres/year new mining disturbance in the CYFO for bentonite and gypsum and 100 acres/year new mining disturbance in the WFO for bentonite. New closures or withdrawals would not take place in areas where exploration for or development of locatable minerals are taking place. Assumes no new surface disturbance for uranium development.	Assumes 700 acres/year new mining disturbance in the CYFO for bentonite and gypsum and 300 acres/year new mining disturbance in the WFO for bentonite. New closures or withdrawals would not take place in areas where exploration for or development of locatable minerals are taking place. Assumes no new surface disturbance for uranium development.
Mineral Resources – Oil and Gas						
Federal Well Projections						
Existing Federal Wells						
Number of Existing Federal Wells	2,966	2,966	2,966	2,966	2,966	2,966
Projected Number of Abandoned Existing Federal Wells	697	697	697	697	697	697
Remaining Number of Existing Productive Federal Wells	2,269	2,269	2,269	2,269	2,269	2,269

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Projected New Federal Wells						
Number of Projected New Federal Wells	1,184	502	1,304	1,143	499	1,141
Projected Number of Abandoned New Federal Wells	229	98	251	922	98	220
Projected Productive New Federal Wells	956	404	1,053	922	401	921
Projected Total Productive Federal Wells						
Remaining Number of Existing Productive Federal Wells	2,269	2,269	2,269	2,269	2,269	2,269
Projected Productive New Federal Wells	956	404	1,053	922	401	921
Total Number Productive Federal Wells	3,225	2,673	3,322	3,191	2,670	3,190
Non-federal Well Projections (State and Fee Minerals)						
Existing Productive Non-federal Wells						
Number of Existing Non-federal Wells	1,544	1,544	1,544	1,544	1,544	1,544
Projected Number of Abandoned Non-federal Wells	346	346	346	346	346	346
Remaining Number of Existing Productive Non-federal Wells	1,198	1,198	1,198	1,198	1,198	1,198
Projected New Non-federal Wells						
Number of Projected New Non-federal Wells	511	466	511	509	466	511
Projected Number of Abandoned New Non-federal Wells	98	89	98	97	89	98
Projected Productive New Non-federal Wells	413	377	413	412	377	413
Projected Total Productive Non-federal Wells						
Remaining Number of Existing Productive Non-federal Wells	1,198	1,198	1,198	1,198	1,198	1,198
Projected Productive New Non-federal Wells	413	377	413	412	377	413
Total Number Productive Non-federal Wells	1,611	1,575	1,611	1,611	1,575	1,611
Cumulative Productive Wells						
Total Number Productive Federal Wells	3,225	2,673	3,322	3,191	2,670	3,190
Total Number Productive Non-federal Wells	1,611	1,575	1,611	1,611	1,575	1,611
Total Productive Wells	4,863	4,248	4,933	4,801	4,245	4,801

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Assumptions	All new wells would result in 3 acres of surface disturbance, which would be reduced to 1.5 acres of long-term disturbance through reclamation. A 1.5-acre areas of disturbance is assumed for all existing wells.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Assumptions	-	Reductions in non-federal wells from the baseline scenario under this alternative reflect potential impacts on the economic viability of drilling wells in areas where non-federal land is surrounded by BLM-administered lands closed to mineral leasing.	-	Same as Alternative B	Same as Alternative B	-

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Mineral Resources – Salable						
Mineral Material Disposals (Number of Sites/Acres)	77/3,760	-	-	-	46/800	77/3,760
Acres Closed to Mineral Material Disposals	231,854	2,541,750	348,215	184,193	2,811,915 (Estimate of all public land that would be closed to mineral material disposals. Takes into account acres already closed in Alternative B and adds remaining fed surface/mineral acres included in all Key ACEC areas).	184,913 (No additional public land would be closed to mineral material disposals in PHMAs so Alternative F = Alternative D).
Acres Open to Mineral Material Disposals	3,975,695	1,665,799	3,859,334	4,023,356	1,163,780 (Alternative A – Alternative E closed).	4,023,356 (Alternative F = Alternative D) See above.
Projected New Acres of Surface Disturbance	2,000	800	2,000	1,800	800	1,800
Assumptions	Assumes a total of 2,000 new acres of surface disturbance due to mineral materials disposal over next 20 years = 100 acres/year on public lands in the Planning Area.	Assumes a 60 percent reduction in the amount of public land available for mineral material disposals = 800 new acres of public land surface disturbance over 20 years = 40 acres/year new mineral materials-related disturbance on public lands in the Planning Area.	Assumes a total of 2,000 new acres of surface disturbance due to mineral materials disposal over next 20 years = 100 acres/year on public lands in the Planning Area.	Assumes a total of 2,000 new acres of surface disturbance due to mineral materials disposal over next 20 years = 100 acres/year on public lands in the Planning Area.	Assumes a 60% reduction in the amount of public land available for mineral material disposals = 800 new acres public land disturbance over 20 years = 40 ac/year new mineral materials-related disturbance on public lands in the Planning Area.	Assumes a total of 2,000 new acres of surface disturbance due to mineral materials disposal over next 20 years = 100 acres/year on public lands in the Planning Area.

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Mineral Resources – Geothermal						
Development (Number of Sites/Acres)	0/0	0/0	0/0	0/0	0/0 (as per Geothermal RFD)	0/0 (as per Geothermal RFD)
Fire and Fuels Management						
Prescribed Fire (acres)	2,000/year	1,000/year	4,000/year	2,000/year	900/year	2000/year
Assumptions			Assumes 2,000 acres for wildlife and 2,000 acres for other purposes.		Alternative E further restricts RX @ or below 12" precipitation zone.	No further restrictions from Alternative D.
Mechanical Fuels Management (acres)	1,500/year	250/year	3,000/year	1,500/year	250/year	1,500/year
Forest, Woodlands, and Forest Products						
Forest Products Sales (acres)	1,500/year	1,000/year	2,000/year	1,500/year	1,000/year	1,500/year
Invasive Species and Pest Management						
Assumptions	For all disturbed areas, assumes 10 percent requires treatment. Ten percent is based on 2 years' experience in treatment of previously disturbed areas for various resources. For federal oil and gas well disturbances, assumes 10 percent requires treatment on short-term disturbance and 10 percent requires treatment on long-term disturbance.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
BLM Road Maintenance	No new disturbance	No new disturbance	No new disturbance	No new disturbance	No new disturbance	No new disturbance
Assumptions	Maintenance actions would be within existing disturbances.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Not associated with any surface disturbance (acres)	2,500	1,250	5,000	2,500	1,250	2,500
Assumptions	Based on average treated acres per year regardless if infestation resulting from surface disturbance activities or not.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Fish and Wildlife Resources						
Habitat Restoration and Enhancement: Sagebrush (acres)	2,000	1,000	2,000	2,000	900/year	2000/year
Assumptions	Same areas as accounted for in prescribed fire disturbance above.	Same areas as accounted for in prescribed fire disturbance above.	This makes up half of the prescribed fire disturbance above.	Same areas as accounted for in prescribed fire disturbance above.	Alternative E further restricts RX @ or below 12" precipitation zone.	No further restrictions from Alternative D.
Habitat Restoration and Enhancement: Aspen (acres)	50	100	0	50	100	50
Assumptions	Included as part of mechanical fuels management treatment noted above.	Included as part of mechanical fuels management treatment noted above.		Included as part of mechanical fuels management treatment noted above.	No further restrictions from Alternative B.	No further restrictions from Alternative D.

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Watershed Restoration and Enhancement (acres)	2,050	1,100	2,000	2,050	1,100	2,050
Stream Restoration, Structure Removal, and Other Fisheries Enhancements (number of sites/acres)	0	91	0	0	91	0
Assumptions		Over the life of the plan: 80 acres lentic restoration; 10 miles lotic restoration; assumes disturbance on 8 feet on either side of the stream = 10 acres per site.			No further restrictions from Alternative B.	No further restrictions from Alternative D.
Culvert Replacements (number of sites/acres)	0	3/1	0	0	3/1	0
Watershed Enhancement Projects						
Seeding and Restoration Projects (acres)	1,331	2,662	616	1,331	2,662	1,331
Assumptions	Based on watershed restoration projects to date.	Assumes greater emphasis on watershed restoration.	Assumes less emphasis on watershed restoration.	Based on watershed restoration projects to date.	Assumes greater emphasis on watershed restoration.	Assumes less emphasis on watershed restoration.
Abandoned Facilities and AML Restoration						
Abandoned Facility Restoration (acres)	10	10	10	10	10	10
AML Restoration (acres)	100	200	100	100	200	100

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Paleontological						
Fossil Collection (acres)	200	250	200	200	250	200
Assumptions	Currently, less than 10 acres/year are disturbed during paleontological excavations in the Planning Area. Assumes this rate would continue.	Alternative B promotes fossil collection and therefore will result in additional acreages.	Currently, less than 10 acres/year are disturbed during paleontological excavations in the Planning Area. Assumes this rate would continue.	Currently, less than 10 acres/year are disturbed during paleontological excavations in the Planning Area. Assumes this rate would continue.	Alternative E continues to promote fossil collection and therefore will result in additional acreages.	Less than 10 acres/year are disturbed during paleontological excavations in the Planning Area. Alternative F assumes this rate would continue.
Renewable Energy						
Wind Energy Development (number of sites/acres)	1/200	1/200	1/200	1/200	1/200	1/200
Rights-of-Way (ROW)						
Communication Site Development (number of sites/acres)	20/10	20/10	20/10	20/10	20/10	20/10
Powerline Development (number of sites/acres)	196/338	132/229	208/359	196/338	132/229	165/312
Pipeline Development (number of sites/acres)	122/2,949	90/2,196	128/3,101	122/2,949	90/2,196	122/1,178
Road Development (number of sites/acres)	220/1,966	137/1,229	519/4,638	220/1,966	137/1,229	220/1,966
Comprehensive Trails and Travel Management						
Road Maintenance	No new disturbance	No new disturbance	No new disturbance	No new disturbance	No new disturbance	No new disturbance
Assumptions	Assumes maintenance actions would be within existing disturbances.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A

Table T-2. Reasonable Foreseeable Development Assumptions (Continued)

Type of Development/Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
BLM Road and Trail Creation (acres)	1,233	2,776	12,907	5,820	1,221	5,820
Methods/Assumptions	There has been an average of 61 acres/year of new road/trail creation over the past 20 years.	Assumes 138 acres/year of new road/trail construction over the life of the plan.	Assumes 645 acres/year of new road/trail construction over the life of the plan.	Assumes 291 acres/year of new road/trail construction over the life of the plan.	41% more roads and trails than Alternative B in WFO, and 15% more roads and trails in CYFO are subject to closure and reclamation.	Same as Alternative D
Recreation						
Campsites (number of sites/acres)	7/14	27/54	4/8	20/40	26/12	19/38
Interpretive Sites (number of sites/acres)	15/78	30/111	7/70	29/107	28/107	27/105
Other Facilities (number of sites/acres)	29/257.5	44/2,088	16/11,232.5	45/5,750	22/2061.3	26/5672
Livestock Grazing						
Reservoir/Pit Development (number of sites/acres)	73/40	36/20	146/80	73/40	36/20	69/38
Well Development (number of sites/acres)	23/5	12/2.5	46/10	23/5	12/2.5	22/4.7
Spring Development (number of sites/acres)	35/5	17/2.5	70/10	35/5	17/2.5	33/4.75
Fence Development (number of sites/acres)	176/250	88/125	352/500	176/250	88/125	167/237
Reservoir Maintenance Development (number of sites/acres)	47/10	23/5	94/20	47/10	23/5	44.6/9.5

ACEC Area of Critical Environmental Concern
CYFO Cody Field Office
PHMA Priority Habitat Management Area
RFD Reasonable Foreseeable Development
WFO Worland Field Office

2.0 REFERENCES

BLM. 2009a. Reasonable Foreseeable Development Scenario for Geothermal. Bighorn Basin Planning Area, Wyoming. Prepared by Wyoming State Office Reservoir Management Group. March 13, 2009.

BLM. 2009b. Reasonable Foreseeable Development Scenario for Oil and Gas. Bighorn Basin Planning Area, Wyoming. Prepared by Wyoming State Office Reservoir Management Group.

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix U

Technical Support Document for Air Quality

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APPENDIX U

TECHNICAL SUPPORT DOCUMENT FOR AIR QUALITY

1.0 INTRODUCTION

This technical support document describes the air quality impact analysis for the Proposed Bighorn Basin Resource Management Plan (RMP) revision, Final Environmental Impact Statement (EIS). This appendix is divided into the following five sections:

2.0 Regulatory Framework

3.0 Thresholds of Significance

4.0 Air Quality Impact Analysis

5.0 Emission Calculations

6.0 References

Copies of this technical support document and accompanying data files are available upon request from the Bureau of Land Management (BLM) Cody or Worland Field Offices.

2.0 REGULATORY FRAMEWORK

The basic framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act (CAA) and its amendments, Environmental Protection Agency (EPA) regulations, including the 1999 Regional Haze Regulations, and state and local air quality regulations. The CAA addresses criteria air pollutants, state and national ambient air quality standards for criteria air pollutants, and the Prevention of Significant Deterioration (PSD) program. The Regional Haze Regulations address visibility impairment. EPA regulations address ambient air quality standards for criteria pollutants, emission control technology, air quality monitoring, and State Implementation Plan (SIP) development (which may include air quality modeling), and air quality related value (AQRV) analyses related to regional haze.

2.1 Ambient Air Quality Constituents

Air pollutants addressed in this study include criteria pollutants, hazardous air pollutants (HAP), sulfur and nitrogen compounds, which could cause visibility impairment (regional haze) or atmospheric deposition impacts, and greenhouse gases.

2.1.1 Criteria Pollutants

Criteria pollutants are those for which national standards of concentration have been established. Ambient air concentrations of these constituents greater than the standards represent a risk to human health. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), particulate matter (PM_{10}, $PM_{2.5}$), and lead, each of which is listed below.

Carbon Monoxide. CO is an odorless, colorless gas formed during any combustion process, such as operation of engines, fireplaces, and furnaces. High concentrations of CO affect the oxygen-carrying capacity of the blood and can lead to unconsciousness and asphyxiation. Wildfires are natural sources of CO.

Nitrogen Dioxide. NO_2 is a red-brown gas formed during the operation of internal combustion engines or other burning processes. Such processes emit a mixture of nitrogen gases, collectively called nitrogen oxides (NO_x). NO_x can contribute to brown cloud conditions and can convert to ammonium nitrate particles and nitric acid, which can cause visibility impairment and acid rain. Bacterial action in soil can be a natural source of nitrogen compounds.

Sulfur Dioxide. SO_2 forms during combustion from trace levels of sulfur in coal or diesel fuel. It can convert to ammonium sulfate and sulfuric acid, which can cause visibility impairment and acid rain. Volcanoes are natural sources of SO_2. Anthropogenic sources include refineries and power plants.

Ozone. O_3 is a gas that generally is not emitted directly into the atmosphere, but is formed from the chemical reactions of NO_x and volatile organic compound (VOC) emissions. As stated above, internal combustion engines are the main source of NO_x, while sources of VOCs include, but are not limited to, leaks from oil and gas development operations ("fugitive" emissions), paint, varnish, and various types of vegetation. The faint acrid smell common after thunderstorms is caused by ozone formation caused by lightning. Ozone is a strong oxidizing chemical that can burn lungs and eyes, as well as damage plants.

Particulate Matter. Particulate matter (e.g., soil particles, hair, pollen) are essentially small particles suspended in the air that settle to the ground slowly and may be re-suspended if disturbed. Separate allowable concentration levels for particulate matter are based on the relative size of the particle:

- PM_{10} particles, particles with diameters of less than 10 micrometers, are small enough to be inhaled and can cause adverse health impacts.
- $PM_{2.5}$ particles, particles with diameters of less than 2.5 micrometers, are so small that they can be drawn deeply into the lungs and cause serious health problems. Particles of this size also are the main cause of visibility impairment.

Lead. Before the widespread use of unleaded fuel in automobiles, lead particles were emitted from automobile tailpipes. Lead is not considered in this RMP and EIS because no proposed projects are expected to emit lead. The lead standard also will not be addressed in this appendix because lead is not a current concern; it will, however, be considered in future projects. Lead is also generally not considered in site specific environmental analysis for similar reasons.

2.1.2 Hazardous Air Pollutants

Although HAPs, including N-hexane, ethylbenzene, toluene, xylene, formaldehyde, and benzene, do not have ambient air quality standards, the EPA has issued reference concentrations for evaluating the inhalation risk for cancerous and noncancerous health impacts, known as reference concentrations for chronic inhalation.

The EIS associated with the Bighorn Basin RMP is a National Environmental Policy Act (NEPA) document and not a regulatory document. However, there are regulatory issues that should be taken into account in preparing this EIS and ensuing project-specific EISs. Actual regulation of HAPs is achieved through compliance with the applicable maximum achievable control technology (MACT) standards and not through ambient air quality standards. Regulatory agencies implement control through Section 112

programs, specifically Section 112(g) case-by-case MACT determinations based on 40 CFR Part 63, Subpart B, and Section 112(d) MACT emission standards.

Any source that emits or has the potential to emit 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs is considered a major source and will require a Title V, Part 70, operating permit review and permit. This may include either a case-by-case 112(g) MACT determination, if the source is new or has had major modifications and no applicable MACT emission standard has been promulgated, or compliance with an applicable MACT emission standard. Specific regulations that may apply in the Planning Area include 40 CFR Part 63 Subpart HH, National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities; 40 CFR Part 63 Subpart HHH, National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities; and 40 CFR Part 63 Subpart ZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. This last regulation, new in 2004, affects source categories using reciprocating engines for gas compression. HAP emissions are associated with industrial activities, such as oil and gas operations, refineries, paint shops, dry cleaning facilities, and woodworking shops. Because this analysis is qualitative, no specific analyses of either short- or long-term HAP impacts are made.

2.1.3 Atmospheric Deposition Constituents

Sulfur and nitrogen compounds that can be deposited in terrestrial and aquatic ecosystems include nitric acid, nitrate, ammonium, and sulfate. Nitric acid and nitrate are not emitted directly into the air, but form in the atmosphere from industrial and automotive emissions of NO_x. Sulfate is formed in the atmosphere from industrial emission of SO_2. Deposition of nitric acid, nitrate, and sulfate can adversely affect plant growth, soil chemistry, lichens, aquatic environments, and petroglyphs. Ammonium is primarily associated with feedlots and agricultural fertilization. Ammonium deposits can affect terrestrial and aquatic vegetation. Although deposition may be beneficial as a fertilizer, it can adversely affect the timing of plant growth and dormancy. Although this analysis will be qualitative, future specific projects will require quantitative analyses using the criteria listed below.

Greenhouse Gases

Greenhouse gases (GHGs) are pollutants that are effective in preventing heat from escaping the earth's atmosphere and have been attributed to altering components of the earth's climate. These include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Other identified GHGs, including hydroflourocarbons, perflourocarbons, and sulfur hexafluoride were not included in the analysis because proposed activities are not sources of these pollutants and emissions are expected to be insignificant or zero.

3.0 THRESHOLDS OF SIGNIFICANCE

Criteria Pollutants

National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS) are health-based standards that identify maximum limits for criteria air pollutant concentrations at all locations to which the public has access. The NAAQS and WAAQS are legally enforceable standards. Concentrations that are above the NAAQS and WAAQS represent a risk to human health and by law, require public safeguards be implemented. State standards must be at least as protective of human health as federal standards, and may be more restrictive than the federal standards as allowed by the CAA. The EPA has developed standards for each pollutant for a specific averaging time. Short averaging times (1, 8, and 24 hours) address short-term exposure, while the annual standards address long-term exposure.

Chapter 3 of the Proposed RMP and Final EIS presented the national primary air quality standards and the Wyoming primary air quality standards. Analyses of proposed alternatives for project-specific EISs compare cumulative concentrations of air pollutants to the NAAQS and WAAQS. The BLM requires that all authorized activities comply with applicable local, state, tribal, and federal air quality laws, regulations, and standards.

3.1.1 Prevention of Significant Deterioration

The goal of the PSD program is to ensure that air quality in areas with clean air does not significantly deteriorate, while a margin for future industrial growth is maintained. Major stationary sources are governed by the PSD program, which is unlikely to apply to BLM sources in the Planning Area with the exception of gas compressor stations. Under the PSD program, each area in the United States is classified by the air quality in that region according to the following system:

- **PSD Class I Areas.** Areas with pristine air quality, such as wilderness areas, national parks, and some Native American reservations, are accorded the strictest protection. Only very small incremental increases in pollutant concentrations are allowed in order to maintain the very clean air quality in these areas.
- **PSD Class II Areas.** Essentially, all areas that are not designated as Class I are designated as Class II. Moderate incremental increases in pollutant concentrations are allowed, although the concentrations are not allowed to reach the concentrations set by Wyoming and federal standards (WAAQS and NAAQS).
- **PSD Class III Areas.** No areas have been designated yet as Class III. A larger incremental increase in pollutant concentrations would be allowed, up to the applicable WAAQS and NAAQS.

The incremental increases allowed for specific pollutants in Class I and Class II areas can be found in the Wyoming Air Quality Standards and Regulations (Wyoming DEQ 2004). Comparisons of potential PM_{10}, NO_2, and SO_2 concentrations with PSD increments are intended to evaluate a threshold of concern only and do not represent a regulatory PSD increment consumption analysis. Regulatory PSD increment consumption analyses are solely the responsibility of the State of Wyoming, which has been granted primacy (with EPA oversight) under the CAA. In project-specific EISs, the BLM does not expect that a PSD analysis will be performed; rather, the PSD standards are used as a reference only to give the public a better understanding of the level of potential impact.

Hazardous Air Pollutants

Section 112 of the CAA lists more than 180 chemicals as HAPs. In addition, Sections 112 (d) and 112(g) require regulatory agencies to establish MACT Standards for sources that emit HAPs. Any source that emits or has the potential to emit 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs is considered a major source and will require a Title V, Part 70, operating permit review and permit. In addition to MACT standards, EPA has listed (on its Air Toxics Database) Reference Exposure Levels (RELs) for many of the HAPs. RELs are defined as concentrations at or below which no adverse health effects are expected.

3.2 Regional Haze

Visibility impairment in the form of regional haze obscures the clarity, color, texture, and form of what we see. Haze-causing pollutants (mostly fine particles) are directly emitted into the atmosphere or are formed when gases emitted into the air form particles as they are carried downwind. Emissions from human-caused and natural sources can be carried great distances, contributing to regional haze. The current method for assessing impacts on visibility is described in the Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report—Revised 2010 and is hereafter referred to as the FLAG 2010 method (FLAG 2010). This method compares incremental changes in light extinction relative to estimated natural background to a 5-percent change in light extinction threshold and a 10-percent change in light extinction threshold. Using the 98th percentile values, a 5-percent change in light extinction (approximately equal to 0.5 deciview [dv]) is the threshold recommended in FLAG 2010 and is considered to contribute to regional haze visibility impairment. A 10-percent change in light extinction (approximately equal to 1.0 dv) is considered to cause visibility impairment when compared to background conditions.

The Wyoming Department of Environmental Quality (DEQ)–Air Quality Division (AQD) originally submitted its Regional Haze SIP in accordance with 40 CFR, Part 51.309, in December 2003. This SIP emphasized reductions in SO_2 emissions with a goal of improving visibility on the Colorado Plateau. Since its submission, EPA revised 40 CFR, Parts 51.308 and 309 based on legal actions, and a revised 309 SIP was submitted by Wyoming DEQ in November 2008. A draft supplemental revision to the 309 SIP was prepared in August 2009

The EPA developed regional haze regulations in response to the CAA amendments of 1977 and 1990. These regulations are intended to maintain visibility on the least-impaired days and to improve visibility on the most-impaired days in mandatory federal Class I areas across the United States, so that visibility in these areas is returned to natural conditions by the year 2064. These regulations require states to submit a regional haze SIP and progress reports to demonstrate reasonable progress toward the 2064 goal.

Atmospheric Deposition

As described in the Federal Land Managers' AQRV Work Group (FLAG) Phase I Report – Revised 2010 (FLAG 2010), the National Park Service, the United States Forest Service (USFS), and the United States Fish and Wildlife Service (USFWS) have established thresholds to evaluate nitrogen and sulfur deposition within Class I areas. These deposition analysis thresholds (DATs) are defined as 0.005 kilogram per hectare per year (kg/ha/yr) in the western United States for both nitrogen and sulfur. These thresholds are typically used to analyze impacts of individual projects. Cumulative impacts are typically compared to the level of concern, which is defined by the National Park Service and USFWS as 3 kg/ha/yr for

nitrogen and 5 kg/ha/yr for sulfur in Rocky Mountain regions. Deposition rates that are below the level of concern are believed to cause no adverse impacts.

Lake Chemistry

The USFWS considers lake chemistry changes to be potentially significant if the screening methodology predicts decreases in acid neutralizing capacity (ANC) of more than defined limits of acceptable change (LAC). A lake's LAC depends on its background ANC value. The LAC is defined as a 10 percent change for lakes with ANC background values greater than 25 microequivalents per liter (eq/l) and is defined as a change of 1 eq/l for lakes with ANC background values less than 25 eq/l. If the ANC of a lake is predicted to decrease by more than the applicable LAC then potential changes to lake chemistry may cause adverse effects and a more detailed analysis of lake chemistry impacts would be required.

3.3 Applicability to the Planning Area

Air pollution impacts are limited by local, state, tribal, and federal air quality regulations, standards, and implementation plans established under the CAA and administered by the Wyoming DEQ AQD with oversight from the EPA. Air quality regulations require that proposed new, or modified existing, air pollutant emission stationary sources (including oil and gas compression facilities) undergo a permitting review before their construction can begin. Therefore, the Wyoming DEQ AQD has the primary authority and responsibility to review permit applications and to require emission permits, fees, and control devices before construction or start of operation. Fugitive dust and exhaust from construction activities, along with air pollutants emitted during operation (for example, well operations, booster and pipeline compressor engines associated with natural gas wells), are potential causes of air quality impacts. These issues are more likely to generate public concern where natural gas development activities occur near residential areas or near sensitive Class I and Class II areas.

The USFS, the National Park Service, and the USFWS, located throughout Wyoming, also have expressed concerns about potential atmospheric deposition (acid rain) and visibility impacts within downwind PSD Class I and PSD Class II sensitive areas under their administrations.

Table U-1 provides a summary of recent air quality conditions for NO_2, ozone, PM_{10}, and $PM_{2.5}$, taken from measurements for the period 2010-2012 from available monitors located within or nearby the planning area. These include maximum 24 hour and annual averages for $PM_{2.5}$, maximum 1 hour averages for NO_2, maximum annual averages for PM_{10}, and the 4th highest 8-hour average ozone concentration for each year, from which the ozone design value is derived. Except for a relatively high measured 24-hour average concentration of $PM_{2.5}$ at the Lander site for 2010, located outside the Planning Area, most concentrations measured during this period are well within the applicable standards. Given the Planning Area's current attainment status, future development projects that have the potential to emit more than 250 tons per year of any criteria pollutant (or certain listed sources that have the potential to emit more than 100 tons per year) would be required to undergo a site-specific regulatory PSD increment consumption analysis under the federal New Source Review permitting regulations.

Development projects that require PSD permits also may be required by the applicable air quality regulatory agencies to incorporate additional emission control measures (including a best available control technology [BACT] analysis and determination) to ensure protection of air quality resources and to demonstrate that the combined impacts of all PSD sources will not exceed the allowable incremental air quality impacts for NO_2, PM_{10}, and SO_2. Minor sources having emissions below the cutoff rates

mentioned above do not require PSD permits; nevertheless, their emissions consume increment. A regulatory PSD increment consumption analysis may be conducted, either as part of a New Source Review or independently. The determination of PSD increment consumption is a responsibility of the applicable air quality regulatory agencies, with EPA oversight. In addition, an analysis of cumulative impacts due to all existing sources and the permit applicant's sources is required during a New Source Review to demonstrate that applicable ambient air quality standards will be met during the operational lifetime of the permit applicant's operations.

Sources subject to the PSD permit review procedure also are required to demonstrate potential impacts on AQRV. These include visibility impacts, degradation of mountain lakes due to atmospheric deposition (acid rain), and impacts on sensitive flora and fauna in Class I areas. The CAA also provides specific visibility protection procedures for the mandatory federal Class I areas designated by the United States Congress on August 7, 1977, which included wilderness areas greater than 5,000 acres in size, as well as national parks and national memorial parks greater than 6,000 acres in size as of that date.

Table U-1. Recently Observed NO_2, O_3, PM_{10}, and $PM_{2.5}$ Concentrations Within and in the Vicinity of the Planning Area and Applicable Air Quality Standards

Pollutant/Monitoring Site (ID)	Average Time/Measurement	2010	2010	2012	NAAQS
Nitrogen Dioxide (NO_2) (ppb)					
Thunder Basin Grassland	1 hour (max)	15	16	25	100
Ozone (O_3) (ppb)					
Basin	8 hours (4th high)	55	56	57	75
Thunder Basin	8 hours (4th high)	63	61	71	75
PM_{10} (µg/m³)					
Cody	24 hours (max)	25	46	45	150
Sheridan – Highland Park	24 hours (max)	36	48	25	150
Sheridan – Police Station	24 hours (max)	70	96	75	150
$PM_{2.5}$ (µg/m³)					
Lander	Annual	9.3	7.8	7.8	15
Sheridan – Highland Park	Annual	8.8	5.5	4.3	15
Sheridan – Police Station	Annual	8.7	7.6	8.3	15
Lander	24 hours (98th %)	32.0	30.0	25.0	35
Sheridan – Highland Park	24 hours (98th %)	14.0	15.0	10.0	35
Sheridan – Police Station	24 hours (98th %)	27.0	23.0	19.0	35

%	percent
NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
O_3	ozone
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
ppb	parts per billion
ppm	parts per million
µg/m³	micrograms per cubic meter

4.0 AIR QUALITY IMPACT ANALYSIS

As described in Chapter 4, a qualitative emission comparison approach was used for this assessment. A qualitative method was selected because of a lack of specific project information on location, types, and magnitude of potential projects. Emissions calculations (see 5.0 *Emission Calculations*) were based on the best available engineering data and assumptions, emission inventory procedures, and professional and scientific judgment. For any future projects, significance criteria for potential air quality impacts will include local, state, tribal, and federally enforced legal requirements to ensure that air pollutant concentrations remain within specific allowable levels.

It is important to note that before actual development could occur, the applicable air quality regulatory agencies (including the state, tribe, or the EPA) would need to review specific air pollutant emissions preconstruction permit applications that examine potential project-specific air quality impacts. As part of these permit reviews (depending on source size), the air quality regulatory agencies could require additional quantitative air quality impact analyses or mitigation measures. Thus, before development occurred, additional site-specific air quality analyses may need to be performed to ensure protection of air quality. Federal land managers may require a demonstration that potential impacts from proposed projects would not adversely affect AQRV (including visibility) in sensitive Class I and Class II areas.

5.0 EMISSION CALCULATIONS

For this analysis, emissions of PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOC, and HAPs were estimated for a 20-year period, beginning with 2008 as the base year, 2018 as the mid-point interim year, and 2027 as the end of this period. Emissions were estimated for the six alternatives: Alternative A (Current Management), Alternative B (Least Resource Use), Alternative C (More Resource Use), Alternative D (Preferred Alternative), Alternative E (Sage-Grouse Key Habitat Areas ACEC), and Alternative F (Sage-Grouse Priority Habitat Management Areas ACEC). Emissions were estimated for the base year 2008 corresponding to Alternative A while emissions for all alternatives were estimated for 2018 and 2027. A set of spreadsheets, originally developed for use in preparing emissions for the Casper RMP revision (BLM 2007), were updated and adapted for use in estimating emissions for the Planning Area for these years. The spreadsheets were updated with the latest emission factors for motor vehicles, off-road engine types, and other activities corresponding to the base year (2008), and the out years, 2018 and 2027. Emission factors used to estimate emissions for various categories were obtained from (1) the EPA NONROAD2008a Emissions Model (EPA 2008), (2) Wyoming DEQ AQD BACT levels for natural gas-fired internal combustion engines (Wyoming DEQ 2011), and (3) the MOBILE6.2.03 emission factor model for on-road vehicles (EPA 2003). Information regarding equipment types, numbers, activity, etc., for the various emission categories/activities was provided by specialists in the BLM Cody (CYFO) and Worland (WFO) Field Offices.

When reviewing the emission inventory, it is important to understand that assumptions were made regarding development. For example, there is uncertainty regarding ultimate development of energy resources (e.g., number of wells, equipment used, specific locations of wells, etc.). In general, the assumptions that were made would tend to result in a conservatively high estimate of emissions. For instance, given the number of sources included in this analysis, the likelihood that all emission sources would actually operate at their reasonable, foreseeable maximum emission rates over an entire year (or even 24 hours) is small. A summary of total emissions for each pollutant species from all BLM activities is presented in Chapter 4, *Air Quality* section. Detailed emission totals for each category/planning year are presented at the end of this section.

The analysis includes emissions estimates for the following activities: (1) oil development, (2) natural gas development, (3) salable minerals development, (4) locatable minerals development, (5) renewable energy development, (6) livestock management activities, (7) vegetation management, (8) vegetation management of invasive species, (9) fire management (including prescribed fire), (10) forest and woodlands activities, (11) rights-of-way (ROW) and corridors, (12) off-highway vehicle (OHV) use, and (13) resource road maintenance. Because of the difficulty in accurately estimating emission factors for fugitive VOC emissions from oil and gas development operations, and emissions from any prescribed fire activities conducted on BLM land within the Planning Area, these types of emissions have not been estimated in this analysis. Also, activities related to cultural resources, paleontology, recreation, and wildlife and fish would produce inconsequential amounts of air emissions and are not included in the emission summaries.

5.1.1 Assumptions Used in Developing Emissions for the Bighorn Basin RMP

The following assumptions were used in the emission calculations:

- All emission sources operated at their reasonably foreseeable maximum emission rates (as identified in the other resource sections of this document) simultaneously throughout the area.
- All conventional oil and gas wells existing currently and projected in the reasonably foreseeable development (RFD) scenario, were assumed to be fully operational and to remain operating, except for normal projected well closures throughout the area. Well numbers were provided by the CYFO and the WFO.
- Activity data associated with management actions other than those related to conventional natural gas and oil wells were averaged over the entire analysis period to produce annual average emissions. Oil and gas activity follows RFD projections both in time and duration.
- Induced or secondary growth related to increases in vehicle miles traveled is not included in the emissions inventory. Only activities directly related to BLM actions are considered.
- Stationary sources associated with oil and gas development would operate at emission levels based on currently observed BACT levels, and compressor stations for natural gas would be equipped with nonselective catalytic reduction (NSCR) catalyst. Also, it is assumed that conventional natural gas well fields would use gas gathering systems and process gas through centralized dehydration units.
- Activity data associated with management actions other than those related to conventional natural gas wells were averaged over the entire analysis period to produce annual average emissions, except for renewable energy development, where the single development activity was assumed to occur in one year (2018).
- EPA off-road emission standards were used to estimate emissions for non-road sources in project years 2008, 2018, and 2027. This approach simulates the replacement of existing sources by new lower-emitting equipment with future EPA off-road engine emission standards.
- Use of water application as a best management practice (BMP) would reduce fugitive dust emissions from ground-disturbing activities during construction and reclamation activities and maintenance of roads at project sites by 50 percent from uncontrolled levels.
- BMPs for surface-disturbing activities are applied under all alternatives. Appendix H lists standard mitigation guidelines that are used in the Planning Area to mitigate adverse impacts caused by surface-disturbing activities. These BMPs provide protection to soil resources and minimize adverse impacts to soil stability, compaction, and productivity.

Detailed descriptions for emissions estimation for each activity follow. Individual tables of air emissions for all BLM activities were calculated in spreadsheets for each activity.

5.1.2 Oil and Natural Gas Wells Emissions Estimation

Criteria pollutant emissions from oil and conventional natural gas wells development were calculated based on data provided by the CYFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions from conventional natural gas wells include the following:

- Fugitive dust and combustive emissions from well pad construction activities
- Fugitive dust and combustive emissions from road traffic
- Combustive emissions from natural gas-fired compressors
- Fugitive dust and combustive emissions from separators, dehydrators, and water-tank heater operations
- Fugitive dust and combustive emissions from compressor station visits
- Fugitive dust and combustive emissions from well workover operations
- Fugitive dust and combustive emissions from well and pipeline visits for inspection and repair
- VOC emissions from tank condensate and truck loadout (for natural gas wells only)
- Fugitive dust and combustive emissions from road-maintenance activities
- Fugitive dust and combustive emissions from road and well reclamation activities

Estimated emissions from oil wells include the following:

- Fugitive dust and combustive emissions from well pad construction activities
- Fugitive dust and combustive emissions from road traffic
- Fugitive dust and combustive emissions from well workover operations
- Fugitive dust and combustive emissions from well and pipeline visits for inspection and repair
- Fugitive dust and combustive emissions from road maintenance activities

5.1.3 Salable and Locatable Minerals Emissions Estimation

Criteria pollutant emissions from salable and locatable minerals operations were calculated based on data provided by the CYFO and used best available information, BACT, AP-42, and emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust emissions from sand and gravel or mineral processing
- Emissions from truck traffic on unpaved roads at the sand and gravel or mineral processing plant
- Emissions from batch-drop operations
- Fugitive dust and combustive emissions from development and reclamation activities

5.1.4 Renewable Energy Development Emissions Estimation

Criteria pollutant emissions from renewable energy activities were calculated based on data provided by the CYFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from wind-energy development
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.5 Livestock Management Emissions Estimation

Criteria pollutant emissions from livestock management projects were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from construction of springs, reservoirs and pits, wells, pipelines, fences, and reservoir maintenance
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.6 Vegetation Emissions Estimation

Criteria pollutant emissions from vegetation operations including management of invasive species were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from vegetative mechanical treatments (excluding hand work)
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.7 Fire Management Emissions Estimation

Criteria pollutant emissions from fire management activities were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from mechanical treatments (hand work) and prescribed fire
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.8 Forest and Woodlands Emissions Estimation

Criteria pollutant emissions from forest and woodlands activities were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from silviculture treatments, forest products, weed treatments, and insect control
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.9 Rights-of-Way Corridor Emissions Estimation

Criteria pollutant emissions from ROW corridor operations were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from construction of roads, telephone and fiber optics, powerlines, pipelines (mineral/water), communication sites, and other facilities
- Fugitive dust and combustive emissions for commuting vehicle road traffic

5.1.10 Off-Highway Vehicles Emissions Estimation

Criteria pollutant emissions from OHVs were calculated using the EPA's NONROAD2008a emissions model for Park, Hot Springs, Big Horn, and Washakie Counties for 2008, 2018, and 2027. OHVs for this category include all-terrain vehicles (ATVs), off-road motorcycles (dirt bikes), and snowmobiles. It was assumed in this analysis that activity (and resulting emissions) for this category would be the same for all alternatives for 2018 and 2027. As a check of the estimates from the NONROAD2008 model, Table U-2 provides estimates for "nonroad recreational equipment" for 2002 for these counties obtained from the Western Regional Air Partnership (WRAP) web site (WRAP 2009). It is assumed that ATVs, off-road motorcycles, and snowmobiles make up the majority of the recreational equipment category. The estimates prepared by WRAP are comparable to those provided by the NONROAD2008 model for 2005 for these counties.

Table U-2. 2002 Annual Nonroad Emission Estimates for Recreational Equipment for the Planning Area Prepared by WRAP

County	Emissions					
	VOC (tpy)	NO_x (tpy)	CO (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Big Horn County	231.97	3.36	837.81	5.35	4.93	0.49
Hot Springs County	504.68	3.80	1,281.48	11.62	10.69	0.93
Park County	192.09	7.47	754.66	5.86	5.43	0.77
Washakie County	284.28	2.35	730.65	6.59	6.07	0.54
Total	**1,213.03**	**16.98**	**3,604.60**	**29.43**	**27.12**	**2.72**

Source: WRAP 2009

Note: Totals may not add up due to rounding

CO	carbon monoxide	SO_2	sulfur dioxide
NO_x	nitrogen oxide	tpy	tons per year
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter	VOC	volatile organic compound
PM_{10}	particulate matter less than 10 microns in diameter	WRAP	Western Regional Air Partnership

5.1.11 Road Maintenance Emissions Estimation

Criteria pollutant emissions from road maintenance activities (excluding well road maintenance) were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include fugitive dust and combustive emissions resulting from the use of a grader. It was assumed that the majority of road maintenance activities would occur in the summer and only once in the winter.

5.1.12 Summary of Emissions for All BLM Activities

Tables U-3 through U-189 summarize the projected total annual emissions by resource for 2008, 2018, and 2027. Air quality impacts would primarily result from minerals development and production and oil and natural gas development activities; emissions associated with these actions would outweigh those produced from other proposed activities. Alternative E would result in the lowest levels of emissions in 2018 and 2027 for all pollutants, while Alternative C would result in the highest levels of emissions for these two years, and except for volatile organic compound (VOC) emissions, higher emissions than in the 2008 base year. Alternative C would have the greatest potential to contribute to exceedances of the NAAQS or WAAQS of any alternative. Alternatives D and F would result in comparable impacts to the base line year (i.e., 2008), except that VOC) emissions are expected to decrease slightly in 2018 and further by 2027; projected emissions are, therefore, unlikely to contribute to an exceedance of a NAAQS or WAAQS. As noted above in Section 2, Alternative E is essentially the same as Alternative B, except that it designates BLM-administered lands within greater sage-grouse Key Habitat Areas as Areas of Critical Environmental Concern (ACECs), which would limit resource development and other activities in these areas, and result in the least amount of emissions of all the alternatives. Alternative F is the nearly the same as Alternative D, except it designates certain areas as Greater Sage-Grouse Priority Habitat Management Areas, which would also limit resource development and other activities, but not as much as those identified in Alternative E.

Table U-3. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	**99**	**21**	**244**	**5**	**63**	**18**	**2**	**26,416**	**0**	**0**	**26,508**	**23,977**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	40	4	0	0	8	0	0	163	0		163	148
Sub-total: Operations	**42**	**5**	**7**	**0**	**10**	**1**	**0**	**668**	**0**	**0**	**670**	**606**
Road Maintenance	5	1	2	0	1	0	0	199	0		199	181
Sub-total: Maintenance	**5**	**1**	**2**	**0**	**1**	**0**	**0**	**199**	**0**	**0**	**199**	**181**
Total Emissions	**146**	**26**	**253**	**5**	**74**	**19**	**2**	**27,283**	**0**	**0**	**27,377**	**24,764**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-4. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	**99**	**21**	**244**	**5**	**63**	**18**	**2**	**26,416**	**0**	**0**	**26,508**	**23,976**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	42	4	0	0	8	0	0	168	0		168	153
Sub-total: Operations	**43**	**5**	**7**	**0**	**11**	**1**	**0**	**673**	**0**	**0**	**675**	**611**
Road Maintenance	6	1	2	0	1	0	0	206	0		206	187
Sub-total: Maintenance	**6**	**1**	**2**	**0**	**1**	**0**	**0**	**206**	**0**	**0**	**206**	**187**
Total Emissions	**148**	**27**	**253**	**5**	**75**	**19**	**2**	**27,294**	**0**	**0**	**27,388**	**24,774**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-5. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	**99**	**21**	**244**	**5**	**63**	**18**	**2**	**26,416**	**0**	**0**	**26,508**	**23,977**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	43	4	0	0	9	0	0	173	0		173	157
Sub-total: Operations	**45**	**5**	**7**	**0**	**11**	**1**	**0**	**678**	**0**	**0**	**680**	**616**
Road Maintenance	5	1	1	0	1	0	0	176	0		176	160
Sub-total: Maintenance	**5**	**1**	**1**	**0**	**1**	**0**	**0**	**176**	**0**	**0**	**176**	**160**
Total Emissions	**148**	**27**	**252**	**5**	**75**	**19**	**2**	**27,270**	**0**	**0**	**27,364**	**24,753**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-6. Summary of Output - Alternative B
Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,422	0	0	11,462	10,367
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	**43**	**9**	**106**	**2**	**28**	**8**	**1**	**11,493**	**0**	**0**	**11,532**	**10,431**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	219	0	0	220	199
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	28	3	0	0	6	0	0	112	0		112	101
Sub-total: Operations	**28**	**3**	**3**	**0**	**7**	**0**	**0**	**331**	**0**	**0**	**332**	**301**
Road Maintenance	4	0	1	0	0	0	0	137	0		137	124
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**137**	**0**	**0**	**137**	**124**
Total Emissions	**75**	**13**	**110**	**2**	**34**	**8**	**1**	**11,960**	**0**	**0**	**12,001**	**10,856**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-7. Summary of Output - Alternative B
Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,422	0	0	11,462	10,367
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	**43**	**9**	**106**	**2**	**28**	**8**	**1**	**11,493**	**0**	**0**	**11,532**	**10,431**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	219	0	0	220	199
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	36	4	0	0	7	0	0	146	0		146	133
Sub-total: Operations	**37**	**4**	**3**	**0**	**8**	**1**	**0**	**365**	**0**	**0**	**366**	**332**
Road Maintenance	4	0	1	0	0	0	0	149	0		149	135
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**149**	**0**	**0**	**149**	**135**
Total Emissions	**84**	**14**	**111**	**2**	**36**	**8**	**1**	**12,006**	**0**	**0**	**12,047**	**10,898**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-8. Summary of Output - Alternative C
Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	14	14	267	6	69	19	2	28,734	0	0	28,833	26,080
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	87	9	1	0	1	0	0	178	0		178	162
Sub-total: Construction	**108**	**23**	**267**	**6**	**69**	**20**	**2**	**28,912**	**0**	**0**	**29,012**	**26,241**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	7	0	2	1	0	551	0	0	553	500
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	1
Well Visits for Inspection & Repair - Operations	32	3	0	0	6	0	0	127	0		128	116
Sub-total: Operations	**34**	**4**	**7**	**0**	**9**	**1**	**0**	**680**	**0**	**0**	**682**	**617**
Road Maintenance	4	0	1	0	0	0	0	156	0		156	142
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**156**	**0**	**0**	**156**	**142**
Total Emissions	**146**	**27**	**276**	**6**	**79**	**21**	**2**	**29,748**	**0**	**0**	**29,850**	**27,000**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-9. Summary of Output - Alternative C
Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	14	14	267	6	69	19	2	28,734	0	0	28,833	26,080
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	87	9	1	0	1	0	0	178	0		178	162
Sub-total: Construction	**108**	**23**	**267**	**6**	**69**	**20**	**2**	**28,912**	**0**	**0**	**29,012**	**26,242**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	7	0	2	1	0	551	0	0	553	500
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	1
Well Visits for Inspection & Repair - Operations	44	4	0	0	9	0	0	177	0		178	162
Sub-total: Operations	**46**	**5**	**7**	**0**	**11**	**1**	**0**	**730**	**0**	**0**	**732**	**663**
Road Maintenance	5	1	1	0	1	0	0	181	0		181	164
Sub-total: Maintenance	**5**	**1**	**1**	**0**	**1**	**0**	**0**	**181**	**0**	**0**	**181**	**164**
Total Emissions	**159**	**29**	**276**	**6**	**81**	**21**	**2**	**29,822**	**0**	**0**	**29,925**	**27,069**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-10. Summary of Output - Alternative D
Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	12	12	235	5	60	17	2	25,371	0	0	25,460	23,028
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	76	8	1	0	1	0	0	157	0		157	143
Sub-total: Construction	**95**	**21**	**236**	**5**	**61**	**17**	**2**	**25,529**	**0**	**0**	**25,617**	**23,171**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	486	0	0	488	441
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	31	3	0	0	6	0	0	124	0		125	113
Sub-total: Operations	**33**	**4**	**6**	**0**	**8**	**1**	**0**	**612**	**0**	**0**	**614**	**556**
Road Maintenance	4	0	1	0	0	0	0	152	0		152	138
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**152**	**0**	**0**	**152**	**138**
Total Emissions	**132**	**25**	**244**	**5**	**70**	**18**	**2**	**26,293**	**0**	**0**	**26,383**	**23,865**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-11. Summary of Output - Alternative D
Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,398	0	0	11,438	10,345
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	**43**	**9**	**106**	**2**	**27**	**8**	**1**	**11,469**	**0**	**0**	**11,508**	**10,409**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	218	0	0	219	198
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	28	3	0	0	6	0	0	111	0		112	101
Sub-total: Operations	**28**	**3**	**3**	**0**	**7**	**0**	**0**	**331**	**0**	**0**	**332**	**300**
Road Maintenance	4	0	1	0	0	0	0	137	0		137	124
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**137**	**0**	**0**	**137**	**124**
Total Emissions	**75**	**13**	**110**	**2**	**34**	**8**	**1**	**11,936**	**0**	**0**	**11,977**	**10,834**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-12. Summary of Output - Alternative E
Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,398	0	0	11,438	10,345
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	**43**	**9**	**106**	**2**	**27**	**8**	**1**	**11,469**	**0**	**0**	**11,508**	**10,409**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	218	0	0	219	198
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	28	3	0	0	6	0	0	111	0		112	101
Sub-total: Operations	**28**	**3**	**3**	**0**	**7**	**0**	**0**	**331**	**0**	**0**	**332**	**300**
Road Maintenance	4	0	1	0	0	0	0	137	0		137	124
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**137**	**0**	**0**	**137**	**124**
Total Emissions	**75**	**13**	**110**	**2**	**34**	**8**	**1**	**11,936**	**0**	**0**	**11,977**	**10,834**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-13. Summary of Output - Alternative E
Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	**99**	**21**	**244**	**5**	**63**	**18**	**2**	**26,416**	**0**	**0**	**26,508**	**23,977**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	43	4	0	0	9	0	0	173	0		173	157
Sub-total: Operations	**45**	**5**	**7**	**0**	**11**	**1**	**0**	**678**	**0**	**0**	**680**	**616**
Road Maintenance	5	1	1	0	1	0	0	176	0		176	160
Sub-total: Maintenance	**5**	**1**	**1**	**0**	**1**	**0**	**0**	**176**	**0**	**0**	**176**	**160**
Total Emissions	**148**	**27**	**252**	**5**	**75**	**19**	**2**	**27,270**	**0**	**0**	**27,364**	**24,753**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-14. Summary of Output - Alternative F
Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	12	12	235	5	60	17	2	25,324	0	0	25,412	22,985
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	76	8	1	0	1	0	0	157	0		157	142
Sub-total: Construction	**95**	**21**	**236**	**5**	**61**	**17**	**2**	**25,481**	**0**	**0**	**25,569**	**23,127**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	485	0	0	487	441
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	31	3	0	0	6	0	0	124	0		125	113
Sub-total: Operations	**33**	**4**	**6**	**0**	**8**	**1**	**0**	**611**	**0**	**0**	**613**	**555**
Road Maintenance	4	0	1	0	0	0	0	152	0		152	138
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**152**	**0**	**0**	**152**	**138**
Total Emissions	**132**	**25**	**243**	**5**	**70**	**18**	**2**	**26,244**	**0**	**0**	**26,334**	**23,820**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-15. Summary of Output - Alternative F
Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	12	12	235	5	60	17	2	25,324	0	0	25,412	22,985
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	76	8	1	0	1	0	0	157	0		157	142
Sub-total: Construction	**95**	**21**	**236**	**5**	**61**	**17**	**2**	**25,481**	**0**	**0**	**25,569**	**23,128**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	485	0	0	487	441
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	43	4	0	0	9	0	0	171	0		172	156
Sub-total: Operations	**44**	**5**	**7**	**0**	**11**	**1**	**0**	**658**	**0**	**0**	**660**	**598**
Road Maintenance	5	1	1	0	1	0	0	175	0		175	159
Sub-total: Maintenance	**5**	**1**	**1**	**0**	**1**	**0**	**0**	**175**	**0**	**0**	**175**	**159**
Total Emissions	**144**	**26**	**244**	**5**	**72**	**18**	**2**	**26,313**	**0**	**0**	**26,404**	**23,884**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-16. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Oil Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	**140**	**30**	**348**	**7**	**90**	**26**	**3**	**37,597**	**0**	**0**	**37,727**	**34,125**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	**64**	**7**	**10**	**0**	**15**	**1**	**0**	**966**	**0**	**0**	**969**	**877**
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**303**	**0**	**0**	**303**	**275**
Total Emissions	**212**	**38**	**360**	**7**	**107**	**27**	**3**	**38,866**	**0**	**0**	**38,999**	**35,278**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-17. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,914
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	**140**	**30**	**348**	**7**	**90**	**26**	**3**	**37,597**	**0**	**0**	**37,727**	**34,125**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	63	6	1	0	13	1	0	253	0		254	231
Sub-total: Operations	**65**	**7**	**10**	**0**	**16**	**1**	**0**	**972**	**0**	**0**	**975**	**883**
Road Maintenance	8	1	3	0	1	0	0	310	0		310	282
Sub-total: Maintenance	**8**	**1**	**3**	**0**	**1**	**0**	**0**	**310**	**0**	**0**	**310**	**282**
Total Emissions	**214**	**38**	**360**	**7**	**107**	**27**	**3**	**38,879**	**0**	**0**	**39,012**	**35,289**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-18. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	**140**	**30**	**348**	**7**	**90**	**26**	**3**	**37,597**	**0**	**0**	**37,727**	**34,125**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	259	0		260	236
Sub-total: Operations	**67**	**7**	**10**	**0**	**16**	**1**	**0**	**977**	**0**	**0**	**981**	**888**
Road Maintenance	7	1	2	0	1	0	0	264	0		264	240
Sub-total: Maintenance	**7**	**1**	**2**	**0**	**1**	**0**	**0**	**264**	**0**	**0**	**264**	**240**
Total Emissions	**214**	**38**	**359**	**7**	**107**	**27**	**3**	**38,839**	**0**	**0**	**38,972**	**35,253**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-19. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Oil Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	**140**	**30**	**348**	**7**	**90**	**26**	**3**	**37,597**	**0**	**0**	**37,727**	**34,125**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	**64**	**7**	**10**	**0**	**15**	**1**	**0**	**966**	**0**	**0**	**969**	**877**
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**303**	**0**	**0**	**303**	**275**
Total Emissions	**212**	**38**	**360**	**7**	**107**	**27**	**3**	**38,866**	**0**	**0**	**38,999**	**35,278**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-20. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	11	10	201	4	52	15	1	21,628	0	0	21,703	19,630
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	122
Sub-total: Construction	**81**	**18**	**201**	**4**	**52**	**15**	**1**	**21,762**	**0**	**0**	**21,837**	**19,752**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	415	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	59	6	1	0	12	1	0	239	0		240	217
Sub-total: Operations	**61**	**6**	**6**	**0**	**14**	**1**	**0**	**655**	**0**	**0**	**657**	**595**
Road Maintenance	8	1	2	0	1	0	0	292	0		293	265
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**292**	**0**	**0**	**293**	**265**
Total Emissions	**150**	**25**	**209**	**4**	**67**	**16**	**2**	**22,709**	**0**	**0**	**22,786**	**20,612**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-21. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	11	10	201	4	52	15	1	21,628	0	0	21,703	19,631
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	122
Sub-total: Construction	**81**	**18**	**201**	**4**	**52**	**15**	**1**	**21,762**	**0**	**0**	**21,837**	**19,752**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	415	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	57	6	1	0	12	1	0	230	0		231	210
Sub-total: Operations	**59**	**6**	**6**	**0**	**13**	**1**	**0**	**646**	**0**	**0**	**648**	**587**
Road Maintenance	6	1	2	0	1	0	0	235	0		235	213
Sub-total: Maintenance	**6**	**1**	**2**	**0**	**1**	**0**	**0**	**235**	**0**	**0**	**235**	**213**
Total Emissions	**146**	**24**	**209**	**4**	**66**	**16**	**2**	**22,642**	**0**	**0**	**22,720**	**20,552**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-22. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Oil Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles – Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	**140**	**30**	**348**	**7**	**90**	**26**	**3**	**37,597**	**0**	**0**	**37,727**	**34,125**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	**64**	**7**	**10**	**0**	**15**	**1**	**0**	**966**	**0**	**0**	**969**	**877**
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**303**	**0**	**0**	**303**	**275**
Total Emissions	**212**	**38**	**360**	**7**	**107**	**27**	**3**	**38,866**	**0**	**0**	**38,999**	**35,278**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-23. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	4	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	19	19	370	8	95	27	3	39,846	0	0	39,984	36,165
Wind Erosion	7	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	120	12	1	0	1	0	0	247	0		247	224
Sub-total: Construction	**150**	**32**	**371**	**8**	**96**	**27**	**3**	**40,092**	**0**	**0**	**40,231**	**36,389**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	1	10	0	3	1	0	764	0	0	767	693
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	256	0		256	233
Sub-total: Operations	**66**	**7**	**10**	**0**	**16**	**1**	**0**	**1,022**	**0**	**0**	**1,025**	**928**
Road Maintenance	8	1	3	0	1	0	0	313	0		313	284
Sub-total: Maintenance	**8**	**1**	**3**	**0**	**1**	**0**	**0**	**313**	**0**	**0**	**313**	**284**
Total Emissions	**224**	**40**	**383**	**8**	**113**	**29**	**3**	**41,427**	**0**	**0**	**41,569**	**37,601**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-24. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	4	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	19	19	370	8	95	27	3	39,846	0	0	39,984	36,166
Wind Erosion	7	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	120	12	1	0	1	0	0	247	0		247	224
Sub-total: Construction	**150**	**32**	**371**	**8**	**96**	**27**	**3**	**40,092**	**0**	**0**	**40,231**	**36,390**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	1	10	0	3	1	0	764	0	0	767	693
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	66	7	1	0	13	1	0	264	0		264	240
Sub-total: Operations	**68**	**7**	**10**	**0**	**17**	**1**	**0**	**1,030**	**0**	**0**	**1,033**	**935**
Road Maintenance	7	1	2	0	1	0	0	269	0		269	244
Sub-total: Maintenance	**7**	**1**	**2**	**0**	**1**	**0**	**0**	**269**	**0**	**0**	**269**	**244**
Total Emissions	**225**	**40**	**383**	**8**	**113**	**29**	**3**	**41,391**	**0**	**0**	**41,533**	**37,570**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-25. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Oil Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	**140**	**30**	**348**	**7**	**90**	**26**	**3**	**37,597**	**0**	**0**	**37,727**	**34,125**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	**64**	**7**	**10**	**0**	**15**	**1**	**0**	**966**	**0**	**0**	**969**	**877**
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**303**	**0**	**0**	**303**	**275**
Total Emissions	**212**	**38**	**360**	**7**	**107**	**27**	**3**	**38,866**	**0**	**0**	**38,999**	**35,278**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-26. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,070
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	**137**	**30**	**339**	**7**	**88**	**25**	**3**	**36,661**	**0**	**0**	**36,788**	**33,275**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	63	6	1	0	13	1	0	252	0		253	230
Sub-total: Operations	**65**	**7**	**9**	**0**	**16**	**1**	**0**	**953**	**0**	**0**	**956**	**866**
Road Maintenance	8	1	2	0	1	0	0	309	0		309	281
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**309**	**0**	**0**	**309**	**281**
Total Emissions	**210**	**37**	**351**	**7**	**104**	**26**	**3**	**37,923**	**0**	**0**	**38,053**	**34,421**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-27. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,071
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	**137**	**30**	**339**	**7**	**88**	**25**	**3**	**36,661**	**0**	**0**	**36,788**	**33,276**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	257	0		258	234
Sub-total: Operations	**66**	**7**	**9**	**0**	**16**	**1**	**0**	**958**	**0**	**0**	**961**	**870**
Road Maintenance	7	1	2	0	1	0	0	263	0		263	238
Sub-total: Maintenance	**7**	**1**	**2**	**0**	**1**	**0**	**0**	**263**	**0**	**0**	**263**	**238**
Total Emissions	**210**	**37**	**351**	**7**	**105**	**26**	**3**	**37,882**	**0**	**0**	**38,012**	**34,385**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-28. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Oil Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles – Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	**140**	**30**	**348**	**7**	**90**	**26**	**3**	**37,597**	**0**	**0**	**37,727**	**34,125**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	**64**	**7**	**10**	**0**	**15**	**1**	**0**	**966**	**0**	**0**	**969**	**877**
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**303**	**0**	**0**	**303**	**275**
Total Emissions	**212**	**38**	**360**	**7**	**107**	**27**	**3**	**38,866**	**0**	**0**	**38,999**	**35,278**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-29. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	10	10	200	4	52	15	1	21,604	0	0	21,679	19,608
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	121
Sub-total: Construction	**81**	**18**	**201**	**4**	**52**	**15**	**1**	**21,738**	**0**	**0**	**21,813**	**19,730**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	414	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	59	6	1	0	12	1	0	239	0		240	217
Sub-total: Operations	**61**	**6**	**6**	**0**	**14**	**1**	**0**	**654**	**0**	**0**	**656**	**594**
Road Maintenance	8	1	2	0	1	0	0	292	0		293	265
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**292**	**0**	**0**	**293**	**265**
Total Emissions	**150**	**25**	**209**	**4**	**67**	**16**	**2**	**22,684**	**0**	**0**	**22,762**	**20,590**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-30. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	10	10	200	4	52	15	1	21,604	0	0	21,679	19,609
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	122
Sub-total: Construction	**81**	**18**	**201**	**4**	**52**	**15**	**1**	**21,738**	**0**	**0**	**21,813**	**19,730**
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	414	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	57	6	1	0	12	1	0	230	0		231	209
Sub-total: Operations	**59**	**6**	**6**	**0**	**13**	**1**	**0**	**645**	**0**	**0**	**648**	**586**
Road Maintenance	6	1	2	0	1	0	0	235	0		235	213
Sub-total: Maintenance	**6**	**1**	**2**	**0**	**1**	**0**	**0**	**235**	**0**	**0**	**235**	**213**
Total Emissions	**146**	**24**	**209**	**4**	**66**	**16**	**2**	**22,618**	**0**	**0**	**22,695**	**20,530**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-31. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Oil Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,070
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	**137**	**30**	**339**	**7**	**88**	**25**	**3**	**36,661**	**0**	**0**	**36,788**	**33,275**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	63	6	1	0	13	1	0	252	0		253	230
Sub-total: Operations	**65**	**7**	**9**	**0**	**16**	**1**	**0**	**953**	**0**	**0**	**956**	**866**
Road Maintenance	8	1	2	0	1	0	0	309	0		309	281
Sub-total: Maintenance	**8**	**1**	**2**	**0**	**1**	**0**	**0**	**309**	**0**	**0**	**309**	**281**
Total Emissions	**210**	**37**	**351**	**7**	**104**	**26**	**3**	**37,923**	**0**	**0**	**38,053**	**34,421**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-32. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Oil Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,071
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	**137**	**30**	**339**	**7**	**88**	**25**	**3**	**36,661**	**0**	**0**	**36,788**	**33,276**
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	257	0		258	234
Sub-total: Operations	**66**	**7**	**9**	**0**	**16**	**1**	**0**	**958**	**0**	**0**	**961**	**870**
Road Maintenance	7	1	2	0	1	0	0	263	0		263	238
Sub-total: Maintenance	**7**	**1**	**2**	**0**	**1**	**0**	**0**	**263**	**0**	**0**	**263**	**238**
Total Emissions	**210**	**37**	**351**	**7**	**105**	**26**	**3**	**37,882**	**0**	**0**	**38,012**	**34,385**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-33. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	2	2	32	1	9	2	0	3,671	0	0	3,684	3,332
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	79	0		79	72
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**14**	**3**	**32**	**1**	**10**	**7**	**1**	**3,751**	**0**	**0**	**3,763**	**3,405**
Natural Gas Compression - Operations[a]	3	3	86	0	43	43	13	34,182	71	0	35,778	32,519
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	73	0	0	73	66
Dehy Venting and Flashing	---	---	---	---	---	28	11	306	19		698	670
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	1	0	0	0	0	76	0	0	76	69
Well & Pipeline Visits for Inspection & Repair - Operations	12	1	0	0	0	0	0	21	0		21	19
Tanks Condensate and Loadout	---	---	---	---	---	33	3	2	5		117	117
Wellhead Fugitives	---	---	---	---	---	182	18	107	1,669		35,154	35,144
Pneumatic Devices	---	---	---	---	---	134	13	79	1,226		25,818	25,811
Sub-total: Operations	**18**	**4**	**86**	**0**	**43**	**420**	**58**	**34,855**	**2,990**	**0**	**97,745**	**94,423**
Road Maintenance	3	0	1	0	0	0	0	91	0		91	83
Sub-total: Maintenance	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**91**	**0**	**0**	**91**	**83**
Road Reclamation	0	0	0	0	0	0	0	5	0		5	5
Well Reclamation	1	0	0	0	0	0	0	16	0		16	14
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**21**	**0**	**0**	**21**	**19**
Total Emissions	**36**	**8**	**119**	**1**	**54**	**427**	**59**	**38,718**	**2,990**	**0**	**101,621**	**97,930**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-34. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	2	2	32	1	9	2	0	3,671	0	0	3,684	3,332
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	79	0		79	72
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**14**	**3**	**32**	**1**	**9**	**5**	**0**	**3,751**	**0**	**0**	**3,763**	**3,405**
Natural Gas Compression - Operations[a]	3	3	88	0	44	44	13	35,242	74	0	36,888	33,528
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	75	0	0	75	68
Dehy Venting and Flashing	---	---	---	---	---	16	6	173	11		395	379
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	1	0	0	0	0	76	0	0	76	69
Well & Pipeline Visits for Inspection & Repair - Operations	12	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	19	2	1	3		66	66
Wellhead Fugitives	---	---	---	---	---	188	19	111	1,721		36,244	36,234
Pneumatic Devices	---	---	---	---	---	138	14	81	1,264		26,619	26,611
Sub-total: Operations	**19**	**5**	**89**	**0**	**45**	**404**	**54**	**35,790**	**3,072**	**0**	**100,395**	**96,983**
Road Maintenance	3	0	0	0	0	0	0	94	0		94	85
Sub-total: Maintenance	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**94**	**0**	**0**	**94**	**85**
Road Reclamation	0	0	0	0	0	0	0	5	0		5	5
Well Reclamation	1	0	0	0	0	0	0	16	0		16	15
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**0**	**22**	**20**
Total Emissions	**36**	**8**	**121**	**1**	**54**	**409**	**54**	**39,657**	**3,072**	**0**	**104,274**	**100,493**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-35. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	2	2	32	1	9	2	0	3,671	0	0	3,684	3,332
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	79	0		79	72
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**14**	**3**	**32**	**1**	**9**	**5**	**0**	**3,751**	**0**	**0**	**3,763**	**3,405**
Natural Gas Compression - Operations[a]	3	3	91	0	45	45	14	36,303	76	0	37,998	34,537
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	77	0	0	77	70
Dehy Venting and Flashing	---	---	---	---	---	12	5	134	8		306	293
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	0	0	0	0	0	76	0	0	76	69
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	14	1	1	2		51	51
Wellhead Fugitives	---	---	---	---	---	193	19	114	1,772		37,335	37,324
Pneumatic Devices	---	---	---	---	---	142	14	84	1,302		27,420	27,412
Sub-total: Operations	**19**	**5**	**91**	**0**	**46**	**408**	**53**	**36,820**	**3,161**	**0**	**103,295**	**99,785**
Road Maintenance	3	0	0	0	0	0	0	97	0		97	88
Sub-total: Maintenance	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**97**	**0**	**0**	**97**	**88**
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**0**	**19**	**17**
Total Emissions	**37**	**8**	**123**	**1**	**55**	**412**	**54**	**40,687**	**3,161**	**0**	**107,174**	**103,295**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-36. Summary of Output - Alternative B
Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	1	1	14	0	4	1	0	1,600	0	0	1,605	1,452
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**6**	**1**	**14**	**0**	**4**	**2**	**0**	**1,635**	**0**	**0**	**1,640**	**1,484**
Natural Gas Compression - Operations[a]	2	2	59	0	29	29	9	23,418	49	0	24,512	22,279
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	50	0	0	50	45
Dehy Venting and Flashing	---	---	---	---	---	7	3	76	5		172	165
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	6
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	8	1	0	0	0	0	0	14	0		14	13
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		29	29
Wellhead Fugitives	---	---	---	---	---	125	12	73	1,143		24,084	24,077
Pneumatic Devices	---	---	---	---	---	92	9	54	840		17,688	17,683
Sub-total: Operations	**12**	**3**	**59**	**0**	**30**	**261**	**34**	**23,725**	**2,038**	**0**	**66,588**	**64,327**
Road Maintenance	2	0	0	0	0	0	0	62	0		62	57
Sub-total: Maintenance	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**62**	**0**	**0**	**62**	**57**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	0	0	0	0	0	0	0	11	0		11	10
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**14**	**13**
Total Emissions	**21**	**5**	**73**	**0**	**34**	**263**	**34**	**25,437**	**2,038**	**0**	**68,306**	**65,881**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-37. Summary of Output - Alternative B
Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	1	1	14	0	4	1	0	1,600	0	0	1,605	1,452
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**6**	**1**	**14**	**0**	**4**	**2**	**0**	**1,635**	**0**	**0**	**1,640**	**1,484**
Natural Gas Compression - Operations[a]	3	3	77	0	38	38	11	30,563	64	0	31,991	29,076
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	65	0	0	65	59
Dehy Venting and Flashing	---	---	---	---	---	7	3	79	5		179	172
Station Visits - Operations	3	0	0	0	0	0	0	9	0		9	8
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	11	1	0	0	0	0	0	19	0		19	17
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		30	30
Wellhead Fugitives	---	---	---	---	---	163	16	96	1,492		31,432	31,423
Pneumatic Devices	---	---	---	---	---	120	12	70	1,096		23,085	23,078
Sub-total: Operations	**16**	**4**	**77**	**0**	**39**	**336**	**43**	**30,934**	**2,658**	**0**	**86,843**	**83,894**
Road Maintenance	2	0	0	0	0	0	0	81	0		81	74
Sub-total: Maintenance	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**81**	**0**	**0**	**81**	**74**
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	0	0	0	0	0	0	0	14	0		14	13
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**16**	**15**
Total Emissions	**25**	**6**	**91**	**0**	**43**	**338**	**43**	**32,666**	**2,658**	**0**	**88,580**	**85,466**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-38. Summary of Output - Alternative C
Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	2	2	35	1	9	3	0	4,018	0	0	4,031	3,647
Well Completion Flaring	0	0	0	0	0	3	0	0	0	0	0	0
Commuting Vehicles - Construction	10	1	0	0	0	0	0	87	0		87	79
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**16**	**3**	**35**	**1**	**10**	**5**	**1**	**4,105**	**0**	**0**	**4,118**	**3,726**
Natural Gas Compression - Operations[a]	2	2	67	0	34	34	10	26,766	56	0	28,016	25,464
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	57	0	0	57	52
Dehy Venting and Flashing	---	---	---	---	---	13	5	142	9		323	310
Station Visits - Operations	2	0	0	0	0	0	0	8	0		8	7
Well Workover - Operations	0	0	1	0	0	0	0	83	0	0	83	75
Well & Pipeline Visits for Inspection & Repair - Operations	9	1	0	0	0	0	0	16	0		16	15
Tanks Condensate and Loadout	---	---	---	---	---	15	2	1	3		54	54
Wellhead Fugitives	---	---	---	---	---	143	14	84	1,307		27,527	27,519
Pneumatic Devices	---	---	---	---	---	105	10	62	960		20,217	20,211
Sub-total: Operations	**14**	**4**	**68**	**0**	**34**	**309**	**41**	**27,218**	**2,334**	**0**	**76,301**	**73,707**
Road Maintenance	2	0	0	0	0	0	0	71	0		71	65
Sub-total: Maintenance	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**71**	**0**	**0**	**71**	**65**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	4
Well Reclamation	0	0	0	0	0	0	0	12	0		12	11
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**0**	**0**	**17**	**15**
Total Emissions	**32**	**7**	**103**	**1**	**44**	**315**	**42**	**31,410**	**2,334**	**0**	**80,507**	**77,512**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-39. Summary of Output - Alternative C
Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	2	2	35	1	9	3	0	4,018	0	0	4,031	3,647
Well Completion Flaring	0	0	0	0	0	3	0	0	0	0	0	0
Commuting Vehicles - Construction	10	1	0	0	0	0	0	87	0		87	79
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**16**	**3**	**35**	**1**	**10**	**5**	**1**	**4,105**	**0**	**0**	**4,118**	**3,726**
Natural Gas Compression - Operations[a]	3	3	93	0	47	47	14	37,259	78	0	38,999	35,447
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	79	0	0	79	72
Dehy Venting and Flashing	---	---	---	---	---	14	5	147	9		335	322
Station Visits - Operations	3	0	0	0	0	0	0	11	0		11	10
Well Workover - Operations	0	0	1	0	0	0	0	83	0	0	83	75
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	23	0		23	21
Tanks Condensate and Loadout	---	---	---	---	---	16	2	1	3		56	56
Wellhead Fugitives	---	---	---	---	---	198	20	117	1,819		38,319	38,308
Pneumatic Devices	---	---	---	---	---	146	15	86	1,336		28,142	28,134
Sub-total: Operations	**20**	**5**	**94**	**0**	**47**	**420**	**55**	**37,805**	**3,245**	**0**	**106,047**	**102,443**
Road Maintenance	3	0	0	0	0	0	0	99	0		99	90
Sub-total: Maintenance	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**99**	**0**	**0**	**99**	**90**
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	16
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**20**	**18**
Total Emissions	**39**	**9**	**129**	**1**	**58**	**426**	**56**	**42,029**	**3,245**	**0**	**110,284**	**106,277**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-40. Summary of Output - Alternative D
Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	2	2	31	1	8	2	0	3,548	0	0	3,560	3,221
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**14**	**3**	**31**	**1**	**9**	**5**	**0**	**3,625**	**0**	**0**	**3,637**	**3,290**
Natural Gas Compression - Operations[a]	2	2	65	0	33	33	10	26,115	55	0	27,334	24,844
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	55	0	0	55	50
Dehy Venting and Flashing	---	---	---	---	---	11	4	122	7		279	268
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	7
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	9	1	0	0	0	0	0	16	0		16	14
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		47	47
Wellhead Fugitives	---	---	---	---	---	139	14	82	1,275		26,857	26,850
Pneumatic Devices	---	---	---	---	---	102	10	60	936		19,725	19,719
Sub-total: Operations	**14**	**3**	**66**	**0**	**33**	**298**	**39**	**26,532**	**2,276**	**0**	**74,394**	**71,865**
Road Maintenance	2	0	0	0	0	0	0	70	0		70	63
Sub-total: Maintenance	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**70**	**0**	**0**	**70**	**63**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	4
Well Reclamation	0	0	0	0	0	0	0	12	0		12	11
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**16**	**15**
Total Emissions	**30**	**7**	**97**	**1**	**42**	**303**	**40**	**30,243**	**2,276**	**0**	**78,117**	**75,234**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-41. Summary of Output - Alternative D
Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	2	2	31	1	8	2	0	3,548	0	0	3,560	3,221
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**14**	**3**	**31**	**1**	**9**	**5**	**0**	**3,625**	**0**	**0**	**3,637**	**3,290**
Natural Gas Compression - Operations[a]	3	3	90	0	45	45	14	35,957	75	0	37,636	34,208
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	76	0	0	76	69
Dehy Venting and Flashing	---	---	---	---	---	12	4	127	8		290	278
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	14	1	1	2		49	49
Wellhead Fugitives	---	---	---	---	---	191	19	113	1,756		36,979	36,969
Pneumatic Devices	---	---	---	---	---	141	14	83	1,289		27,158	27,151
Sub-total: Operations	**19**	**5**	**91**	**0**	**46**	**403**	**52**	**36,462**	**3,130**	**0**	**102,294**	**98,818**
Road Maintenance	3	0	0	0	0	0	0	96	0		96	87
Sub-total: Maintenance	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**96**	**0**	**0**	**96**	**87**
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**0**	**19**	**17**
Total Emissions	**36**	**8**	**122**	**1**	**55**	**407**	**53**	**40,202**	**3,130**	**0**	**106,046**	**102,213**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-42. Summary of Output - Alternative E
Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	1	1	14	0	4	1	0	1,597	0	0	1,602	1,449
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**6**	**1**	**14**	**0**	**4**	**2**	**0**	**1,631**	**0**	**0**	**1,637**	**1,481**
Natural Gas Compression - Operations[a]	2	2	59	0	29	29	9	23,412	49	0	24,506	22,273
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	50	0	0	50	45
Dehy Venting and Flashing	---	---	---	---	---	7	3	76	5		172	165
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	6
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	8	1	0	0	0	0	0	14	0		14	13
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		29	29
Wellhead Fugitives	---	---	---	---	---	125	12	73	1,143		24,078	24,071
Pneumatic Devices	---	---	---	---	---	92	9	54	840		17,683	17,678
Sub-total: Operations	**12**	**3**	**59**	**0**	**30**	**261**	**34**	**23,719**	**2,037**	**0**	**66,572**	**64,311**
Road Maintenance	2	0	0	0	0	0	0	62	0		62	57
Sub-total: Maintenance	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**62**	**0**	**0**	**62**	**57**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	0	0	0	0	0	0	0	11	0		11	10
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**14**	**13**
Total Emissions	**21**	**5**	**73**	**0**	**34**	**263**	**34**	**25,428**	**2,038**	**0**	**68,286**	**65,862**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-43. Summary of Output - Alternative E
Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	1	1	14	0	4	1	0	1,597	0	0	1,602	1,449
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**6**	**1**	**14**	**0**	**4**	**2**	**0**	**1,631**	**0**	**0**	**1,637**	**1,481**
Natural Gas Compression - Operations[a]	3	3	77	0	38	38	11	30,552	64	0	31,979	29,066
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	65	0	0	65	59
Dehy Venting and Flashing	---	---	---	---	---	7	3	79	5		179	172
Station Visits - Operations	3	0	0	0	0	0	0	9	0		9	8
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	11	1	0	0	0	0	0	19	0		19	17
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		30	30
Wellhead Fugitives	---	---	---	---	---	163	16	96	1,492		31,420	31,412
Pneumatic Devices	---	---	---	---	---	119	12	70	1,096		23,076	23,069
Sub-total: Operations	**16**	**4**	**77**	**0**	**39**	**336**	**43**	**30,922**	**2,657**	**0**	**86,810**	**83,862**
Road Maintenance	2	0	0	0	0	0	0	81	0		81	74
Sub-total: Maintenance	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**81**	**0**	**0**	**81**	**74**
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	0	0	0	0	0	0	0	14	0		14	13
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**16**	**15**
Total Emissions	**25**	**6**	**91**	**0**	**43**	**338**	**43**	**32,651**	**2,657**	**0**	**88,544**	**85,432**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-44. Summary of Output - Alternative F
Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	2	2	31	1	8	2	0	3,542	0	0	3,554	3,214
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**14**	**3**	**31**	**1**	**9**	**4**	**0**	**3,618**	**0**	**0**	**3,630**	**3,284**
Natural Gas Compression - Operations[a]	2	2	65	0	33	33	10	26,109	55	0	27,328	24,839
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	55	0	0	55	50
Dehy Venting and Flashing	---	---	---	---	---	11	4	122	7		279	268
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	7
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	9	1	0	0	0	0	0	16	0		16	14
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		47	47
Wellhead Fugitives	---	---	---	---	---	139	14	82	1,275		26,851	26,844
Pneumatic Devices	---	---	---	---	---	102	10	60	936		19,720	19,715
Sub-total: Operations	**14**	**3**	**66**	**0**	**33**	**298**	**39**	**26,526**	**2,275**	**0**	**74,378**	**71,849**
Road Maintenance	2	0	0	0	0	0	0	70	0		70	63
Sub-total: Maintenance	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**70**	**0**	**0**	**70**	**63**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	4
Well Reclamation	0	0	0	0	0	0	0	12	0		12	11
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**16**	**15**
Total Emissions	**30**	**7**	**97**	**1**	**42**	**303**	**40**	**30,230**	**2,275**	**0**	**78,094**	**75,211**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-45. Summary of Output - Alternative F
Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	2	2	31	1	8	2	0	3,542	0	0	3,554	3,214
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**14**	**3**	**31**	**1**	**9**	**4**	**0**	**3,618**	**0**	**0**	**3,630**	**3,284**
Natural Gas Compression - Operations[a]	3	3	90	0	45	45	14	35,945	75	0	37,624	34,197
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	76	0	0	76	69
Dehy Venting and Flashing	---	---	---	---	---	12	4	127	8		290	278
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	14	1	1	2		49	49
Wellhead Fugitives	---	---	---	---	---	191	19	113	1,755		36,967	36,957
Pneumatic Devices	---	---	---	---	---	141	14	83	1,289		27,150	27,142
Sub-total: Operations	**19**	**5**	**91**	**0**	**46**	**403**	**52**	**36,450**	**3,129**	**0**	**102,261**	**98,787**
Road Maintenance	3	0	0	0	0	0	0	96	0		96	87
Sub-total: Maintenance	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**96**	**0**	**0**	**96**	**87**
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**0**	**19**	**17**
Total Emissions	**36**	**8**	**122**	**1**	**55**	**407**	**53**	**40,183**	**3,129**	**0**	**106,006**	**102,175**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-46. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	3	2	45	1	12	3	0	5,223	0	0	5,241	4,741
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	113	0		113	103
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**20**	**4**	**45**	**1**	**13**	**7**	**1**	**5,336**	**0**	**0**	**5,354**	**4,844**
Natural Gas Compression - Operations[a]	4	4	130	0	65	65	20	51,976	109	0	54,403	49,448
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	110	0	0	110	100
Dehy Venting and Flashing	---	---	---	---	---	28	11	306	19		698	670
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	13
Well Workover - Operations	0	0	1	0	0	0	0	107	0	0	108	98
Well & Pipeline Visits for Inspection & Repair - Operations	18	2	0	0	0	0	0	32	0		32	29
Tanks Condensate and Loadout	---	---	---	---	---	33	3	2	5		117	117
Wellhead Fugitives	---	---	---	---	---	277	28	163	2,538		53,454	53,439
Pneumatic Devices	---	---	---	---	---	203	20	120	1,864		39,258	39,247
Sub-total: Operations	**27**	**7**	**131**	**0**	**66**	**607**	**81**	**52,832**	**4,534**	**0**	**148,196**	**143,160**
Road Maintenance	4	0	1	0	0	0	0	139	0		139	126
Sub-total: Maintenance	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**139**	**0**	**0**	**139**	**126**
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	24	0		24	22
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**0**	**32**	**29**
Total Emissions	**53**	**12**	**178**	**1**	**80**	**614**	**82**	**58,339**	**4,534**	**1**	**153,721**	**148,159**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-47. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	3	2	45	1	12	3	0	5,223	0	0	5,241	4,741
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	113	0		113	103
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**20**	**4**	**45**	**1**	**13**	**7**	**1**	**5,336**	**0**	**0**	**5,354**	**4,844**
Natural Gas Compression - Operations[a]	5	5	133	0	67	67	20	53,192	111	0	55,676	50,604
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	113	0	0	113	102
Dehy Venting and Flashing	---	---	---	---	---	24	9	261	16		596	572
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	107	0	0	108	98
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	0	0	0	33	0		33	29
Tanks Condensate and Loadout	---	---	---	---	---	28	3	2	5		100	100
Wellhead Fugitives	---	---	---	---	---	283	28	167	2,597		54,704	54,689
Pneumatic Devices	---	---	---	---	---	208	21	122	1,907		40,176	40,165
Sub-total: Operations	**28**	**7**	**134**	**0**	**68**	**610**	**81**	**54,012**	**4,636**	**0**	**151,521**	**146,373**
Road Maintenance	4	0	0	0	0	0	0	142	0		142	129
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**142**	**0**	**0**	**142**	**129**
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	25	0		25	22
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**0**	**0**	**33**	**30**
Total Emissions	**54**	**12**	**180**	**1**	**81**	**617**	**82**	**59,523**	**4,636**	**1**	**157,050**	**151,375**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-48. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	3	2	45	1	12	3	0	5,223	0	0	5,241	4,741
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	113	0		113	103
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**20**	**4**	**45**	**1**	**13**	**7**	**1**	**5,336**	**0**	**0**	**5,354**	**4,844**
Natural Gas Compression - Operations[a]	5	5	136	0	68	68	20	54,408	114	0	56,949	51,761
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	115	0	0	116	105
Dehy Venting and Flashing	---	---	---	---	---	18	7	201	12		458	439
Station Visits - Operations	4	0	0	0	0	0	0	16	0		16	14
Well Workover - Operations	0	0	1	0	0	0	0	107	0	0	108	98
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	22	2	1	4		77	77
Wellhead Fugitives	---	---	---	---	---	290	29	171	2,656		55,955	55,939
Pneumatic Devices	---	---	---	---	---	213	21	125	1,951		41,095	41,083
Sub-total: Operations	**29**	**7**	**137**	**0**	**69**	**611**	**80**	**55,178**	**4,737**	**0**	**154,805**	**149,546**
Road Maintenance	4	0	0	0	0	0	0	145	0		145	132
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**145**	**0**	**0**	**145**	**132**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**29**	**0**	**0**	**29**	**26**
Total Emissions	**54**	**12**	**183**	**1**	**83**	**618**	**81**	**60,688**	**4,737**	**1**	**160,333**	**154,547**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-49. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	1	1	26	1	7	2	0	3,025	0	0	3,036	2,746
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	66	0		66	59
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**12**	**3**	**26**	**1**	**8**	**3**	**0**	**3,091**	**0**	**0**	**3,101**	**2,806**
Natural Gas Compression - Operations[a]	4	4	126	0	63	63	19	50,150	105	0	52,491	47,710
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	106	0	0	106	96
Dehy Venting and Flashing	---	---	---	---	---	15	6	162	10		369	354
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	13
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	18	2	0	0	0	0	0	31	0		31	28
Tanks Condensate and Loadout	---	---	---	---	---	17	2	1	3		62	62
Wellhead Fugitives	---	---	---	---	---	267	27	157	2,448		51,575	51,561
Pneumatic Devices	---	---	---	---	---	196	20	115	1,798		37,878	37,868
Sub-total: Operations	**26**	**7**	**126**	**0**	**64**	**559**	**73**	**50,799**	**4,364**	**0**	**142,590**	**137,748**
Road Maintenance	4	0	0	0	0	0	0	134	0		134	121
Sub-total: Maintenance	4	0	0	0	0	0	0	134	0	0	134	121
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	23	0		23	21
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**0**	**0**	**31**	**28**
Total Emissions	**43**	**10**	**153**	**1**	**72**	**562**	**73**	**54,054**	**4,364**	**0**	**145,856**	**140,703**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-50. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	1	1	26	1	7	2	0	3,025	0	0	3,036	2,746
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	66	0		66	59
Wind Erosion	1	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**12**	**3**	**26**	**1**	**8**	**3**	**0**	**3,091**	**0**	**0**	**3,101**	**2,806**
Natural Gas Compression - Operations[a]	4	4	121	0	61	61	18	48,323	101	0	50,580	45,972
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	102	0	0	103	93
Dehy Venting and Flashing	---	---	---	---	---	11	4	124	8		284	272
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	12
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	17	2	0	0	0	0	0	30	0		30	27
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		48	48
Wellhead Fugitives	---	---	---	---	---	257	26	152	2,359		49,697	49,683
Pneumatic Devices	---	---	---	---	---	189	19	111	1,733		36,499	36,488
Sub-total: Operations	**25**	**6**	**122**	**0**	**61**	**532**	**68**	**48,919**	**4,203**	**0**	**137,315**	**132,651**
Road Maintenance	4	0	0	0	0	0	0	129	0		129	117
Sub-total: Maintenance	4	0	0	0	0	0	0	129	0	0	129	117
Road Reclamation	0	0	0	0	0	0	0	3	0		3	3
Well Reclamation	1	0	0	0	0	0	0	22	0		22	20
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**25**	**0**	**0**	**25**	**23**
Total Emissions	**42**	**9**	**148**	**1**	**69**	**535**	**69**	**52,164**	**4,203**	**0**	**140,570**	**135,597**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-51. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	3	3	48	1	13	4	0	5,570	0	0	5,588	5,055
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	14	1	0	0	1	0	0	120	0		120	109
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**22**	**5**	**48**	**1**	**14**	**7**	**1**	**5,690**	**0**	**0**	**5,709**	**5,165**
Natural Gas Compression - Operations[a]	5	5	134	0	67	67	20	53,670	112	0	56,177	51,059
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	114	0	0	114	103
Dehy Venting and Flashing	---	---	---	---	---	26	10	284	17		648	622
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	115	0	0	115	104
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	31	3	2	5		109	109
Wellhead Fugitives	---	---	---	---	---	286	29	168	2,620		55,196	55,181
Pneumatic Devices	---	---	---	---	---	210	21	124	1,924		40,537	40,526
Sub-total: Operations	**28**	**7**	**136**	**0**	**68**	**620**	**83**	**54,525**	**4,679**	**0**	**152,945**	**147,748**
Road Maintenance	4	0	0	0	0	0	0	143	0		143	130
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**143**	**0**	**0**	**143**	**130**
Road Reclamation	0	0	0	0	0	0	0	8	0		8	8
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**0**	**0**	**33**	**30**
Total Emissions	**55**	**12**	**185**	**1**	**83**	**628**	**83**	**60,391**	**4,680**	**1**	**158,830**	**153,072**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-52. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	3	3	48	1	13	4	0	5,570	0	0	5,588	5,055
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	14	1	0	0	1	0	0	120	0		120	109
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**22**	**5**	**48**	**1**	**14**	**7**	**1**	**5,690**	**0**	**0**	**5,709**	**5,165**
Natural Gas Compression - Operations[a]	5	5	139	0	69	69	21	55,364	116	0	57,950	52,671
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	117	0	0	118	107
Dehy Venting and Flashing	---	---	---	---	---	20	8	219	13		498	478
Station Visits - Operations	5	0	0	0	0	0	0	16	0		16	14
Well Workover - Operations	0	0	1	0	0	0	0	115	0	0	115	104
Well & Pipeline Visits for Inspection & Repair - Operations	20	2	0	0	1	0	0	34	0		34	31
Tanks Condensate and Loadout	---	---	---	---	---	23	2	2	4		84	84
Wellhead Fugitives	---	---	---	---	---	295	29	174	2,703		56,939	56,922
Pneumatic Devices	---	---	---	---	---	216	22	127	1,985		41,817	41,805
Sub-total: Operations	**29**	**7**	**140**	**0**	**70**	**625**	**82**	**56,167**	**4,821**	**1**	**157,570**	**152,216**
Road Maintenance	4	0	0	0	0	0	0	148	0		148	134
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**148**	**0**	**0**	**148**	**134**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**29**	**0**	**0**	**29**	**26**
Total Emissions	**56**	**12**	**189**	**1**	**85**	**632**	**83**	**62,034**	**4,821**	**1**	**163,456**	**157,541**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-53. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	1	1	26	1	7	2	0	3,022	0	0	3,032	2,743
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	65	0		65	59
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**12**	**3**	**26**	**1**	**8**	**3**	**0**	**3,088**	**0**	**0**	**3,098**	**2,802**
Natural Gas Compression - Operations[a]	4	4	126	0	63	63	19	50,144	105	0	52,485	47,704
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	106	0	0	106	96
Dehy Venting and Flashing	---	---	---	---	---	15	6	162	10		369	354
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	13
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	18	2	0	0	0	0	0	31	0		31	28
Tanks Condensate and Loadout	---	---	---	---	---	17	2	1	3		62	62
Wellhead Fugitives	---	---	---	---	---	267	27	157	2,448		51,569	51,555
Pneumatic Devices	---	---	---	---	---	196	20	115	1,798		37,874	37,863
Sub-total: Operations	**26**	**7**	**126**	**0**	**64**	**558**	**73**	**50,793**	**4,364**	**0**	**142,574**	**137,732**
Road Maintenance	4	0	0	0	0	0	0	134	0		134	121
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**134**	**0**	**0**	**134**	**121**
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	23	0		23	21
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**0**	**0**	**31**	**28**
Total Emissions	**43**	**10**	**153**	**1**	**72**	**562**	**73**	**54,045**	**4,364**	**0**	**145,836**	**140,684**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-54. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**20**	**4**	**44**	**1**	**13**	**6**	**1**	**5,204**	**0**	**0**	**5,221**	**4,723**
Natural Gas Compression - Operations[a]	5	5	135	0	68	68	20	54,039	113	0	56,563	51,410
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	115	0	0	115	104
Dehy Venting and Flashing	---	---	---	---	---	18	7	191	12		435	418
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	20	2	1	3		73	73
Wellhead Fugitives	---	---	---	---	---	288	29	169	2,638		55,576	55,560
Pneumatic Devices	---	---	---	---	---	211	21	124	1,938		40,816	40,805
Sub-total: Operations	**28**	**7**	**136**	**0**	**69**	**605**	**79**	**54,793**	**4,704**	**0**	**153,731**	**148,508**
Road Maintenance	4	0	0	0	0	0	0	144	0		144	131
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**144**	**0**	**0**	**144**	**131**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**0**	**28**	**26**
Total Emissions	**53**	**12**	**181**	**1**	**82**	**612**	**80**	**60,169**	**4,704**	**1**	**159,124**	**153,388**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-55. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	**20**	**4**	**44**	**1**	**13**	**6**	**1**	**5,204**	**0**	**0**	**5,221**	**4,723**
Natural Gas Compression - Operations[a]	5	5	133	0	66	66	20	53,008	111	0	55,483	50,429
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	112	0	0	113	102
Dehy Venting and Flashing	---	---	---	---	---	23	9	248	15		566	543
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	0	0	0	32	0		32	29
Tanks Condensate and Loadout	---	---	---	---	---	27	3	2	4		95	95
Wellhead Fugitives	---	---	---	---	---	282	28	166	2,588		54,515	54,499
Pneumatic Devices	---	---	---	---	---	207	21	122	1,901		40,037	40,026
Sub-total: Operations	**28**	**7**	**134**	**0**	**67**	**606**	**80**	**53,811**	**4,619**	**0**	**150,961**	**145,832**
Road Maintenance	4	0	0	0	0	0	0	141	0		141	128
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**141**	**0**	**0**	**141**	**128**
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	25	0		25	22
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**0**	**0**	**33**	**30**
Total Emissions	**53**	**12**	**179**	**1**	**81**	**612**	**81**	**59,188**	**4,619**	**1**	**156,356**	**150,713**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-56. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	1	1	26	1	7	2	0	3,022	0	0	3,032	2,743
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	65	0		65	59
Wind Erosion	1	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**12**	**3**	**26**	**1**	**8**	**3**	**0**	**3,088**	**0**	**0**	**3,098**	**2,802**
Natural Gas Compression - Operations[a]	4	4	121	0	61	61	18	48,311	101	0	50,567	45,961
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	102	0	0	103	93
Dehy Venting and Flashing	---	---	---	---	---	11	4	124	8		284	272
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	12
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	17	2	0	0	0	0	0	30	0		30	27
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		48	48
Wellhead Fugitives	---	---	---	---	---	257	26	151	2,359		49,685	49,671
Pneumatic Devices	---	---	---	---	---	189	19	111	1,732		36,490	36,480
Sub-total: Operations	**25**	**6**	**122**	**0**	**61**	**532**	**68**	**48,907**	**4,202**	**0**	**137,282**	**132,620**
Road Maintenance	4	0	0	0	0	0	0	129	0		129	117
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**129**	**0**	**0**	**129**	**117**
Road Reclamation	0	0	0	0	0	0	0	3	0		3	3
Well Reclamation	1	0	0	0	0	0	0	22	0		22	20
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**25**	**0**	**0**	**25**	**23**
Total Emissions	**42**	**9**	**148**	**1**	**69**	**535**	**69**	**52,149**	**4,202**	**0**	**140,534**	**135,562**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-57. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	**2**	**0**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Sub-total: Construction	**20**	**4**	**44**	**1**	**13**	**6**	**1**	**5,204**	**0**	**0**	**5,221**	**4,723**
Natural Gas Compression - Operations[a]	5	5	133	0	66	66	20	53,008	111	0	55,483	50,429
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	112	0	0	113	102
Dehy Venting and Flashing	---	---	---	---	---	23	9	248	15		566	543
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	0	0	0	32	0		32	29
Tanks Condensate and Loadout	---	---	---	---	---	27	3	2	4		95	95
Wellhead Fugitives	---	---	---	---	---	282	28	166	2,588		54,515	54,499
Pneumatic Devices	---	---	---	---	---	207	21	122	1,901		40,037	40,026
Sub-total: Operations	**28**	**7**	**134**	**0**	**67**	**606**	**80**	**53,811**	**4,619**	**0**	**150,961**	**145,832**
Road Maintenance	4	0	0	0	0	0	0	141	0		141	128
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**141**	**0**	**0**	**141**	**128**
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	25	0		25	22
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**0**	**0**	**33**	**30**
Total Emissions	**53**	**12**	**179**	**1**	**81**	**612**	**81**	**59,188**	**4,619**	**1**	**156,356**	**150,713**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-58. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---		---	---
Heavy Equipment Combustive Emissions[a]	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	2	0	---	---	---	---	---	---	---		---	---
Sub-total: Construction	**20**	**4**	**44**	**1**	**13**	**6**	**1**	**5,204**	**0**	**0**	**5,221**	**4,723**
Natural Gas Compression - Operations[a]	5	5	135	0	68	68	20	54,039	113	0	56,563	51,410
Separator, Dehydrator & Water Tank Heaters - Operations[a]	0	0	0	0	0	0	0	115	0	0	115	104
Dehy Venting and Flashing	---	---	---	---	---	18	7	191	12		435	418
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	20	2	1	3		73	73
Wellhead Fugitives	---	---	---	---	---	288	29	169	2,638		55,576	55,560
Pneumatic Devices	---	---	---	---	---	211	21	124	1,938		40,816	40,805
Sub-total: Operations	**28**	**7**	**136**	**0**	**69**	**605**	**79**	**54,793**	**4,704**	**0**	**153,731**	**148,508**
Road Maintenance	4	0	0	0	0	0	0	144	0		144	131
Sub-total: Maintenance	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**144**	**0**	**0**	**144**	**131**
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**0**	**28**	**26**
Total Emissions	**53**	**12**	**181**	**1**	**82**	**612**	**80**	**60,169**	**4,704**	**1**	**159,124**	**153,388**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

Table U-59 Summary of Output - Alternative A
Total Annual Emissions from CBNG Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	0	0	0	0	0	0	0	0	0	0
Wind Erosion	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Combustive Emissions[a]	0	0	0	0	0	0	0	0	0	0	0	0
Commuting Vehicles - Construction	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Construction	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Natural Gas Compression - Operations[a]	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	0	0	0	0	0	0	0	0	0	0
Wellhead Fugitives	0	0	0	0	0	0	0	0	0	0	0	0
Pneumatics	0	0	0	0	0	0	0	0	0	0	0	0
Station Visits - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well Workover - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Operations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Road Maintenance	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Road Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Well Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Emissions	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: No CBNG well development occurred during 2008 in the Planning Area

Table U-60 Summary of Output - Alternative A
Total Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	457	0	0	458	416
Commuting Vehicles - Construction	2	0	0	0	0	0	0	24	0		24	22
Sub-total: Construction	**4**	**1**	**3**	**0**	**1**	**0**	**0**	**481**	**0**	**0**	**482**	**438**
Natural Gas Compression - Operations[a]	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	3	87		1,828	1,659
Pneumatics	---	---	---	---	---	3	0	43	679		14,299	12,976
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	35	0	0	35	32
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	2
Sub-total: Operations	**1**	**0**	**1**	**0**	**1**	**4**	**0**	**1,074**	**766**	**0**	**17,157**	**15,569**
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		2	1
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**1**
Total Emissions	**5**	**1**	**5**	**0**	**2**	**4**	**0**	**1,559**	**766**	**0**	**17,643**	**16,010**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-61 Summary of Output - Alternative A
Total Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	457	0	0	458	416
Commuting Vehicles - Construction	2	0	0	0	0	0	0	24	0		24	22
Sub-total: Construction	**4**	**1**	**3**	**0**	**1**	**0**	**0**	**481**	**0**	**0**	**482**	**438**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	6	174		3,656	3,318
Pneumatics	---	---	---	---	---	7	1	87	1,358		28,599	25,952
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	35	0	0	35	32
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**7**	**1**	**1,119**	**1,532**	**0**	**33,283**	**30,202**
Road Maintenance	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**5**	**4**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**3**
Total Emissions	**4**	**1**	**5**	**0**	**2**	**8**	**1**	**1,608**	**1,532**	**0**	**33,773**	**30,647**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-62 Summary of Output - Alternative B
Total Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	1	0	0	0	0	127	0	0	127	115
Commuting Vehicles - Construction	0	0	0	0	0	0	0	7	0		7	6
Sub-total: Construction	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**133**	**0**	**0**	**134**	**121**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	1	24		512	465
Pneumatics	---	---	---	---	---	1	0	12	190		4,004	3,633
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	10	0	0	10	9
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**1,014**	**214**	**0**	**5,518**	**5,008**
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Emissions	**1**	**0**	**2**	**0**	**1**	**1**	**0**	**1,148**	**214**	**0**	**5,653**	**5,130**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-63 Summary of Output - Alternative B
Total Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	1	0	0	0	0	127	0	0	127	115
Commuting Vehicles - Construction	0	0	0	0	0	0	0	7	0		7	6
Sub-total: Construction	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**133**	**0**	**0**	**134**	**121**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	49		1,024	929
Pneumatics	---	---	---	---	---	2	0	24	380		8,008	7,266
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	10	0	0	10	9
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**2**	**0**	**1,026**	**429**	**0**	**10,034**	**9,105**
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Total Emissions	**1**	**0**	**2**	**0**	**1**	**2**	**0**	**1,162**	**429**	**0**	**10,170**	**9,228**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-64 Summary of Output - Alternative C
Total Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	4	0	1	0	0	545	0	0	547	496
Commuting Vehicles - Construction	2	0	0	0	0	0	0	28	0		28	26
Sub-total: Construction	**4**	**1**	**4**	**0**	**1**	**0**	**0**	**573**	**0**	**0**	**575**	**522**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	4	103		2,170	1,969
Pneumatics	---	---	---	---	---	4	0	52	806		16,969	15,398
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	42	0	0	42	38
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	2
Sub-total: Operations	**1**	**0**	**1**	**0**	**1**	**4**	**0**	**1,090**	**909**	**0**	**20,175**	**18,307**
Road Maintenance	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**3**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Total Emissions	**6**	**1**	**5**	**0**	**2**	**5**	**0**	**1,668**	**909**	**0**	**20,755**	**18,834**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-65 Summary of Output - Alternative C
Total Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	4	0	1	0	0	545	0	0	547	496
Commuting Vehicles - Construction	2	0	0	0	0	0	0	28	0		28	26
Sub-total: Construction	**4**	**1**	**4**	**0**	**1**	**0**	**0**	**573**	**0**	**0**	**575**	**522**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	8	206		4,339	3,937
Pneumatics	---	---	---	---	---	8	1	103	1,611		33,937	30,796
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	42	0	0	42	38
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**9**	**1**	**1,143**	**1,817**	**0**	**39,311**	**35,672**
Road Maintenance	0	0	0	0	0	0	0	6	0		6	5
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**6**	**5**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**4**	**3**
Total Emissions	**5**	**1**	**5**	**0**	**2**	**9**	**1**	**1,726**	**1,817**	**0**	**39,895**	**36,203**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-66 Summary of Output - Alternative D
Total Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	**3**	**1**	**3**	**0**	**1**	**0**	**0**	**458**	**0**	**0**	**459**	**417**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	3	82		1,731	1,571
Pneumatics	---	---	---	---	---	3	0	41	643		13,537	12,284
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	1
Sub-total: Operations	**1**	**0**	**1**	**0**	**1**	**3**	**0**	**1,070**	**725**	**0**	**16,295**	**14,787**
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Total Emissions	**5**	**1**	**4**	**0**	**2**	**4**	**0**	**1,531**	**725**	**0**	**16,758**	**15,207**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-67 Summary of Output - Alternative D
Total Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	**3**	**1**	**3**	**0**	**1**	**0**	**0**	**458**	**0**	**0**	**459**	**417**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	6	165		3,461	3,141
Pneumatics	---	---	---	---	---	6	1	82	1,285		27,074	24,568
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**7**	**1**	**1,112**	**1,450**	**0**	**31,561**	**28,640**
Road Maintenance	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**5**	**4**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**3**
Total Emissions	**4**	**1**	**4**	**0**	**2**	**7**	**1**	**1,577**	**1,450**	**0**	**32,028**	**29,063**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-68 Summary of Output - Alternative E
Total Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	1	0	0	0	0	116	0	0	116	105
Commuting Vehicles - Construction	0	0	0	0	0	0	0	6	0		6	5
Sub-total: Construction	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**122**	**0**	**0**	**122**	**111**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	1	22		463	420
Pneumatics	---	---	---	---	---	1	0	11	172		3,623	3,287
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	9	0	0	9	8
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**1,012**	**194**	**0**	**5,087**	**4,617**
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Emissions	**1**	**0**	**2**	**0**	**1**	**1**	**0**	**1,134**	**194**	**0**	**5,211**	**4,728**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-69 Summary of Output - Alternative E
Total Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	1	0	0	0	0	116	0	0	116	105
Commuting Vehicles - Construction	0	0	0	0	0	0	0	6	0		6	5
Sub-total: Construction	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**122**	**0**	**0**	**122**	**111**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	44		926	841
Pneumatics	---	---	---	---	---	2	0	22	344		7,245	6,574
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	9	0	0	9	8
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**2**	**0**	**1,023**	**388**	**0**	**9,173**	**8,324**
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Total Emissions	**1**	**0**	**2**	**0**	**1**	**2**	**0**	**1,147**	**388**	**0**	**9,297**	**8,436**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-70 Summary of Output - Alternative F
Total Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	**3**	**1**	**3**	**0**	**1**	**0**	**0**	**458**	**0**	**0**	**459**	**417**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	3	82		1,731	1,571
Pneumatics	---	---	---	---	---	3	0	41	643		13,537	12,284
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	1
Sub-total: Operations	**1**	**0**	**1**	**0**	**1**	**3**	**0**	**1,070**	**725**	**0**	**16,295**	**14,787**
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Total Emissions	**5**	**1**	**4**	**0**	**2**	**4**	**0**	**1,531**	**725**	**0**	**16,758**	**15,207**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-71 Summary of Output - Alternative F
Total Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	**3**	**1**	**3**	**0**	**1**	**0**	**0**	**458**	**0**	**0**	**459**	**417**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	6	165		3,461	3,141
Pneumatics	---	---	---	---	---	6	1	82	1,285		27,074	24,568
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**7**	**1**	**1,112**	**1,450**	**0**	**31,561**	**28,640**
Road Maintenance	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**5**	**4**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**3**
Total Emissions	**4**	**1**	**4**	**0**	**2**	**7**	**1**	**1,577**	**1,450**	**0**	**32,028**	**29,063**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-72 Summary of Output - Alternative A
Total Cumulative Annual Emissions from CBNG Wells - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	0	0	0	0	0	0	0	0	0	0
Wind Erosion	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Combustive Emissions[a]	0	0	0	0	0	0	0	0	0	0	0	0
Commuting Vehicles - Construction	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Construction	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	0	0	0	0	0	0	0	0	0	0
Wellhead Fugitives	0	0	0	0	0	0	0	0	0	0	0	0
Pneumatics	0	0	0	0	0	0	0	0	0	0	0	0
Station Visits - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well Workover - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Operations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Road Maintenance	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Road Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Well Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Emissions	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: No CBNG well development occurred during 2008 in the Planning Area

Table U-73 Summary of Output - Alternative A
Total Cumulative Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	5	0	2	0	0	705	0	0	707	642
Commuting Vehicles - Construction	3	0	0	0	0	0	0	37	0		37	33
Sub-total: Construction	**5**	**1**	**5**	**0**	**2**	**0**	**0**	**741**	**0**	**0**	**744**	**675**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	133		2,803	2,544
Pneumatics	---	---	---	---	---	5	1	67	1,041		21,926	19,896
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	54	0	0	54	49
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	3	0		3	2
Sub-total: Operations	**2**	**0**	**1**	**0**	**1**	**6**	**1**	**1,119**	**1,174**	**0**	**25,778**	**23,392**
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**4**	**3**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Total Emissions	**7**	**1**	**7**	**0**	**3**	**6**	**1**	**1,866**	**1,174**	**0**	**26,528**	**24,073**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-74 Summary of Output - Alternative A
Total Cumulative Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	5	0	2	0	0	705	0	0	707	642
Commuting Vehicles - Construction	3	0	0	0	0	0	0	37	0		37	33
Sub-total: Construction	**5**	**1**	**5**	**0**	**2**	**0**	**0**	**741**	**0**	**0**	**744**	**675**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	10	267		5,607	5,088
Pneumatics	---	---	---	---	---	10	1	133	2,082		43,852	39,793
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	54	0	0	54	49
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**11**	**1**	**1,188**	**2,348**	**0**	**50,505**	**45,830**
Road Maintenance	0	0	0	0	0	0	0	8	0		8	7
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**8**	**7**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**5**	**4**
Total Emissions	**6**	**1**	**7**	**0**	**3**	**12**	**1**	**1,941**	**2,348**	**0**	**51,261**	**46,516**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-75 Summary of Output - Alternative B
Total Cumulative Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	336	0	0	337	306
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		18	16
Sub-total: Construction	**3**	**0**	**3**	**0**	**1**	**0**	**0**	**353**	**0**	**0**	**354**	**322**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	64		1,341	1,217
Pneumatics	---	---	---	---	---	2	0	32	498		10,486	9,516
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	26	0	0	26	23
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	1	0		1	1
Sub-total: Operations	**1**	**0**	**1**	**0**	**1**	**3**	**0**	**1,052**	**562**	**0**	**12,847**	**11,657**
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Total Emissions	**3**	**1**	**4**	**0**	**2**	**3**	**0**	**1,408**	**562**	**0**	**13,204**	**11,982**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-76 Summary of Output - Alternative B
Total Cumulative Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	3	0	1	0	0	336	0	0	337	306
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		18	16
Sub-total: Construction	**3**	**0**	**3**	**0**	**1**	**0**	**0**	**353**	**0**	**0**	**354**	**322**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	127		2,681	2,433
Pneumatics	---	---	---	---	---	5	0	64	996		20,972	19,031
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	26	0	0	26	23
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**5**	**1**	**1,085**	**1,123**	**0**	**24,672**	**22,389**
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**4**	**3**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Total Emissions	**3**	**1**	**4**	**0**	**2**	**6**	**1**	**1,444**	**1,123**	**0**	**25,033**	**22,716**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-77 Summary of Output - Alternative C
Total Cumulative Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	6	0	2	0	0	793	0	0	795	722
Commuting Vehicles - Construction	3	0	0	0	0	0	0	41	0		41	38
Sub-total: Construction	**6**	**1**	**6**	**0**	**2**	**1**	**0**	**834**	**0**	**0**	**837**	**759**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	6	151		3,169	2,876
Pneumatics	---	---	---	---	---	6	1	75	1,177		24,786	22,492
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	61	0	0	61	55
Well & Pipeline Visits for Inspection & Repair - Operations	2	0	0	0	0	0	0	3	0		3	3
Sub-total: Operations	**2**	**0**	**1**	**0**	**1**	**6**	**1**	**1,135**	**1,327**	**0**	**29,011**	**26,326**
Road Maintenance	0	0	0	0	0	0	0	4	0		4	4
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**4**	**4**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	2
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**2**
Total Emissions	**8**	**1**	**7**	**0**	**3**	**7**	**1**	**1,976**	**1,327**	**0**	**29,855**	**27,091**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-78 Summary of Output - Alternative C
Total Cumulative Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	6	0	2	0	0	793	0	0	795	722
Commuting Vehicles - Construction	3	0	0	0	0	0	0	41	0		41	38
Sub-total: Construction	**6**	**1**	**6**	**0**	**2**	**1**	**0**	**834**	**0**	**0**	**837**	**759**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	11	301		6,338	5,751
Pneumatics	---	---	---	---	---	12	1	151	2,353		49,571	44,983
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	61	0	0	61	55
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**13**	**1**	**1,213**	**2,655**	**0**	**56,963**	**51,690**
Road Maintenance	0	0	0	0	0	0	0	9	0		9	8
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**0**	**9**	**8**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	5	0		5	5
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**5**	**5**
Total Emissions	**7**	**1**	**7**	**0**	**3**	**13**	**1**	**2,061**	**2,655**	**0**	**57,813**	**52,462**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-79 Summary of Output - Alternative D
Total Cumulative Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	**5**	**1**	**5**	**0**	**2**	**0**	**0**	**718**	**0**	**0**	**720**	**654**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	130		2,730	2,477
Pneumatics	---	---	---	---	---	5	1	65	1,014		21,354	19,377
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	3	0		3	2
Sub-total: Operations	**2**	**0**	**1**	**0**	**1**	**5**	**1**	**1,115**	**1,144**	**0**	**25,132**	**22,805**
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**4**	**3**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Total Emissions	**7**	**1**	**6**	**0**	**3**	**6**	**1**	**1,839**	**1,144**	**0**	**25,858**	**23,465**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-80 Summary of Output - Alternative D
Total Cumulative Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	**5**	**1**	**5**	**0**	**2**	**0**	**0**	**718**	**0**	**0**	**720**	**654**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	10	260		5,460	4,955
Pneumatics	---	---	---	---	---	10	1	130	2,028		42,708	38,755
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**11**	**1**	**1,182**	**2,287**	**0**	**49,213**	**44,658**
Road Maintenance	0	0	0	0	0	0	0	7	0		7	7
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**7**	**7**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	4	0		4	4
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**5**	**4**
Total Emissions	**6**	**1**	**6**	**0**	**3**	**11**	**1**	**1,912**	**2,287**	**0**	**49,945**	**45,323**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-81 Summary of Output - Alternative E
Total Cumulative Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	2	0	1	0	0	325	0	0	326	296
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Construction	**3**	**0**	**2**	**0**	**1**	**0**	**0**	**342**	**0**	**0**	**343**	**311**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	61		1,292	1,172
Pneumatics	---	---	---	---	---	2	0	31	480		10,105	9,170
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	25	0	0	25	23
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	1	0		1	1
Sub-total: Operations	**1**	**0**	**1**	**0**	**1**	**3**	**0**	**1,050**	**541**	**0**	**12,416**	**11,266**
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**
Total Emissions	**3**	**1**	**3**	**0**	**2**	**3**	**0**	**1,394**	**541**	**0**	**12,761**	**11,580**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-82 Summary of Output - Alternative E
Total Cumulative Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	2	0	1	0	0	325	0	0	326	296
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Construction	**3**	**0**	**2**	**0**	**1**	**0**	**0**	**342**	**0**	**0**	**343**	**311**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	123		2,584	2,345
Pneumatics	---	---	---	---	---	5	0	61	959		20,210	18,339
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	25	0	0	25	23
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**5**	**1**	**1,081**	**1,082**	**0**	**23,811**	**21,607**
Road Maintenance	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**3**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Total Emissions	**3**	**0**	**3**	**0**	**2**	**5**	**1**	**1,429**	**1,082**	**0**	**24,160**	**21,924**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-83 Summary of Output - Alternative F
Total Cumulative Annual Emissions from CBNG Wells - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	**5**	**1**	**5**	**0**	**2**	**0**	**0**	**718**	**0**	**0**	**720**	**654**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	130		2,730	2,477
Pneumatics	---	---	---	---	---	5	1	65	1,014		21,354	19,377
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	3	0		3	2
Sub-total: Operations	**2**	**0**	**1**	**0**	**1**	**5**	**1**	**1,115**	**1,144**	**0**	**25,132**	**22,805**
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**4**	**3**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**
Total Emissions	**7**	**1**	**6**	**0**	**3**	**6**	**1**	**1,839**	**1,144**	**0**	**25,858**	**23,465**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-84 Summary of Output - Alternative F
Total Cumulative Annual Emissions from CBNG Wells - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions[a]	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	**5**	**1**	**5**	**0**	**2**	**0**	**0**	**718**	**0**	**0**	**720**	**654**
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	10	260		5,460	4,955
Pneumatics	---	---	---	---	---	10	1	130	2,028		42,708	38,755
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	**0**	**0**	**1**	**0**	**1**	**11**	**1**	**1,182**	**2,287**	**0**	**49,213**	**44,658**
Road Maintenance	0	0	0	0	0	0	0	7	0		7	7
Sub-total: Maintenance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**7**	**7**
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	4	0		4	4
Sub-total: Reclamation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**5**	**4**
Total Emissions	**6**	**1**	**6**	**0**	**3**	**11**	**1**	**1,912**	**2,287**	**0**	**49,945**	**45,323**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-85. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2008

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	1	1	12	0	5	1	0	1,356	0	1,356	1,231
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	**679**	**73**	**15**	**0**	**8**	**2**	**0**	**2,096**	**0**	**2,096**	**1,902**

[a]HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

Table U-86. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	1	0	1,426	0	1,426	1,294
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	**679**	**73**	**7**	**0**	**5**	**2**	**0**	**2,165**	**0**	**2,166**	**1,965**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-87. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	1	0	0	1,426	0	1,426	1,294
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	**678**	**73**	**4**	**0**	**4**	**2**	**0**	**2,165**	**0**	**2,166**	**1,966**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-88. Summary of Output - Alternative B
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	78	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	564	56	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	0	0	1,369	0	1,369	1,242
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	**652**	**70**	**7**	**0**	**5**	**2**	**0**	**2,108**	**0**	**2,109**	**1,914**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-89. Summary of Output - Alternative B
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	97	15	---	---	---	---	---	---	---	---	---
Unpaved Roads	705	71	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	2	0	1	0	0	1,711	0	1,711	1,553
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	**812**	**87**	**4**	**0**	**4**	**2**	**0**	**2,451**	**0**	**2,451**	**2,224**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-90. Summary of Output - Alternative C
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	98	15	---	---	---	---	---	---	---	---	---
Unpaved Roads	705	71	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	1	1	5	0	2	1	0	1,711	0	1,711	1,553
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	**813**	**87**	**8**	**0**	**5**	**2**	**0**	**2,450**	**0**	**2,451**	**2,224**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-91. Summary of Output - Alternative C
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	97	15	---	---	---	---	---	---	---	---	---
Unpaved Roads	705	71	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	2	0	1	0	0	1,711	0	1,711	1,553
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	**812**	**87**	**4**	**0**	**4**	**2**	**0**	**2,451**	**0**	**2,451**	**2,224**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-92. Summary of Output - Alternative D
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	73	11	---	---	---	---	---	---	---	---	---
Unpaved Roads	529	53	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	1	0	0	1,283	0	1,283	1,164
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	**612**	**66**	**7**	**0**	**5**	**2**	**0**	**2,022**	**0**	**2,023**	**1,836**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-93. Summary of Output - Alternative D
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	80	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	576	58	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	1	0	0	1,397	0	1,397	1,268
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---
Total Emissions	**659**	**71**	**4**	**0**	**4**	**2**	**0**	**2,137**	**0**	**2,137**	**1,940**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-94. Summary of Output - Alternative E
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	80	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	576	58	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	0	0	1,397	0	1,397	1,268
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---
Total Emissions	**660**	**71**	**7**	**0**	**5**	**2**	**0**	**2,136**	**0**	**2,137**	**1,939**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-95. Summary of Output - Alternative E
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	73	11	---	---	---	---	---	---	---	---	---
Unpaved Roads	529	53	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	0	0	0	1,283	0	1,283	1,165
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	**611**	**65**	**4**	**0**	**4**	**1**	**0**	**2,023**	**0**	**2,024**	**1,836**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-96. Summary of Output - Alternative F
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	1	0	1,426	0	1,426	1,294
Wind Erosion	3	0	---	---	---	---	---	---	---	---	---
Total Emissions	**674**	**72**	**7**	**0**	**5**	**2**	**0**	**2,165**	**0**	**2,166**	**1,965**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-97. Summary of Output - Alternative F
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	1	0	0	1,426	0	1,426	1,294
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---
Total Emissions	**673**	**72**	**4**	**0**	**4**	**2**	**0**	**2,165**	**0**	**2,166**	**1,966**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-98. Summary of Output - Alternative A
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	439	122	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,124**	**308**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-99. Summary of Output - Alternative A
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,192**	**322**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-100. Summary of Output - Alternative A
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,108**	**310**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-101. Summary of Output - Alternative B
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,192**	**322**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-102. Summary of Output - Alternative B
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,108**	**310**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-103. Summary of Output - Alternative C
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,192**	**322**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-104. Summary of Output - Alternative C
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,108**	**310**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-105. Summary of Output - Alternative D
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,192**	**322**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-106. Summary of Output - Alternative D
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,108**	**310**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-107. Summary of Output - Alternative E
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	344	92	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	13	2										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,022**	**277**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-108. Summary of Output - Alternative E
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	302	85	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	13	2										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**1,980**	**270**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-109. Summary of Output - Alternative F
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,192**	**322**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-110. Summary of Output - Alternative F
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	**2,108**	**310**	**88**	**2**	**21**	**7**	**1**	**12,523**	**0**	**0**	**12,525**	**11,366**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-111. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2008

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	2	0	1	0	0	170	0	170	154
Sub-total: Heavy Equipment	**1**	**0**	**2**	**0**	**1**	**0**	**0**	**170**	**0**	**170**	**154**
Commuting Vehicles - Fugitive Dust	27	2	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	749	0	749	680
Sub-total: Commuting Vehicles	**27**	**3**	**3**	**0**	**7**	**3**	**0**	**749**	**0**	**749**	**680**
Total Emissions	**27**	**3**	**4**	**0**	**8**	**3**	**0**	**919**	**0**	**919**	**834**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-112. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	179	18	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	8	0	4	1	0	2,115	0	2,116	1,920
Sub-total: Heavy Equipment	**179**	**19**	**8**	**0**	**4**	**1**	**0**	**2,115**	**0**	**2,116**	**1,920**
Commuting Vehicles - Fugitive Dust	50	5	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	**50**	**5**	**3**	**0**	**7**	**3**	**0**	**1,644**	**0**	**1,644**	**1,492**
Total Emissions	**230**	**24**	**11**	**0**	**10**	**4**	**0**	**3,759**	**0**	**3,760**	**3,412**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-113. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	106	11	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	866	0	866	786
Sub-total: Heavy Equipment	**106**	**11**	**1**	**0**	**1**	**0**	**0**	**866**	**0**	**866**	**786**
Commuting Vehicles - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	**76**	**8**	**3**	**0**	**7**	**3**	**0**	**1,644**	**0**	**1,644**	**1,492**
Total Emissions	**182**	**19**	**4**	**0**	**7**	**3**	**0**	**2,510**	**0**	**2,511**	**2,278**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-114. Summary of Output - Alternative B
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	149	15	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	6	0	3	1	0	1,567	0	1,567	1,422
Sub-total: Heavy Equipment	**150**	**15**	**6**	**0**	**3**	**1**	**0**	**1,567**	**0**	**1,567**	**1,422**
Commuting Vehicles - Fugitive Dust	36	4	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	**36**	**4**	**2**	**0**	**5**	**2**	**0**	**1,133**	**0**	**1,134**	**1,029**
Total Emissions	**186**	**19**	**8**	**0**	**8**	**3**	**0**	**2,700**	**0**	**2,700**	**2,450**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-115. Summary of Output - Alternative B
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	767	0	767	696
Sub-total: Heavy Equipment	**77**	**8**	**1**	**0**	**1**	**0**	**0**	**767**	**0**	**767**	**696**
Commuting Vehicles - Fugitive Dust	63	6	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	**63**	**6**	**2**	**0**	**5**	**2**	**0**	**1,133**	**0**	**1,134**	**10,29**
Total Emissions	**139**	**14**	**3**	**0**	**5**	**2**	**0**	**1,900**	**0**	**1,901**	**1,725**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-116. Summary of Output - Alternative C
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	202	20	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	10	0	5	1	0	2,658	0	2,659	2,413
Sub-total: Heavy Equipment	**203**	**21**	**10**	**0**	**5**	**1**	**0**	**2,658**	**0**	**2,659**	**2,413**
Commuting Vehicles - Fugitive Dust	60	6	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	4	0	7	3	0	2,207	0	2,208	2,004
Sub-total: Commuting Vehicles	**60**	**6**	**4**	**0**	**7**	**3**	**0**	**2,207**	**0**	**2,208**	**2,004**
Total Emissions	**264**	**27**	**14**	**1**	**12**	**4**	**0**	**4,866**	**0**	**4,867**	**4,416**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-117. Summary of Output - Alternative C
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	129	13	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	990	0	990	898
Sub-total: Heavy Equipment	**130**	**13**	**1**	**0**	**1**	**0**	**0**	**990**	**0**	**990**	**898**
Commuting Vehicles - Fugitive Dust	82	9	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	4	0	7	3	0	2,207	0	2,208	2,004
Sub-total: Commuting Vehicles	**82**	**9**	**4**	**0**	**7**	**3**	**0**	**2,207**	**0**	**2,208**	**2,004**
Total Emissions	**212**	**22**	**5**	**0**	**8**	**4**	**0**	**3,197**	**0**	**3,198**	**2,902**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-118. Summary of Output - Alternative D
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	179	18	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	8	0	4	1	0	2,115	0	2,116	1,920
Sub-total: Heavy Equipment	**179**	**19**	**8**	**0**	**4**	**1**	**0**	**2,115**	**0**	**2,116**	**1,920**
Commuting Vehicles - Fugitive Dust	50	5	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	**50**	**5**	**3**	**0**	**7**	**3**	**0**	**1,644**	**0**	**1,644**	**1,492**
Total Emissions	**230**	**24**	**11**	**0**	**10**	**4**	**0**	**3,759**	**0**	**3,760**	**3,412**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-119. Summary of Output - Alternative D
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	106	11	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	866	0	866	786
Sub-total: Heavy Equipment	**106**	**11**	**1**	**0**	**1**	**0**	**0**	**866**	**0**	**866**	**786**
Commuting Vehicles - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	**76**	**8**	**3**	**0**	**7**	**3**	**0**	**1,644**	**0**	**1,644**	**1,492**
Total Emissions	**182**	**19**	**4**	**0**	**7**	**3**	**0**	**2,510**	**0**	**2,511**	**2,278**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-120. Summary of Output - Alternative E
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	149	15	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	6	0	3	1	0	1,567	0	1,567	1,422
Sub-total: Heavy Equipment	**150**	**15**	**6**	**0**	**3**	**1**	**0**	**1,567**	**0**	**1,567**	**1,422**
Commuting Vehicles - Fugitive Dust	36	4	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	**36**	**4**	**2**	**0**	**5**	**2**	**0**	**1,133**	**0**	**1,134**	**1,029**
Total Emissions	**186**	**19**	**8**	**0**	**8**	**3**	**0**	**2,700**	**0**	**2,700**	**2,450**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-121. Summary of Output - Alternative E
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	767	0	767	696
Sub-total: Heavy Equipment	**77**	**8**	**1**	**0**	**1**	**0**	**0**	**767**	**0**	**767**	**696**
Commuting Vehicles - Fugitive Dust	63	6	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	**63**	**6**	**2**	**0**	**5**	**2**	**0**	**1,133**	**0**	**1,134**	**1,029**
Total Emissions	**139**	**14**	**3**	**0**	**5**	**2**	**0**	**1,900**	**0**	**1,901**	**1,725**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-122. Summary of Output - Alternative F
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	124	12	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	8	0	4	1	0	2,035	0	2,035	1,847
Sub-total: Heavy Equipment	**125**	**13**	**8**	**0**	**4**	**1**	**0**	**2,035**	**0**	**2,035**	**1,847**
Commuting Vehicles - Fugitive Dust	45	4	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	6	3	0	1,520	0	1,521	1,380
Sub-total: Commuting Vehicles	**45**	**5**	**3**	**0**	**6**	**3**	**0**	**1,520**	**0**	**1,521**	**1,380**
Total Emissions	**170**	**18**	**11**	**0**	**10**	**4**	**0**	**3,555**	**0**	**3,556**	**3,227**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-123. Summary of Output - Alternative F
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	51	5	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	848	0	848	769
Sub-total: Heavy Equipment	**52**	**5**	**1**	**0**	**1**	**0**	**0**	**848**	**0**	**848**	**769**
Commuting Vehicles - Fugitive Dust	70	7	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	6	3	0	1,520	0	1,521	1,380
Sub-total: Commuting Vehicles	**71**	**7**	**3**	**0**	**6**	**3**	**0**	**1,520**	**0**	**1,521**	**1,380**
Total Emissions	**122**	**13**	**4**	**0**	**7**	**3**	**0**	**2,368**	**0**	**2,369**	**2,150**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-124. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2008

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	0	0	0	78	0	78	71
Sub-total: Construction	**6**	**1**	**1**	**0**	**0**	**0**	**0**	**78**	**0**	**78**	**71**
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**28**	**1**	**1**	**0**	**13**	**13**	**1**	**404**	**5,708**	**120,273**	**109,140**
Total Emissions	**34**	**2**	**2**	**0**	**14**	**13**	**1**	**482**	**5,708**	**120,351**	**109,211**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-125. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	84	0	84	76
Sub-total: Construction	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**84**	**0**	**84**	**76**
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**28**	**1**	**1**	**0**	**13**	**13**	**1**	**404**	**5,708**	**120,273**	**109,140**
Total Emissions	**34**	**2**	**2**	**0**	**14**	**13**	**1**	**488**	**5,708**	**120,356**	**109,216**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-126. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	81	0	81	74
Sub-total: Construction	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**81**	**0**	**81**	**74**
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**28**	**1**	**1**	**0**	**13**	**13**	**1**	**404**	**5,708**	**120,273**	**109,140**
Total Emissions	**34**	**2**	**1**	**0**	**13**	**13**	**1**	**485**	**5,708**	**120,354**	**109,214**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-127. Summary of Output - Alternative B
Total Annual Emissions from Livestock Grazing Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	42	0	42	38
Sub-total: Construction	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**42**	**0**	**42**	**38**
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	**14**	**1**	**1**	**0**	**7**	**6**	**1**	**201**	**2,875**	**60,575**	**54,968**
Total Emissions	**17**	**1**	**1**	**0**	**7**	**6**	**1**	**243**	**2,875**	**60,616**	**55,006**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-128. Summary of Output - Alternative B
Total Annual Emissions from Livestock Grazing Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	41	0	41	37
Sub-total: Construction	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**41**	**0**	**41**	**37**
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	**14**	**1**	**1**	**0**	**7**	**6**	**1**	**201**	**2,875**	**60,575**	**54,968**
Total Emissions	**17**	**1**	**1**	**0**	**7**	**6**	**1**	**242**	**2,875**	**60,615**	**55,005**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-129. Summary of Output - Alternative C
Total Annual Emissions from Livestock Grazing Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	11	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	0	0	0	167	0	167	152
Sub-total: Construction	**11**	**1**	**1**	**0**	**0**	**0**	**0**	**167**	**0**	**167**	**152**
Commuting Vehicles - Fugitive Dust	29	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	26	25	3	456	0	461	418
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**30**	**2**	**1**	**0**	**26**	**25**	**3**	**456**	**5,708**	**120,327**	**109,189**
Total Emissions	**41**	**3**	**2**	**0**	**26**	**25**	**3**	**623**	**5,708**	**120,494**	**109,341**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-130. Summary of Output - Alternative C
Total Annual Emissions from Livestock Grazing Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	11	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	162	0	162	147
Sub-total: Construction	**11**	**1**	**0**	**0**	**0**	**0**	**0**	**162**	**0**	**162**	**147**
Commuting Vehicles - Fugitive Dust	29	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	26	25	3	456	0	461	418
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**30**	**2**	**1**	**0**	**26**	**25**	**3**	**456**	**5,708**	**120,327**	**109,189**
Total Emissions	**41**	**3**	**2**	**0**	**26**	**25**	**3**	**618**	**5,708**	**120,489**	**109,337**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-131. Summary of Output - Alternative D
Total Annual Emissions from Livestock Grazing Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	84	0	84	76
Sub-total: Construction	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**84**	**0**	**84**	**76**
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**28**	**1**	**1**	**0**	**13**	**13**	**1**	**404**	**5,708**	**120,273**	**109,140**
Total Emissions	**34**	**2**	**2**	**0**	**14**	**13**	**1**	**488**	**5,708**	**120,356**	**109,216**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-132. Summary of Output - Alternative D
Total Annual Emissions from Livestock Grazing Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	81	0	81	74
Sub-total: Construction	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**81**	**0**	**81**	**74**
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**28**	**1**	**1**	**0**	**13**	**13**	**1**	**404**	**5,708**	**120,273**	**109,140**
Total Emissions	**34**	**2**	**1**	**0**	**13**	**13**	**1**	**485**	**5,708**	**120,354**	**109,214**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-133. Summary of Output - Alternative E
Total Annual Emissions from Livestock Grazing Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	42	0	42	38
Sub-total: Construction	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**42**	**0**	**42**	**38**
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	**14**	**1**	**1**	**0**	**7**	**6**	**1**	**201**	**2,875**	**60,575**	**54,968**
Total Emissions	**17**	**1**	**1**	**0**	**7**	**6**	**1**	**243**	**2,875**	**60,616**	**55,006**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-134. Summary of Output - Alternative E
Total Annual Emissions from Livestock Grazing Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	41	0	41	37
Sub-total: Construction	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**41**	**0**	**41**	**37**
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	**14**	**1**	**1**	**0**	**7**	**6**	**1**	**201**	**2,875**	**60,575**	**54,968**
Total Emissions	**17**	**1**	**1**	**0**	**7**	**6**	**1**	**242**	**2,875**	**60,615**	**55,005**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-135. Summary of Output - Alternative F
Total Annual Emissions from Livestock Grazing Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	5	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	79	0	79	72
Sub-total: Construction	**5**	**1**	**0**	**0**	**0**	**0**	**0**	**79**	**0**	**79**	**72**
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	12	1	401	0	404	367
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**28**	**1**	**1**	**0**	**13**	**12**	**1**	**401**	**5,708**	**120,270**	**109,138**
Total Emissions	**33**	**2**	**2**	**0**	**13**	**12**	**1**	**481**	**5,708**	**120,349**	**109,210**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-136. Summary of Output - Alternative F
Total Annual Emissions from Livestock Grazing Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	5	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	77	0	77	70
Sub-total: Construction	**5**	**1**	**0**	**0**	**0**	**0**	**0**	**77**	**0**	**77**	**70**
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	12	1	401	0	404	367
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	**28**	**1**	**1**	**0**	**13**	**12**	**1**	**401**	**5,708**	**120,270**	**109,138**
Total Emissions	**33**	**2**	**1**	**0**	**13**	**12**	**1**	**478**	**5,708**	**120,347**	**109,208**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-137. Summary of Output - Alternative A
Total Annual Emissions from Forest Products - Year 2008

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**319**	**32**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**322**	**32**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-138. Summary of Output - Alternative A
Total Annual Emissions from Forest Products - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**319**	**32**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**322**	**32**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-139. Summary of Output - Alternative A
Total Annual Emissions from Forest Products - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**319**	**32**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**322**	**32**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-140. Summary of Output - Alternative B
Total Annual Emissions from Forest Products - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**213**	**21**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**216**	**22**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-141. Summary of Output - Alternative B
Total Annual Emissions from Forest Products - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**213**	**21**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**216**	**22**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-142. Summary of Output - Alternative C
Total Annual Emissions from Forest Products - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	429	43	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**429**	**43**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**432**	**43**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-143. Summary of Output - Alternative C
Total Annual Emissions from Forest Products - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	429	43	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**429**	**43**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**432**	**43**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-144. Summary of Output - Alternative D
Total Annual Emissions from Forest Products - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**319**	**32**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**322**	**32**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-145. Summary of Output - Alternative D
Total Annual Emissions from Forest Products - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**319**	**32**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**322**	**32**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-146. Summary of Output - Alternative E
Total Annual Emissions from Forest Products - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**213**	**21**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**216**	**22**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-147. Summary of Output - Alternative E
Total Annual Emissions from Forest Products - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**213**	**21**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**216**	**22**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-148. Summary of Output - Alternative F
Total Annual Emissions from Forest Products - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	320	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**320**	**32**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**322**	**32**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-149. Summary of Output - Alternative F
Total Annual Emissions from Forest Products - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	320	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	**320**	**32**	**0**	**0**	**1**	**0**	**0**	**17**	**0**	**17**	**15**
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**18**
Total Emissions	**322**	**32**	**0**	**0**	**1**	**0**	**0**	**36**	**0**	**36**	**33**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-150. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2008

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	**21.06**	**2.16**	**0.35**	**0.02**	**0.34**	**0.05**	**0.01**	**89.65**	**0.00**	**89.66**	**81.36**
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	**12.61**	**1.27**	**0.24**	**0.00**	**0.34**	**0.13**	**0.01**	**16.34**	**0.00**	**16.34**	**14.83**
Total Emissions	**33.67**	**3.43**	**0.59**	**0.02**	**0.68**	**0.18**	**0.02**	**105.99**	**0.00**	**106.01**	**96.19**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-151. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	**21.06**	**2.16**	**0.35**	**0.02**	**0.34**	**0.05**	**0.01**	**89.65**	**0.00**	**89.66**	**81.36**
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	**12.61**	**1.27**	**0.24**	**0.00**	**0.34**	**0.13**	**0.01**	**16.34**	**0.00**	**16.34**	**14.83**
Total Emissions	**33.67**	**3.43**	**0.59**	**0.02**	**0.68**	**0.18**	**0.02**	**105.99**	**0.00**	**106.01**	**96.19**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-152. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	**21.06**	**2.16**	**0.35**	**0.02**	**0.34**	**0.05**	**0.01**	**89.65**	**0.00**	**89.66**	**81.36**
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Sub-total: Commuting Vehicles	**12.61**	**1.27**	**0.24**	**0.00**	**0.34**	**0.13**	**0.01**	**16.34**	**0.00**	**16.38**	**14.87**
Total Emissions	**33.67**	**3.43**	**0.59**	**0.02**	**0.68**	**0.18**	**0.02**	**105.99**	**0.00**	**106.05**	**96.23**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-153. Summary of Output - Alternative B
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	**10.53**	**1.08**	**0.18**	**0.01**	**0.17**	**0.03**	**0.00**	**44.82**	**0.00**	**44.83**	**40.68**
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.17	7.41
Sub-total: Commuting Vehicles	**6.31**	**0.63**	**0.12**	**0.00**	**0.17**	**0.06**	**0.01**	**8.17**	**0.00**	**8.17**	**7.41**
Total Emissions	**16.84**	**1.71**	**0.29**	**0.01**	**0.34**	**0.09**	**0.01**	**52.99**	**0.00**	**53.00**	**48.10**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-154. Summary of Output - Alternative B
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	**10.53**	**1.08**	**0.18**	**0.01**	**0.17**	**0.03**	**0.00**	**44.82**	**0.00**	**44.83**	**40.68**
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.19	7.43
Sub-total: Commuting Vehicles	**6.31**	**0.63**	**0.12**	**0.00**	**0.17**	**0.06**	**0.01**	**8.17**	**0.00**	**8.19**	**7.43**
Total Emissions	**16.84**	**1.71**	**0.29**	**0.01**	**0.34**	**0.09**	**0.01**	**52.99**	**0.00**	**53.02**	**48.12**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-155. Summary of Output - Alternative C
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	42.00	4.20	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.12	0.12	0.70	0.03	0.68	0.10	0.01	179.29	0.00	179.33	162.73
Sub-total: Heavy Equipment	**42.12**	**4.32**	**0.70**	**0.03**	**0.68**	**0.10**	**0.01**	**179.29**	**0.00**	**179.33**	**162.73**
Commuting Vehicles - Fugitive Dust	25.19	2.51	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.03	0.47	0.00	0.68	0.26	0.03	32.68	0.00	32.68	29.66
Sub-total: Commuting Vehicles	**25.22**	**2.54**	**0.47**	**0.00**	**0.68**	**0.26**	**0.03**	**32.68**	**0.00**	**32.68**	**29.66**
Total Emissions	**67.34**	**6.86**	**1.17**	**0.03**	**1.36**	**0.36**	**0.04**	**211.98**	**0.00**	**212.01**	**192.39**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-156. Summary of Output - Alternative C
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	42.00	4.20	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.12	0.12	0.70	0.03	0.68	0.10	0.01	179.29	0.00	179.33	162.73
Sub-total: Heavy Equipment	**42.12**	**4.32**	**0.70**	**0.03**	**0.68**	**0.10**	**0.01**	**179.29**	**0.00**	**179.33**	**162.73**
Commuting Vehicles - Fugitive Dust	25.19	2.51	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.03	0.47	0.00	0.68	0.26	0.03	32.68	0.00	32.77	29.73
Sub-total: Commuting Vehicles	**25.22**	**2.54**	**0.47**	**0.00**	**0.68**	**0.26**	**0.03**	**32.68**	**0.00**	**32.77**	**29.73**
Total Emissions	**67.34**	**6.86**	**1.17**	**0.03**	**1.36**	**0.36**	**0.04**	**211.98**	**0.01**	**212.10**	**192.46**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-157. Summary of Output - Alternative D
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	**21.06**	**2.16**	**0.35**	**0.02**	**0.34**	**0.05**	**0.01**	**89.65**	**0.00**	**89.66**	**81.36**
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	**12.61**	**1.27**	**0.24**	**0.00**	**0.34**	**0.13**	**0.01**	**16.34**	**0.00**	**16.34**	**14.83**
Total Emissions	**33.67**	**3.43**	**0.59**	**0.02**	**0.68**	**0.18**	**0.02**	**105.99**	**0.00**	**106.01**	**96.19**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-158. Summary of Output - Alternative D
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	**21.06**	**2.16**	**0.35**	**0.02**	**0.34**	**0.05**	**0.01**	**89.65**	**0.00**	**89.66**	**81.36**
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Sub-total: Commuting Vehicles	**12.61**	**1.27**	**0.24**	**0.00**	**0.34**	**0.13**	**0.01**	**16.34**	**0.00**	**16.38**	**14.87**
Total Emissions	**33.67**	**3.43**	**0.59**	**0.02**	**0.68**	**0.18**	**0.02**	**105.99**	**0.00**	**106.05**	**96.23**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-159. Summary of Output - Alternative E
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	**10.53**	**1.08**	**0.18**	**0.01**	**0.17**	**0.03**	**0.00**	**44.82**	**0.00**	**44.83**	**40.68**
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.17	7.41
Sub-total: Commuting Vehicles	**6.31**	**0.63**	**0.12**	**0.00**	**0.17**	**0.06**	**0.01**	**8.17**	**0.00**	**8.17**	**7.41**
Total Emissions	**16.84**	**1.71**	**0.29**	**0.01**	**0.34**	**0.09**	**0.01**	**52.99**	**0.00**	**53.00**	**48.10**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-160. Summary of Output - Alternative E
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	**10.53**	**1.08**	**0.18**	**0.01**	**0.17**	**0.03**	**0.00**	**44.82**	**0.00**	**44.83**	**40.68**
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.19	7.43
Sub-total: Commuting Vehicles	**6.31**	**0.63**	**0.12**	**0.00**	**0.17**	**0.06**	**0.01**	**8.17**	**0.00**	**8.19**	**7.43**
Total Emissions	**16.84**	**1.71**	**0.29**	**0.01**	**0.34**	**0.09**	**0.01**	**52.99**	**0.00**	**53.02**	**48.12**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-161. Summary of Output - Alternative F
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	**21.06**	**2.16**	**0.35**	**0.02**	**0.34**	**0.05**	**0.01**	**89.65**	**0.00**	**89.66**	**81.36**
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	**12.61**	**1.27**	**0.24**	**0.00**	**0.34**	**0.13**	**0.01**	**16.34**	**0.00**	**16.34**	**14.83**
Total Emissions	**33.67**	**3.43**	**0.59**	**0.02**	**0.68**	**0.18**	**0.02**	**105.99**	**0.00**	**106.01**	**96.19**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-162. Summary of Output - Alternative F
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq}	CO_{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust[a]	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	**21.06**	**2.16**	**0.35**	**0.02**	**0.34**	**0.05**	**0.01**	**89.65**	**0.00**	**89.66**	**81.36**
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Sub-total: Commuting Vehicles	**12.61**	**1.27**	**0.24**	**0.00**	**0.34**	**0.13**	**0.01**	**16.34**	**0.00**	**16.38**	**14.87**
Total Emissions	**33.67**	**3.43**	**0.59**	**0.02**	**0.68**	**0.18**	**0.02**	**105.99**	**0.00**	**106.05**	**96.23**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-163. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2008

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	1	1	3	0	9	2	0	406	0		406	369
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	7	1	164	0		165	150
Total Emissions	**266**	**167**	**54**	**14**	**1,814**	**100**	**10**	**570**	**95**	**14**	**6,850**	**6,216**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-164. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	**266**	**166**	**51**	**14**	**1,806**	**99**	**10**	**286**	**95**	**14**	**6,565**	**5,957**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-165. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	2	0	8	2	0	408	0		409	371
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	163	0		164	149
Total Emissions	**266**	**167**	**52**	**14**	**1,813**	**100**	**10**	**571**	**95**	**14**	**6,851**	**6,217**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-166. Summary of Output - Alternative B
Total Annual Emissions from Fire Management Projects - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	114	81	25	7	899	46	5	0	48	7	3,139	2,849
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	**152**	**85**	**26**	**7**	**907**	**53**	**5**	**286**	**48**	**7**	**3,426**	**3,109**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-167. Summary of Output - Alternative B
Total Annual Emissions from Fire Management Projects - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	114	81	25	7	899	46	5	0	48	7	3,139	2,849
Heavy Equipment Exhaust	1	1	4	0	21	4	0	1,049	0		1,050	952
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	18	17	2	417	0		420	381
Total Emissions	**154**	**87**	**30**	**7**	**938**	**68**	**7**	**1,466**	**48**	**7**	**4,609**	**4,182**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-168. Summary of Output - Alternative C
Total Annual Emissions from Fire Management Projects - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	455	324	100	28	3,597	183	18	0	190	28	12,556	11,394
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	**493**	**328**	**101**	**28**	**3,605**	**190**	**19**	**286**	**191**	**28**	**12,843**	**11,654**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-169. Summary of Output - Alternative C
Total Annual Emissions from Fire Management Projects - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	455	324	100	28	3,597	183	18	0	190	28	12,556	11,394
Heavy Equipment Exhaust	1	1	3	0	16	3	0	638	0		638	579
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	13	13	1	239	0		242	219
Total Emissions	**494**	**329**	**104**	**28**	**3,626**	**200**	**20**	**877**	**191**	**28**	**13,436**	**12,193**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-170. Summary of Output - Alternative D
Total Annual Emissions from Fire Management Projects - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	**266**	**166**	**51**	**14**	**1,806**	**99**	**10**	**286**	**95**	**14**	**6,565**	**5,957**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-171. Summary of Output - Alternative D
Total Annual Emissions from Fire Management Projects - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	5	1	0	279	0		279	253
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	5	4	0	112	0		113	103
Total Emissions	**266**	**166**	**51**	**14**	**1,808**	**97**	**10**	**391**	**95**	**14**	**6,670**	**6,053**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-172. Summary of Output - Alternative E
Total Annual Emissions from Fire Management Projects - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	104	73	23	6	809	41	4	0	43	6	2,825	2,564
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	**142**	**77**	**23**	**6**	**817**	**48**	**5**	**286**	**43**	**6**	**3,112**	**2,824**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-173. Summary of Output - Alternative E
Total Annual Emissions from Fire Management Projects - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	104	73	23	6	809	41	4	0	43	6	2,825	2,564
Heavy Equipment Exhaust	1	1	4	0	21	4	0	1,049	0		1,050	952
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	18	17	2	417	0		420	381
Total Emissions	**144**	**79**	**27**	**6**	**849**	**63**	**6**	**1,466**	**43**	**6**	**4,295**	**3,897**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-174. Summary of Output - Alternative F
Total Annual Emissions from Fire Management Projects - Year 2018

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	**266**	**166**	**51**	**14**	**1,806**	**99**	**10**	**286**	**95**	**14**	**6,565**	**5,957**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-175. Summary of Output - Alternative F
Total Annual Emissions from Fire Management Projects - Year 2027

Activity	Annual Emissions (Tons)											
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	N_2O	CO_{2eq}	CO_{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	5	1	0	279	0		279	253
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	5	4	0	112	0		113	103
Total Emissions	**266**	**166**	**51**	**14**	**1,808**	**97**	**10**	**391**	**95**	**14**	**6,670**	**6,053**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-176. Summary of Output - All Alternatives
Annual Criteria Air Pollutant Emissions from Off-highway Vehicles for Park, Hot Springs, Big Horn and Washakie Counties

	2008				2018				2027			
	ATVs	Off-road Motorcycles	Snow-mobiles	2008 total	ATVs	Off-road Motorcycles	Snow-mobiles	2018 total	ATVs	Off-road Motorcycles	Snow-mobiles	2027 total
	(tpy)	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*	*(tpy)*
PM_{10}	7.3	5.2	18.1	**30.6**	3.4	4.3	15.2	**22.8**	1.6	4.09	12.37	**18.1**
$PM_{2.5}$	6.6	4.7	16.2	**27.5**	3.0	3.8	13.7	**20.6**	1.4	3.7	11.1	**16.2**
NO_x	8.4	1.5	11.1	**21.0**	9.1	2.1	33.8	**44.9**	8.9	2.29	46.63	**57.8**
SO_2	0.7	0.2	2.7	**3.5**	1.0	0.2	3.3	**4.5**	1.0	0.25	3.61	**4.9**
CO	680.2	169.5	1573.3	**2423.0**	829.6	179.8	1289.0	**2298.4**	829.0	187.11	1164.35	**2180.5**
VOC	219.4	137.6	693.8	**1050.7**	119.6	114.2	493.0	**726.9**	73.2	110.81	392.12	**576.1**

Note: Sub-totals and totals may not add up due to rounding

Tpy tons per year

Table U-177. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2008

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.43	0.41	5.59	0.13	2.09	0.50	0.05	610.54	0.01	610.70	554.17
Total Emissions	**80.19**	**8.97**	**5.59**	**0.13**	**2.09**	**0.50**	**0.05**	**610.54**	**0.01**	**610.70**	**554.17**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-178. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.29	0.28	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	**80.05**	**8.83**	**2.10**	**0.11**	**0.93**	**0.50**	**0.05**	**617.20**	**0.00**	**617.29**	**560.15**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-179. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.18	0.17	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	**79.95**	**8.72**	**0.63**	**0.10**	**0.31**	**0.50**	**0.05**	**617.20**	**0.00**	**617.29**	**560.15**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-180. Summary of Output - Alternative B
Total Annual Emissions from Road Maintenance Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.22	0.21	1.60	0.08	0.71	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	**60.83**	**6.71**	**1.60**	**0.08**	**0.71**	**0.38**	**0.04**	**468.99**	**0.00**	**469.06**	**425.64**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-181. Summary of Output - Alternative B
Total Annual Emissions from Road Maintenance Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.14	0.13	0.48	0.07	0.24	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	**60.75**	**6.63**	**0.48**	**0.07**	**0.24**	**0.38**	**0.04**	**468.99**	**0.00**	**469.06**	**425.64**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-182. Summary of Output - Alternative C
Total Annual Emissions from Road Maintenance Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	125.95	13.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.45	0.44	3.32	0.17	1.47	0.79	0.08	974.53	0.01	974.67	884.45
Total Emissions	**126.40**	**13.94**	**3.32**	**0.17**	**1.47**	**0.79**	**0.08**	**974.53**	**0.01**	**974.67**	**884.45**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-183. Summary of Output - Alternative C
Total Annual Emissions from Road Maintenance Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	125.95	13.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.28	0.27	0.99	0.15	0.49	0.79	0.08	974.53	0.01	974.67	884.45
Total Emissions	**126.23**	**13.78**	**0.99**	**0.15**	**0.49**	**0.79**	**0.08**	**974.53**	**0.01**	**974.67**	**884.45**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-184. Summary of Output - Alternative D
Total Annual Emissions from Road Maintenance Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.29	0.28	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	**80.05**	**8.83**	**2.10**	**0.11**	**0.93**	**0.50**	**0.05**	**617.20**	**0.00**	**617.29**	**560.15**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-185. Summary of Output - Alternative D
Total Annual Emissions from Road Maintenance Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.18	0.17	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	**79.95**	**8.72**	**0.63**	**0.10**	**0.31**	**0.50**	**0.05**	**617.20**	**0.00**	**617.29**	**560.15**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-186. Summary of Output - Alternative E
Total Annual Emissions from Road Maintenance Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.22	0.21	1.60	0.08	0.71	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	**60.83**	**6.71**	**1.60**	**0.08**	**0.71**	**0.38**	**0.04**	**468.99**	**0.00**	**469.06**	**425.64**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-187. Summary of Output - Alternative E
Total Annual Emissions from Road Maintenance Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.14	0.13	0.48	0.07	0.24	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	**60.75**	**6.63**	**0.48**	**0.07**	**0.24**	**0.38**	**0.04**	**468.99**	**0.00**	**469.06**	**425.64**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-188. Summary of Output - Alternative F
Total Annual Emissions from Road Maintenance Projects - Year 2018

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.29	0.28	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	**80.05**	**8.83**	**2.10**	**0.11**	**0.93**	**0.50**	**0.05**	**617.20**	**0.00**	**617.29**	**560.15**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-189. Summary of Output - Alternative F
Total Annual Emissions from Road Maintenance Projects - Year 2027

Activity	Annual Emissions (Tons)										
	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAPs[a]	CO_2	CH_4	CO_{2eq} tons	CO_{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions[a]	0.18	0.17	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	**79.95**	**8.72**	**0.63**	**0.10**	**0.31**	**0.50**	**0.05**	**617.20**	**0.00**	**617.29**	**560.15**

[a]HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

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Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix V

Water Erosion Prediction Project (WEPP)
Technical Support Document

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APPENDIX V

WATER EROSION PREDICTION PROJECT (WEPP) TECHNICAL SUPPORT DOCUMENT

1.0 WEPP ANALYSIS

This appendix describes the process and results of the quantitative analysis conducted by the Bureau of Land Management (BLM) using the Water Erosion Prediction Project (WEPP) model for the Bighorn Basin Resource Management Plan (RMP) revision. The WEPP model was used to predict how management under each alternative would impact erosion in the Planning Area. WEPP simulates the conditions that impact erosion, such as the amount of vegetation canopy and soil water content. Specifically, the BLM used the WEPP model to calculate runoff amounts and erosion rates which were based on a series of parameters designed to estimate conditions in the Planning Area and model the impacts of management actions. The results of the analysis are described in the *Soil* and *Water* sections of Chapter 4 of the Proposed RMP and Final Environmental Impact Statement.

The WEPP model used by the BLM is a web-based interface designed by the United States Forest Service. The WEPP model can be accessed at: *http://forest.moscowfsl.wsu.edu/fswepp/*. Erosion rates are inherently difficult to predict, and the rates of erosion predicted by WEPP are within +/-50 percent. Despite this lack of precision, these rates are appropriate for comparing and analyzing impacts of the alternatives on the soil resource. Erosion rates were calculated for different resource programs using surface disturbance acreage figures as projected in Appendix T.

Two modules available in the WEPP interface were used by the BLM to estimate erosion rates: WEPP Road and Disturbed WEPP. The WEPP Road module was used to predict erosion rates for new roads built in the Planning Area over the life of the plan. Disturbed WEPP was used to estimate runoff amounts and all other erosion rates as a result of surface-disturbing activity in the Planning Area. WEPP allows users to predict erosion rates for numerous forest and rangeland erosion conditions. In order to estimate these conditions, the BLM used certain assumptions and input parameters for the analysis.

Climate parameters used by the WEPP model were developed using Worland, Wyoming precipitation data at 5,000 feet of elevation in order to represent the entire Planning Area. Both the Disturbed WEPP and WEPP Road modules are limited to four soil textures (clay loam, silt loam, sandy loam, and loam); a loam soil texture was used for all erosion predictions.

All WEPP erosion analyses were conducted using a 50-year simulation to represent the return interval.

The following parameters were used to simulate conditions in the Planning Area:

- Slopes used in Disturbed WEPP: Upper slope 0 to 25 percent; lower slope 5 to 25 percent
- Slope lengths used in Disturbed WEPP: 300 feet (standard length used for environmental analysis in the Planning Area)
- Gradients used in WEPP Road: Road gradient 4 percent; fill gradient 30 percent; buffer gradient 15 percent
- Lengths used in WEPP Road: Road length 200 feet; fill length 15 feet; buffer length 130 feet
- Width used in WEPP Road: Road width 12 feet
- Rock cover used in Disturbed WEPP and WEPP Road: 5 percent

In addition to simulating conditions in the Planning Area the BLM needed to model the conditions for short-term and long-term surface disturbances. Disturbed WEPP has eight vegetative treatment options available: 20-year-old forest, 5-year-old forest, shrub-dominated rangeland, tall-grass prairie, short-grass prairie, low-severity fire, high-severity fire, and skid trail. By adjusting cover parameters, these vegetative treatment options can be applied to a wide variety of vegetative communities and land uses. In order to simulate short-term and long-term disturbances, the following vegetation treatment and cover parameters were used:

- Short-term disturbance: high-severity fire with zero percent cover
- Long-term disturbance: short-grass prairie with 40 percent cover

The WEPP model, using these input parameters, calculated an initial average erosion rate of 4.165 tons per acre per year for short-term disturbances and a rate of 1.602 tons per acre per year for post-reclamation disturbances in the long term. Runoff amounts were calculated using the same parameters. The WEPP model estimated that areas impacted by short-term surface disturbance would experience 0.34 inches of runoff per year, and in the long term, average runoff would drop to 0.19 inches per year. The WEPP model estimated that with no disturbance there would be only trace amounts of annual runoff.

The WEPP Road module simulates road conditions using options for road design, road surface, and traffic level. Road design has four options including insloped, bare ditch; insloped, vegetated or rocked ditch; outsloped, rutted; and outsloped, unrutted. WEPP Road module options for road surface include native, graveled, or paved, and traffic level can be represented by a high, low, or no traffic option. For this analysis, the insloped, bare ditch road design, native road surface, and high traffic level were used. Using these parameters, the BLM calculated the erosion rate associated with road development to be 292.4 pounds per year per 200 foot long, 12 foot wide stretch of road.

Using these average erosion rates and the surface disturbance acreage figures as projected in Appendix T, the BLM calculated the erosion figures displayed in Table V-1.

Table V-1. Estimated Annual Erosion from BLM Actions by Resource (Tons/Year)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Mineral Resources – Leasable Oil and Gas (includes CBNG)						
Tons of Erosion from Disturbance in Short Term	14,794	6,272	16,293	14,282	6,235	14,257
Tons of Erosion from Disturbance in Long Term	2,296	971	2,531	2,216	964	2,212
Mineral Resources – Locatable Minerals						
Tons of Erosion from Disturbance in Short Term	83,300	62,475	83,300	83,300	62,475	83,300
Tons of Erosion from Disturbance in Long Term	16,020	8,010	16,020	16,020	8,010	16,020
Mineral Resources – Salable Minerals						
Tons of Erosion from Disturbance in Short Term	8,330	3,332	8,330	7,497	332	7,497
Tons of Erosion from Disturbance in Long Term	2,563	961	2,563	2,163	961	2,163
Mineral Resources – Other Solid Leasables						
Tons of Erosion from Disturbance in Short Term	0	0	0	0	0	0
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Mineral Resources – Leasable Geothermal						
Tons of Erosion from Disturbance in Short Term	0	0	0	0	0	0
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Fire and Fuels Management[1,2]						
Prescribed Fire						
Tons of Erosion from Disturbance in Short Term	166,600	83,300	333,200	166,600	74,970	166,600
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Mechanical Fuels Treatment						
Tons of Erosion from Disturbance in Short Term	124,950	20,825	249,900	124,950	20,825	124,950
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0

Table V-1. Estimated Annual Erosion from BLM Actions by Resource (Tons/Year) (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Forest, Woodlands, and Forest Products						
Tons of Erosion from Disturbance in Short Term	124,950	83,300	166,600	124,950	83,300	124,950
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Invasive Species[3]						
Tons of Erosion from Disturbance in Short Term	8,330	417	16,660	8,330	417	8,330
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Fish and Wildlife Resources						
Fisheries and Stream Enhancement Activities						
Tons of Erosion from Disturbance in Short Term	0	379	0	0	379	0
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Watershed Enhancement Projects						
Tons of Erosion from Disturbance in Short Term	3,253	6,506	1,629	3,253	6,506	3,253
Tons of Erosion from Disturbance in Long Term	370	740	266	370	740	266
Health and Safety – Abandoned Facilities and AML						
Abandoned Facilities						
Tons of Erosion from Disturbance in Short Term	833	833	833	833	833	833
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Abandoned Mine Lands Restoration						
Tons of Erosion from Disturbance in Short Term	0	0	0	0	0	0
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Paleontological						
Tons of Erosion from Disturbance in Short Term	833	1,041	833	833	1,041	833
Tons of Erosion from Disturbance in Long Term	80	160	80	80	160	80

Table V-1. Estimated Annual Erosion from BLM Actions by Resource (Tons/Year) (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Renewable Energy – Wind Energy Development						
Tons of Erosion from Disturbance in Short Term	833	833	833	833	833	833
Tons of Erosion from Disturbance in Long Term	80	80	80	80	80	80
Rights-of-Way (ROW)						
Telephone and Fiber Optics						
Tons of Erosion from Disturbance in Short Term	908	900	908	908	900	908
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Pipelines (Mineral and Water)[4]						
Tons of Erosion from Disturbance in Short Term	12,283	9,146	12,916	12,283	9,146	4,906
Tons of Erosion from Disturbance in Long Term	0	0	0	0	0	0
Roads[5,6]						
Tons of Erosion from Disturbance in Short Term	5,217	3,261	12,307	5,217	3,261	3,564
Tons of Erosion from Disturbance in Long Term	2,608	1,632	6,154	2,608	1,629	1,783
Powerlines						
Tons of Erosion from Disturbance in Short Term	1,408	954	1,495	1,408	954	687
Tons of Erosion from Disturbance in Long Term	2	2	2	2	2	2
Communication Sites						
Tons of Erosion from Disturbance in Short Term	42	42	42	42	42	42
Tons of Erosion from Disturbance in Long Term	16	16	16	16	16	16
Other Facilities[7]						
Tons of Erosion from Disturbance in Short Term	875	396	970	875	396	754
Tons of Erosion from Disturbance in Long Term	336	152	373	336	152	290

Table V-1. Estimated Annual Erosion from BLM Actions by Resource (Tons/Year) (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Comprehensive Trails and Travel Management						
Motorized Vehicle Use						
Tons of Erosion from Disturbance in Short Term	5,135	11,562	53,758	24,240	11,366	23,949
Tons of Erosion from Disturbance in Long Term	1,338	1,711	20,401	6,313	1,676	6,275
Recreation						
Recreational Site Development						
Tons of Erosion from Disturbance in Short Term	1,456	9,384	53,374	1,456	9,080	1,129
Tons of Erosion from Disturbance in Long Term	560	3,609	20,530	560	3,493	434
Livestock Grazing						
Spring Development						
Tons of Erosion from Disturbance in Short Term	21	10	42	21	10	20
Tons of Erosion from Disturbance in Long Term	2	1	8	2	1	1
Pipeline Development						
Tons of Erosion from Disturbance in Short Term	250	125	500	250	125	237
Tons of Erosion from Disturbance in Long Term	4	2	8	4	2	4
Reservoir/Pit Development						
Tons of Erosion from Disturbance in Short Term	167	83	333	167	83	158
Tons of Erosion from Disturbance in Long Term	8	4	16	8	4	8
Fence Development						
Tons of Erosion from Disturbance in Short Term	1,041	521	2,083	1,041	521	989
Tons of Erosion from Disturbance in Long Term	16	8	32	16	8	15

Table V-1. Estimated Annual Erosion from BLM Actions by Resource (Tons/Year) (Continued)

Type of Disturbance	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Well Development						
Tons of Erosion from Disturbance in Short Term	21	10	42	21	10	20
Tons of Erosion from Disturbance in Long Term	2	1	3	2	1	2
Reservoir Maintenance Development						
Tons of Erosion from Disturbance in Short Term	42	21	83	42	21	35
Tons of Erosion from Disturbance in Long Term	3	2	6	3	4	8
Cumulative Disturbance						
Total Tons of Erosion from Disturbance in Short Term	567,492	307,960	1,023,099	583,827	299,169	570,877
Total Tons of Erosion from Disturbance in Long Term	25,065	17,450	66,459	29,326	17,305	28,297

[1]Acres disturbed by mechanical fuels treatment and prescribed fire will naturally be reclaimed within 5 years. Therefore long-term erosion will be zero.
[2]Includes range enhancements and other wildlife habitat restoration actions.
[3]Surface disturbance activities resulting from invasive species projects will be naturally reclaimed within 5 years. Therefore long-term erosion will be zero.
[4]Actions would likely be mostly oil and gas related, including carbon dioxide and energy pipeline.
[5]Calculated using WEPP Road module and parameters.
[6]Approximately 50 percent of roads would be oil and gas related, with the rest coming from local demand.
[7]Actions would likely be mostly oil and gas related.

AML Abandoned Mine Land
BLM Bureau of Land Management
CBNG coalbed natural gas
ROW Right-of-way
WEPP Water Erosion Prediction Project

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Appendix W

Utilization Levels in the Planning Area

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APPENDIX W

UTILIZATION LEVELS IN THE PLANNING AREA

1.0 INTRODUCTION

Utilization is the percentage of forage that has been consumed or destroyed during a specific period. By comparing measured utilization with appropriate use levels for key forage plants, and by comparing utilization with actual use, climate, and trend data, short- and long-term stocking level adjustments can be made. Utilization monitoring provides an index to the amount of the current year's standing crop that remains on the range following grazing. This standing crop helps maintain soil productivity, livestock diet quality, wildlife habitat, and forage plant vigor.

Use pattern mapping will be collected on scheduled allotments to provide an estimate of forage utilization on a pasture or allotment basis. On priority allotments, more detailed utilization data may be collected on key forage plants along permanent transects on existing or new, cooperatively established key areas.

Utilization will be measured on the standing vegetation in a pasture or allotment using Bureau of Land Management (BLM) approved methods. When practical, the times for measuring utilization will be agreed upon by the BLM and livestock grazing permittees, or otherwise will be consistent with federal regulations and BLM policy.

The utilization levels provided in Table W-1 are generally considered to be appropriate for the precipitation levels, vegetative communities, and grazing seasons encountered in the Planning Area. These utilization levels will be considered during the allotment monitoring, assessment, and evaluation process, as well as during activity plan development and the National Environmental Policy Act (NEPA) and permit/lease renewal process, and will be linked to climatic conditions and site-specific vegetative community information.

Although utilization levels may vary from year to year, utilization levels which consistently exceed the levels displayed in Table W-1 would not be expected to meet watershed and vegetation management objectives. Some exceptions may occur. Specialized grazing management may require utilization levels different than those cited.

Although the growing season varies by precipitation zone and from year to year, the growth curves described in the Natural Resources Conservation Service (NRCS) Ecological Site Technical Guides would be used as a guide to growing seasons.

The utilization levels in the Planning Area (Table W-1) were developed from 30 years of experience and success by the BLM in the Wind River/Bighorn Basin District. The prescribed and/or desired grazing management that provides plant recovery time and associated utilization levels is supported by the references provided following the table.

Table W-1. Utilization Levels in the Planning Area

On an allotment-by-allotment basis, the following utilization levels[1] for key species and key areas would be established[2] as appropriate in allotments not meeting or not making acceptable progress toward meeting rangeland health standards due to current livestock grazing use or not meeting allotment objectives under current prescribed grazing management.[3]		On an allotment-by-allotment basis, the following utilization levels[1] for key species and key areas would be established[2] as appropriate in allotments meeting or making acceptable progress toward meeting rangeland health standards under current livestock grazing use and/or meeting allotment objectives under current prescribed grazing management.[3]	
Key grass species on key upland sites receiving 14 or less inches annual precipitation	35% or less utilization of current standing crop during growing season[4] 50% or less utilization of current year's growth during dormant season[5]	Key grass species on key upland sites receiving 14 or less inches annual precipitation	50% or less utilization of current standing crop during growing season[4] 60% or less utilization of current year's growth during dormant season[5]
Key grass species on key upland sites receiving greater than 14 inches annual precipitation	45% or less utilization of current standing crop during growing season[4] 60% or less utilization of current year's growth during dormant season[5]	Key grass species on key upland sites receiving greater than 14 inches annual precipitation	55% or less utilization of current standing crop during growing season[4] 65% or less utilization of current year's growth during dormant season[5]
Key grass species on all riparian sites	Less than 50% utilization of current year's growth	Key grass species on all riparian sites	Less than 50% utilization of current year's growth
Key shrub/woody species on all sites	Less than 35% utilization of current year's growth	Key shrub/woody species on all sites	Less than 40% utilization of current year's growth

[1]In areas where extensive wildlife use occurs (crucial winter ranges for elk, bighorn sheep, pronghorn, and winter sage-grouse concentration areas or sage-grouse nesting habitat and brood rearing habitat), utilization levels may need to be adjusted downward to ensure that total utilization of the current year's growth following the use period of large ungulates (livestock and /or wildlife) does not exceed the prescribed level for dormant season use. During the collection/evaluation of utilization data if desired levels are consistently exceeded and the causal factor(s) are identified (livestock/wildlife/wild horses etc.), management actions/mitigation to alleviate the overuse would be employed and directed towards those responsible for the overuse. Please refer to Section 3.6.7 of the document for more information about wildlife and livestock grazing.

[2]Although levels may vary widely from year to year, utilization levels which consistently exceed these would not be expected to meet watershed and vegetation management objectives and would necessitate an adjustment in management.

[3]"Prescribed grazing" is defined as the controlled harvest of vegetation with grazing or browsing animals designed to meet rangeland health standards and allotment specific resource objectives. Prescribed grazing management is outlined in management agreements, allotment management plans, the terms and conditions of a permit or lease, etc. Grazing systems (rest rotation, deferred rotation, short duration, conservatively stocked season-long, etc.), range improvement projects, utilization standards, etc., are tools which could be used on an allotment specific basis to achieve resource objectives.

[4]Growing season in the 5-9 inch precipitation zone is generally considered to be April-June. Growing season in the 10-14 inch precipitation zone is generally considered to be May-July 15. Growing season in the 15-19 inch precipitation zone is generally considered to be May 15-August 1.

[5]Dormant season is defined as the period outside of growing season.

Sources: Holecheck et al. 2010; Anderson 1991; Mueggler 1975; Cagney et al. 2010

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Appendix X

Visual Resource Inventory

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APPENDIX X

VISUAL RESOURCE INVENTORY

1.0 OVERVIEW

The visual resource inventory process provides Bureau of Land Management (BLM) managers with a means for determining visual values. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes. These inventory classes represent the relative value of the visual resources. Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least value. The inventory classes provide the basis for considering visual values in the resource management planning (RMP) process. Visual Resource Management classes are established through the RMP process for all BLM-administered lands. During the RMP process, the class boundaries are adjusted as necessary to reflect the resource allocation decisions made in RMPs.

2.0 DELINEATING SCENIC QUALITY RATING UNITS

The Planning Area is subdivided into scenic quality rating units (SQRUs) for rating purposes. Rating areas are delineated on a basis of: like physiographic characteristics; similar visual patterns, texture, color, variety, etc.; and areas which have similar impacts from man-made modifications. The size of SQRU's may vary from several thousand acres to 100 or less acres, depending on the homogeneity of the landscape features and the detail desired in the inventory. Refer to Map X-1 to see the SQRUs delineated for the Bighorn Basin.

3.0 SCENIC QUALITY EVALUATION

Scenic quality is a measure of the visual appeal of a tract of land. In the visual resource inventory process, public lands are given an A, B, or C rating based on the apparent scenic quality which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural. During the rating process, each of these factors are ranked on a comparative basis with similar features within the physiographic province. The "Ecoregions of the United States" by R.G. Bailey is used in making these refinements (Bailey 1994). An important premise of the evaluation is that all public lands have scenic value, but areas with the most variety and most harmonious composition have the greatest scenic value. Another important concept is that the evaluation of scenic quality is done in relationship to the natural landscape. This does not mean that man-made features within a landscape necessarily detract from the scenic value. Man-made features that complement the natural landscape may enhance the scenic value. Evaluations should avoid any bias against man-made modification to natural landscape. Each SQRU is evaluated by an interdisciplinary team by observing the area from several important viewpoints. Scores should reflect the evaluator's overall impression of the area. Refer to Map X-2 for an illustration of the scenic quality evaluation for the Bighorn Basin.

4.0 SENSITIVITY LEVEL ANALYSIS

Sensitivity levels are a measure of public concern for scenic quality. Public lands are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern. In evaluating sensitivity levels, the following six key factors are considered:

1. Type of Users. Visual sensitivity will vary with the type of users. Recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.
2. Amount of Use. Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase.
3. Public Interest. The visual quality of an area may be of concern to local, state, or national groups. Indicators of this concern are usually expressed in public meetings, letters, newspaper or magazine articles, newsletters, land-use plans, etc. Public controversy created in response to proposed activities that would change the landscape character should also be considered.
4. Adjacent Land Uses. The interrelationship with land uses in adjacent lands can affect the visual sensitivity of an area. For example, an area within the view shed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be visually sensitive.
5. Special Areas. Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Areas of Critical Environmental Concern, frequently require special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.
6. Other Factors. Consider any other information such as research or studies that includes indicators of visual sensitivity.

Map X-3 illustrates the sensitivity levels evaluated for the Bighorn Basin.

5.0 DISTANCE ZONES

Landscapes are subdivided into three distance zones based on relative visibility from travel routes or observation points. The three zones are: foreground-middleground, background, and seldom seen. The foreground-middleground zone includes areas seen from highways, rivers, or other viewing locations which are less than 3 to 5 miles away. Seen areas beyond the foreground-middleground zone but usually less than 15 miles away are in the background zone. Areas not seen as foreground-middleground or background (i.e., hidden from view) are in the seldom-seen zone. For the Bighorn Basin, linear transportation routes transect through nearly the entire planning area, which eliminates the background and seldom seen areas. As a result, the entire Bighorn Basin Planning Area is evaluated and delineated as foreground/middle ground zone. Refer to Map X-4 for an illustration of the Planning Area's distance zones.

6.0 VISUAL RESOURCE INVENTORY CLASSES

After evaluating and rating scenic quality, sensitivity levels, and delineating distance zones, visual resource inventory classes are assigned to each SQRU. Class I is assigned to those areas where a management decision has been made previously to maintain a natural landscape. This includes areas such as national wilderness areas, the wild section of national wild and scenic rivers, and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape. Classes II, III, and IV are assigned based on a combination of scenic quality, sensitivity level, and distance zones. This is accomplished by combining the three overlays for scenic quality, sensitivity levels, and distance zones and using the guidelines shown in Table X-1 to assign the proper class. The end product is a visual resource inventory class overlay as shown in Map X-5. Inventory classes are informational in nature and provide the basis for considering visual values in the RMP process.

Table X-1. Visual Resource Inventory Matrix

		Visual Sensitivity Levels						
		High			***Medium***			***Low***
Special Areas		**I**	**I**	**I**	**I**	**I**	**I**	**I**
Scenic Quality	**A**	**II**	**II**	**II**	**II**	**II**	**II**	**II**
	B	**II**	**III**	**III*** / **IV***	**III**	**IV**	**IV**	**IV**
	C	**III**	**IV**	**IV**	**IV**	**IV**	**IV**	**IV**
		f/m	**b**	**s/s**	**f/m**	**b**	**s/s**	**s/s**
		Distance Zones						

Source: BLM 1986

Distance zones: f/m = foreground-middleground, b = background, s/s = seldom seen areas

*If adjacent area is Class III or lower, assign Class III, if higher, assign Class IV

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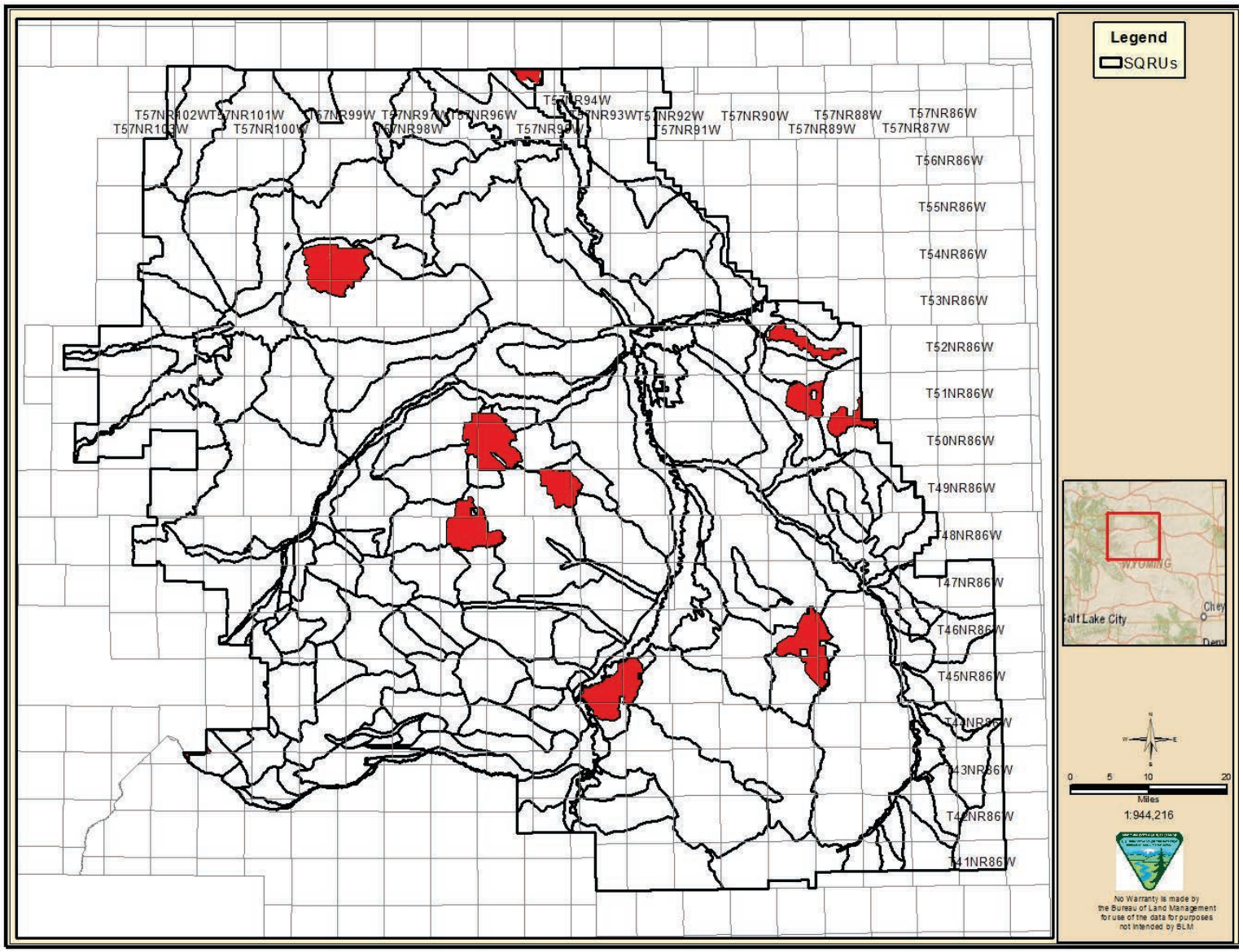
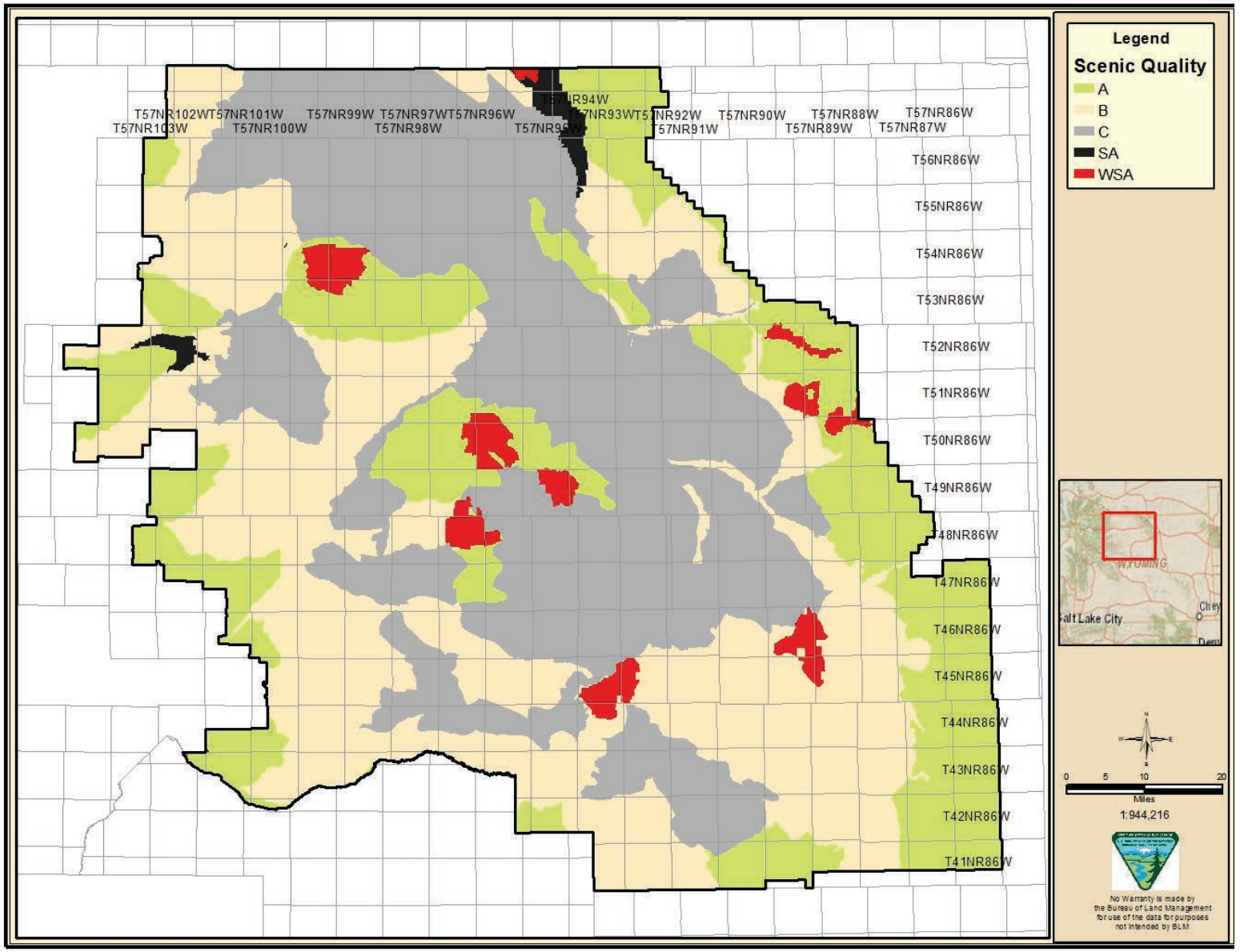
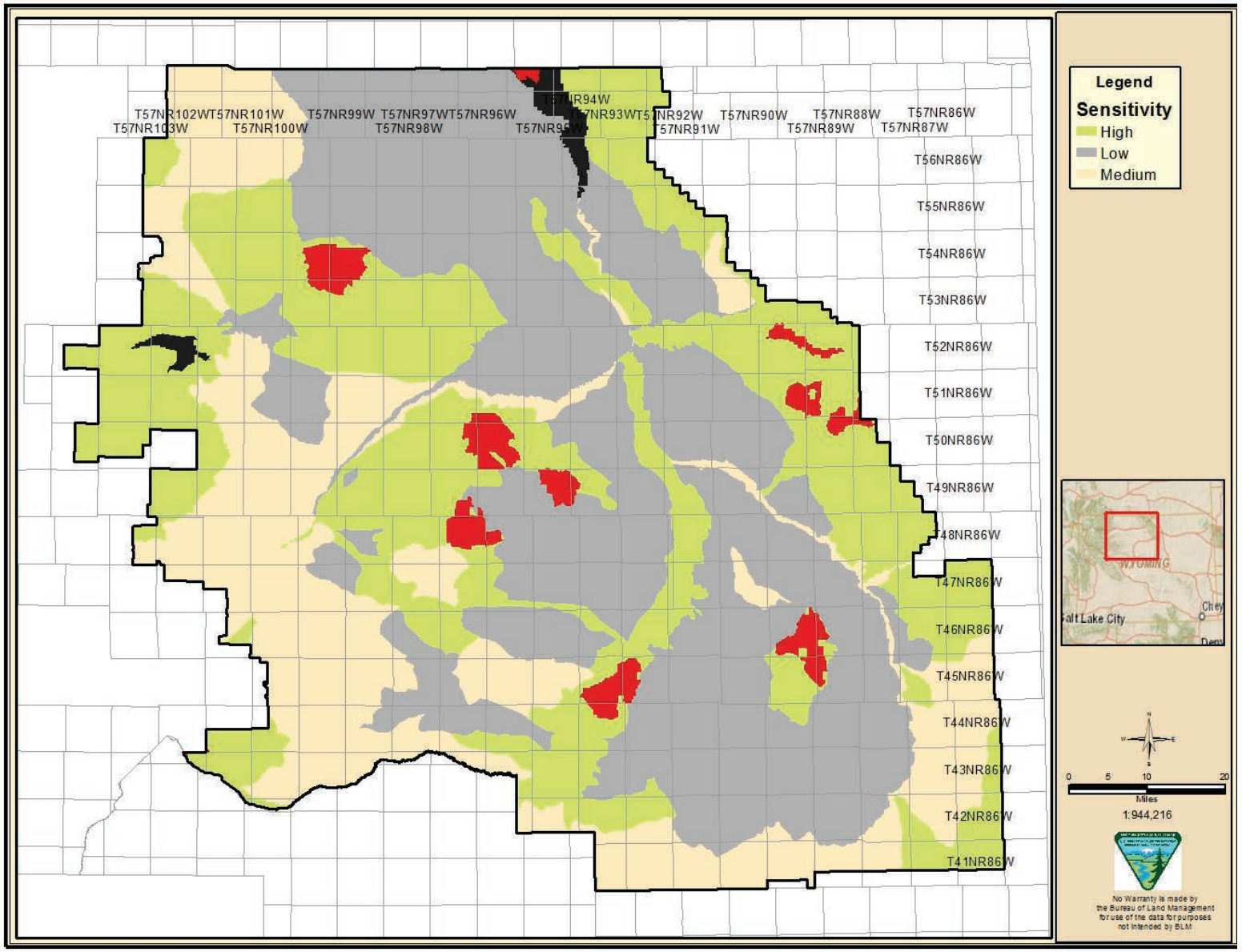
Map X-1. Scenic Quality Rating Units



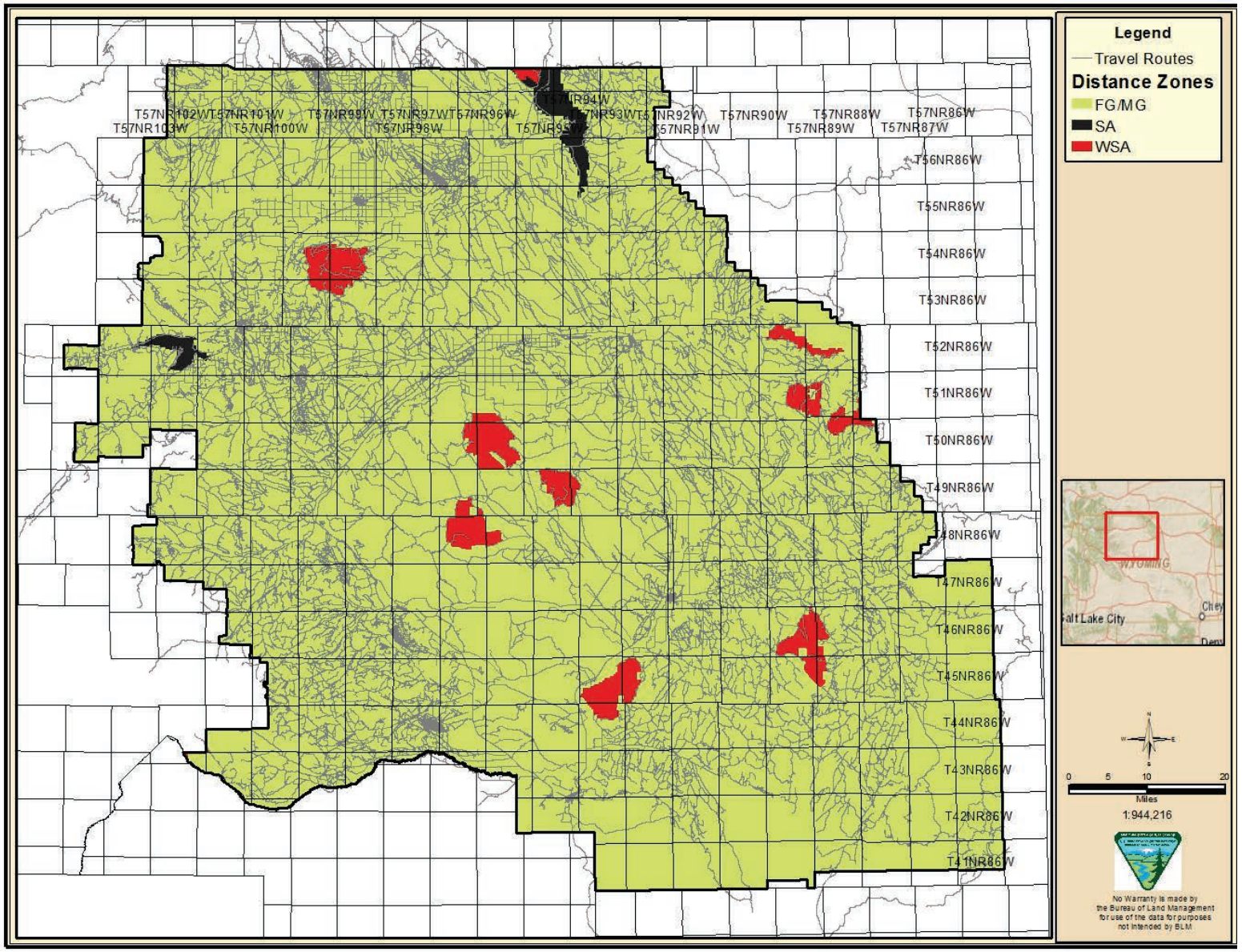
Map X-2. Scenic Quality Evaluation



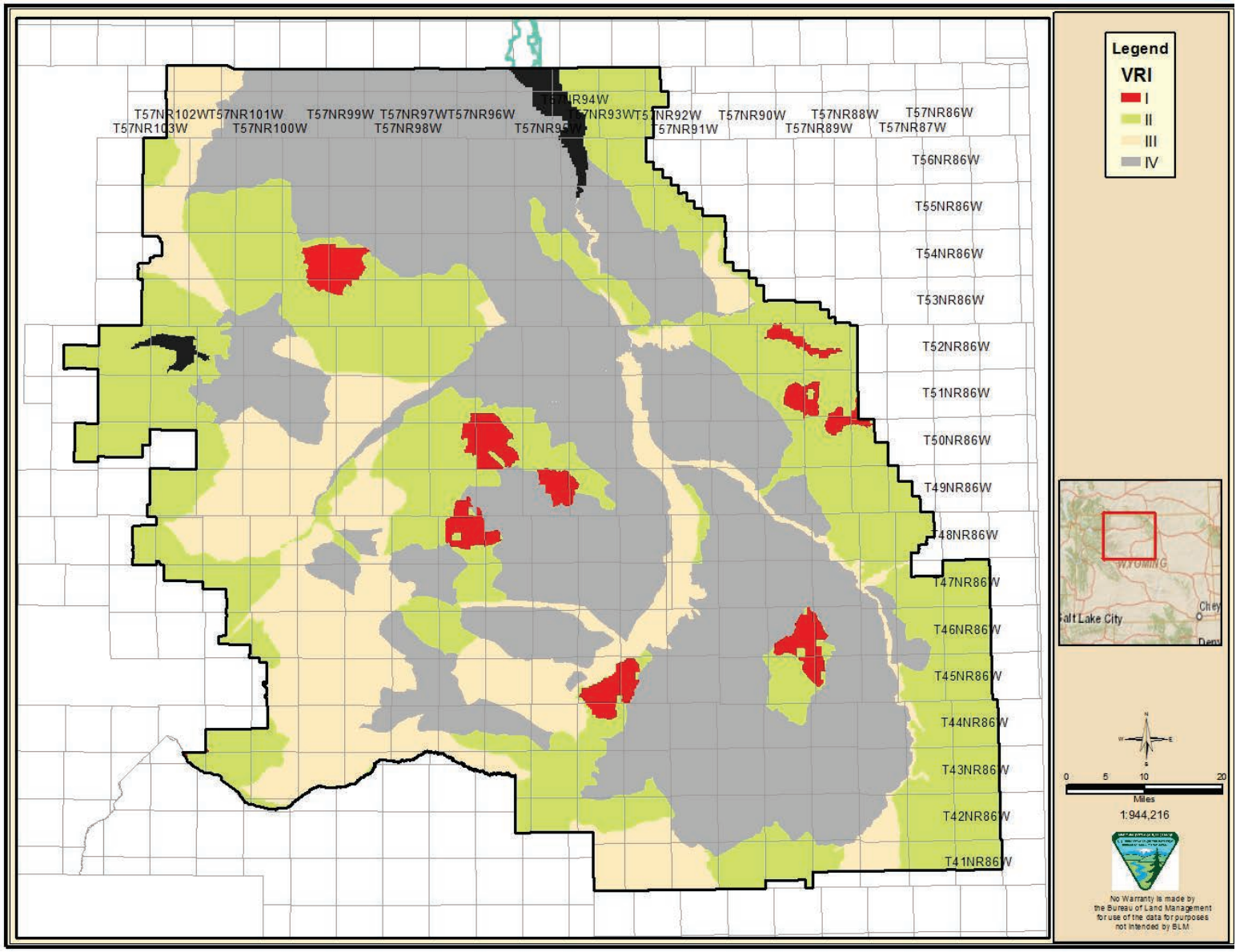
Map X-3. Sensitivity Levels



Map X-4. Distance Zones



Map X-5. Bighorn Basin Visual Resource Inventory



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Appendix Y

Greater Sage-Grouse Implementation Strategy

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APPENDIX Y

GREATER SAGE-GROUSE IMPLEMENTATION STRATEGY

1.0 INTRODUCTION

The Bighorn Basin Resource Management Plan (RMP) and Final EIS provides specific goals, objectives, management actions, and required design features for the conservation of greater sage-grouse in Wyoming. These are the commitments made to meet the federal agencies' national policy and direction for the conservation of greater sage-grouse in light of the 2010 U.S. Fish and Wildlife Service (USFWS) listing decision as warranted but precluded from listing under the Endangered Species Act. Through the National Planning Strategy, BLM and U.S. Forest Service (USFS) in coordination with USFWS have identified conservation measures to be included in the respective agencies' land use plans as the principal regulatory mechanisms to assure adequate conservation of the greater sage-grouse and its habitat on public lands.

The measures identified in this RMP have been developed in coordination with not just the USFWS, but also the State of Wyoming, including the Wyoming Game and Fish Department (WGFD), and local cooperating agencies including conservation districts and counties.

Wyoming has established Core Population Areas to help delineate landscape planning units by distinguishing areas of high biological value. These areas are based on the locations of breeding areas and are intended to help balance greater sage-grouse habitat requirements with demand for energy development (Doherty et al. 2011). The Proposed RMP is consistent with the Core Area Strategy, but contains additional restrictions to protect other resources, which results in added protections to greater sage-grouse habitat and achieving conservation objectives identified in the Conservation Objectives Team (COT) Report on BLM-managed public lands. The COT Report indicates that the Core Area Strategy is a substantial regulatory mechanism that contributes to the conservation of greater sage-grouse and balances the priorities of retaining a healthy greater sage-grouse population on the landscape and energy development.

This appendix will introduce the framework for implementation of greater sage-grouse conservation measures within the Cody and Worland Field Offices. Implementation is a combination of permitting activities under the auspices of management direction provided in the Land Use Plan (LUP), undertaking specific activities in pursuit of the goals and objectives identified in the plan and monitoring of sage brush habitat and populations.

The implementation framework outlined here is focused specifically towards greater sage-grouse and is reflective of how the national strategy will be assimilated into the existing statewide implementation efforts currently in place in Wyoming. This framework has been developed mindful of the varying scales at which implementation will be evaluated: at the local level to define successful conservation measures, at the state level to assess success of the statewide strategy, and across the species' range.

In 2013, the Director of U.S. Fish and Wildlife Service tasked staff with the development of range-wide conservation objectives for the sage-grouse to define the degree to which threats need to be reduced or ameliorated to conserve sage-grouse so that it is no longer in danger of extinction or likely to become in danger of extinction in the foreseeable future. Recognizing that state wildlife agencies have management expertise and management authority for sage-grouse, the FWS created a COT of state and USFWS representatives to accomplish this task.

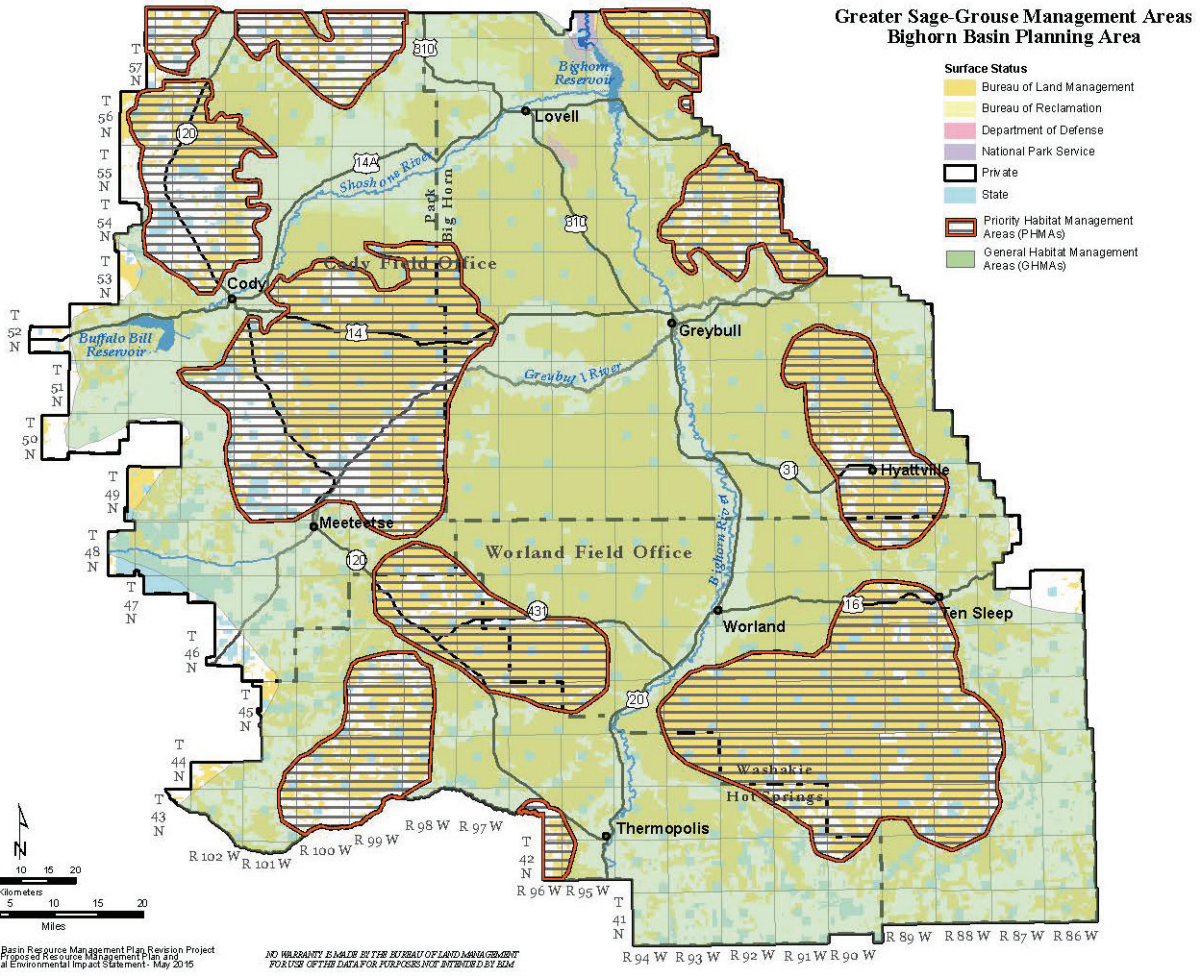
The COT conservation framework consisted of (1) identifying greater sage-grouse population and habitat status and threats, (2) defining a broad conservation goal, (3) identifying priority areas for conservation, and (4) developing specific conservation objectives and measures. The COT used three parameters—population and habitat representation, redundancy, and resilience (Shaffer and Stein 2010, Redford et al. 2011)—as guiding concepts in developing the conservation goal, priority areas for conservation, conservation objectives, and measures.

The COT report identified priority areas for greater sage-grouse population habitats as Priority Areas for Conservation or (PACs). PACs are recognized as key areas across the landscape that are necessary to maintain redundant, representative, and resilient populations" of the species. The COT Report describes maintaining the integrity of PACs as "the essential foundation for greater sage-grouse conservation." PACs cover nearly 73 million acres across the west; within the Bighorn Basin Planning Area, more than 1.1 million acres of BLM-administered surface are considered priority habitat (Table Y-1). Thirty-five percent of the priority habitat in the Planning Area is BLM-administered surface and twenty-six percent is BLM-administered minerals. Based upon 2007 lek counts, and the population data contained in the COT Report, the Bighorn Basin Planning Area contains an estimated two percent of the range-wide population of greater sage-grouse. Priority Habitat Management Areas (PHMAs) and General Habitat Management Areas (GHMAs) within the Planning Area are depicted in Figure Y-1.

Table Y-1. Greater Sage-Grouse Habitat within the Bighorn Basin Planning Area

Populations / Subpopulations: ***Wyoming Basin and Powder River Basin Populations*** ***WAFWA Management Zone I and II***		
Surface Estate	**Priority Habitat Acres (%)**	**General Habitat Acres (%)**
Private	505,850 (28)	1,327,877 (36)
State	151,591 (8)	244,045 (7)
BLM	1,115,076 (62)	2,034,027 (55)
Other	13,652 (1)	86,707 (2)
Total	**1,786,169**	**3,692,656**
Fluid Mineral Estate	**Priority Habitat Acres (%)**	**General Habitat Acres (%)**
Non-federal	360,032 (20)	1,099,993 (30)
BLM	1,426,137 (80)	2,592,663 (70)
Total	**1,786,169**	**3,692,656**

Figure Y-1. Priority Habitat Management Areas and General Habitat Management Areas within the Planning Area Bighorn Basin Planning Area



The conservation objectives identified in the COT Report, targeted at maintaining redundant, representative, and resilient greater sage-grouse habitats and populations, is the basis by which the greater sage-grouse elements of the Bighorn Basin Proposed RMP were developed. Due to the variability in ecological conditions and the nature of the threats across the range of the greater sage-grouse, developing detailed, prescriptive species or habitat actions was not attainable at the range-wide scale. Specific strategies and actions necessary to achieve the conservation objectives have been developed by BLM and USFS in cooperation with state and local governments to ensure implementation of activities to meet the objectives identified in the COT report.

2.0 COT OBJECTIVE 1: STOP POPULATION DECLINES AND HABITAT LOSS

"There is an urgent need to 'stop the bleeding' of continued population declines and habitat losses by acting immediately to eliminate or reduce the impacts contributing to population declines and range erosion. There are no populations within the range of sage-grouse that are immune to the threat of habitat loss and fragmentation." (COT Report 2013)

The COT Report identified a series of threats to greater sage-grouse habitat and the extent of those threats at the population scale. The management actions identified in the RMP were specifically designed to reduce the threats, as they were identified. The Wyoming 9-Plan RMP encompasses lands within WAFWA Management Zones 1 and 2. To ensure that the threats are adequately addressed by the RMP, a strategy for reviewing activities and projects on public lands to determine the extent of their impact on greater sage-grouse habitat has also been developed. The following outlines the process by which all activities on public lands will be reviewed.

The BLM will ensure that any activities or projects in greater sage-grouse habitats would: 1) only occur in compliance with Bighorn Basin RMP greater sage-grouse goals and objectives for priority management areas; and 2) maintain neutral or positive greater sage-grouse population trends and habitat by avoiding, minimizing, and offsetting unavoidable impacts to assure a conservation gain at the scale of this land use plan and within greater sage-grouse population areas, state boundaries, and WAFWA Management Zones through the application of mitigation for implementation-level decisions. The mitigation process will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g., avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy, while also following Secretary of the Interior Order 3330 and consulting BLM, USFWS and other current and appropriate mitigation guidance. If it is determined that residual impacts to greater sage-grouse from implementation-level actions would remain after applying avoidance and minimization measures to the extent possible, then compensatory mitigation projects will be used to offset residual impacts, or the project may be deferred or denied if necessary to achieve the goals and objectives for priority and general management areas in the Bighorn Basin RMP.

To ensure that impacts from activities proposed in greater sage-grouse PHMAs are appropriately approved and mitigated as necessary, the BLM will apply mitigation measures and conservation actions and potentially modify the location, design, construction, and/or operation of proposed land uses or activities to comply with statutory requirements for environmental protection. The mitigation measures and conservation actions (Appendix L) for proposed projects or activities in these areas will be identified as part of the National Environmental Policy Act (NEPA) environmental review process, through interdisciplinary analysis involving resource specialists, project proponents, government entities, landowners or other Surface Management Agencies. Those measures selected for implementation will be identified in the Record of Decision (ROD) or Decision Record (DR) for those authorizations and will inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered public lands and minerals to mitigate, per the mitigation hierarchy referenced above, impacts from the activity or project such that greater sage-grouse goals and objectives are met. Because these actions create a clear obligation for the BLM to ensure any proposed mitigation action adopted in the environmental review process is performed, there is assurance that mitigation will lead to a reduction of environmental impacts in the implementation stage and include binding mechanisms for enforcement (CEQ Memorandum for Heads of Federal Departments and Agencies 2011).

To achieve the goals and objectives for PHMAs in the Bighorn Basin Planning Area, the BLM will assess all proposed land uses or activities such as road, pipeline, communication tower, or powerline construction,

fluid and solid mineral development, range improvements, and recreational activities proposed for location in PHMAs in a step-wise manner. The following steps identify a screening process for review of proposed activities or projects in these areas (Table Y-2). This process will provide a consistent approach and ensure that authorization of these projects, if granted, will appropriately mitigate impacts and be consistent with the RMP goals and objectives for greater sage-grouse. The following steps provide for a sequential screening of proposals.

Table Y-2. Implementation of RMP Decisions to Address COT Threats

COT Threat	Threat Extent	Program Area	RMP Decision	Implementation Process	Tracking Mechanism
Sagebrush Elimination	Present but Localized (MZ1) Present but Localized (Wyoming Basin Population)	Vegetation Management Wildland Fire Management			
Weeds/ Annual Grasses	Present but Localized (MZ1) Present but Localized (Wyoming Basin Population)	Vegetation Management Range Management Wildland Fire Management Recreation			
Energy	Present and Widespread (MZ1) Present and Widespread (Wyoming Basin Population)	Lands and Realty Fluid Minerals			
Fire	Present but Localized (MZ1) Present but Localized (Wyoming Basin Population)	Wildland Fire Management			
Grazing Range Management Structures	Present and Widespread (MZ1) Present and Widespread (Wyoming Basin Population)	Range Management Wild Horse and Burro Management Special Status Species Vegetation Management			
Free-Roaming Equids	Not Present (MZ1) Present but Localized (Wyoming Basin Population)	Wild Horse and Burro Management			
Conifer Encroachment	Present but Localized (MZ1) Present but Localized (Wyoming Basin Population)	Wildland Fire Management Vegetation Management			
Agriculture and Urbanization	Present but Localized (MZ1) Present but Localized (Wyoming Basin Population)	Lands and Realty			

Table Y-2. Implementation of RMP Decisions to Address COT Threats (Continued)

COT Threat	Threat Extent	Program Area	RMP Decision	Implementation Process	Tracking Mechanism
Mining	Present and Widespread (MZ1) Present but Localized (Wyoming Basin Population)	Lands and Realty Locatable Minerals Salable Minerals Non-energy Leasable Minerals Management			
Recreation	Present and Widespread (MZ1) Present and Widespread (Wyoming Basin Population)	Recreation Trails and Travel Management			
Infrastructure	Present and Widespread (MZ1) Present and Widespread (Wyoming Basin Population)	Lands and Realty Trails and Travel Management			

Step 1 – Determine Proposal Adequacy

This screening process is initiated upon formal submittal of a proposal for authorization for use of BLM/USFS lands. The actual documentation of the proposal would include at a minimum a description of the location, scale of the project and timing of the disturbance. The acceptance of the proposal(s) for review would be consistent with existing protocol and procedures for each type of use. Evaluating consistency with (at a minimum) state greater sage-grouse regulations.

Step 2 – Evaluate Proposal Consistency with LUP

Step 2.1 – The proposal will be reviewed to determine whether it would be allowed as prescribed in the Land Use Plan. For example, some activities or types of development are prohibited in greater sage-grouse habitat, such as wind developments in Priority Habitat. Evaluation of projects will also include an assessment of the current state of the Adaptive Management hard and soft triggers. If the proposal is for an activity that is specifically prohibited, the applicant should be informed that the application is being rejected since it would not be allowed, regardless of the design of the project.

Step 2.2 – The proposal will be reviewed to determine whether it conforms with the Density and Disturbance Limitations. If the proposed activity occurs within a PHMA, evaluate whether the disturbance from the activity exceeds the limit on the amount of disturbance allowed within the activity or project area (Density/Disturbance Calculation Tool [DDCT] process). If current disturbance within the activity area or the anticipated disturbance from the proposed activity exceeds this threshold, the project would be deferred until such time as the amount of disturbance within the area has been reduced below the threshold, redesigned so as to not result in any additional surface disturbance (collocation) or redesigned to move it outside of PHMA. Should the project be a result of a valid existing right, BLM will work to minimize the disturbance and determine any residual impacts that may require appropriate mitigation.

The maximum density of disruptive activities and surface disturbance allowed will be analyzed via the DDCT, and will be conducted by the Federal Land Management Agency on federal land and the project proponent on non-federal (private, state) land per the RMP 9 revision.

State Agency Permit is needed, without a need for a federal permit:

The first point of contact for addressing greater sage-grouse issues for any state permit application should be the WGFD. Project proponents (proponents) need to have a thorough description of their project and identify the potential effects on greater sage-grouse prior to submitting an application to the permitting agency. Project proponents should contact WGFD at least 45-60 days prior to submitting their application. More complex projects will require more time. It is understood that WGFD has a role of consultation, recommendation, and facilitation, and has no authority to either approve or deny the project. The purpose of the initial consultation with the WGFD is to become familiar with the project proposal and ensure the project proponent understands the DDCT and recommended stipulations.

Federal Agency Permit is needed, with or without a State permit:

When a project requires federal action prior to approval, the proponent should contact the federal agency responsible for reviewing the action. The federal agency and the proponent will determine the best process for completing the DDCT and receiving recommendations from WGFD. Project proponents (proponents) need to have a thorough description of their project and identify the potential effects on greater sage-grouse prior to submitting an application to the permitting agency.

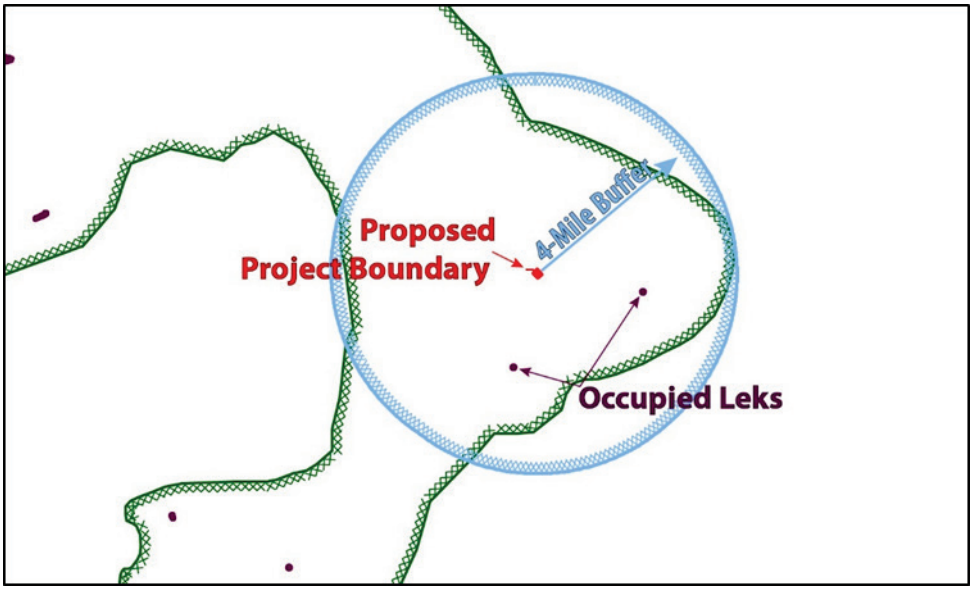
Maximum Density and Disturbance Process

Density and Disturbance Calculation: The DDCT is a spatially based tool that calculates both the average density of disruptive activities and total surface disturbance within the area affected by the project, or DDCT assessment area. The DDCT assessment area is created based on buffers around proposed projects (first buffer) in protected greater sage-grouse PHMAs, and subsequent buffers around any occupied, PHMA leks within the first buffer. A 4-mile buffer is used to identify 75% of the greater sage-grouse use around a lek. All activities will be evaluated within the context of maximum allowable disturbance (disturbance percentages, location and number of disturbances) of suitable greater sage-grouse habitat (see Appendix 1 for definition of suitable greater sage-grouse habitat and disturbance of suitable greater sage-grouse habitat) within the DDCT assessment area. This tool allows for better siting of projects rather than averaging the density/disturbance calculation per section.

All lands within PHMA boundaries are is considered suitable habitat unless documented. Mapped unsuitable habitat is treated neither as suitable habitat, nor disturbance, which results in the area being removed from the DDCT assessment area altogether.

1. Density/Disturbance Calculation Tool: Determine all occupied leks within PHMAs that may be affected by the project by placing a 4 mile boundary around the project boundary (as defined by the proposed area of disturbance related to the project). All occupied leks located within the 4 mile boundary and within PHMAs will be considered in this assessment (Figure Y-2).

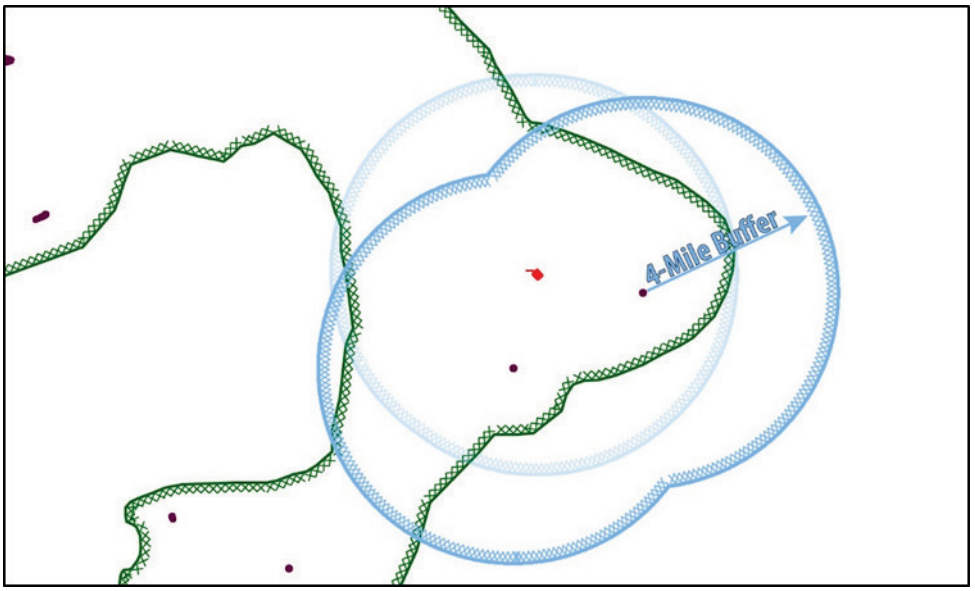
Figure Y-2. Proposed Project Boundary



A 4-mile boundary will then be placed around the perimeter of each of these lek(s) (Figure Y-2).

The PHMAs within the combined 4-mile buffer around both the leks and the project boundary creates the DDCT assessment area for each individual project (Figure Y-3).

Figure Y-3. DDCT Assessment Area



Disturbance will be analyzed for the DDCT assessment area as a whole and for each individual lek within the DDCT assessment area (Figures Y-4 through Y-7).

Figure Y-4. DDCT Assessment Area – Existing Disturbance

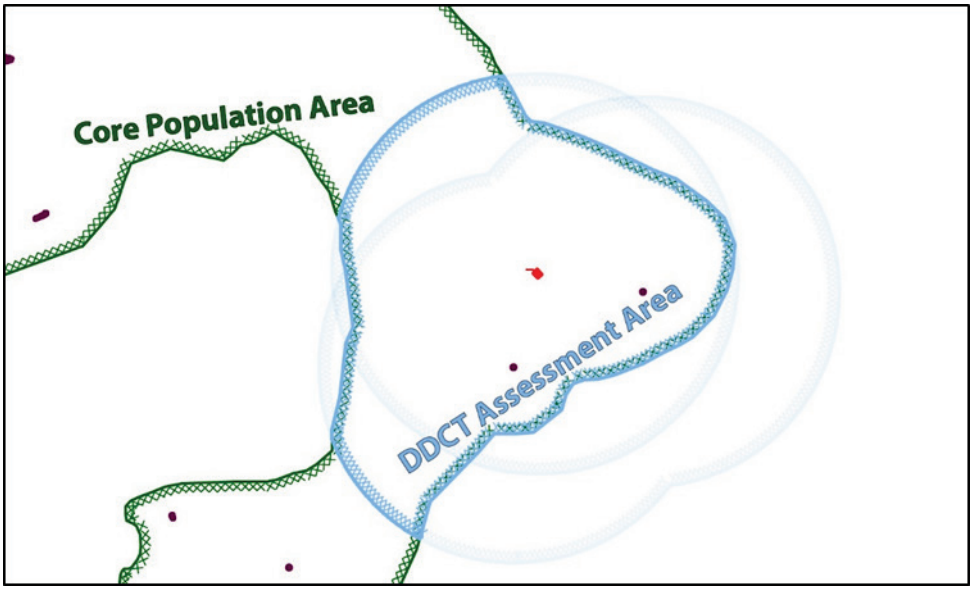


Figure Y-5. DDCT Assessment Area – Existing Disturbance (cont.)

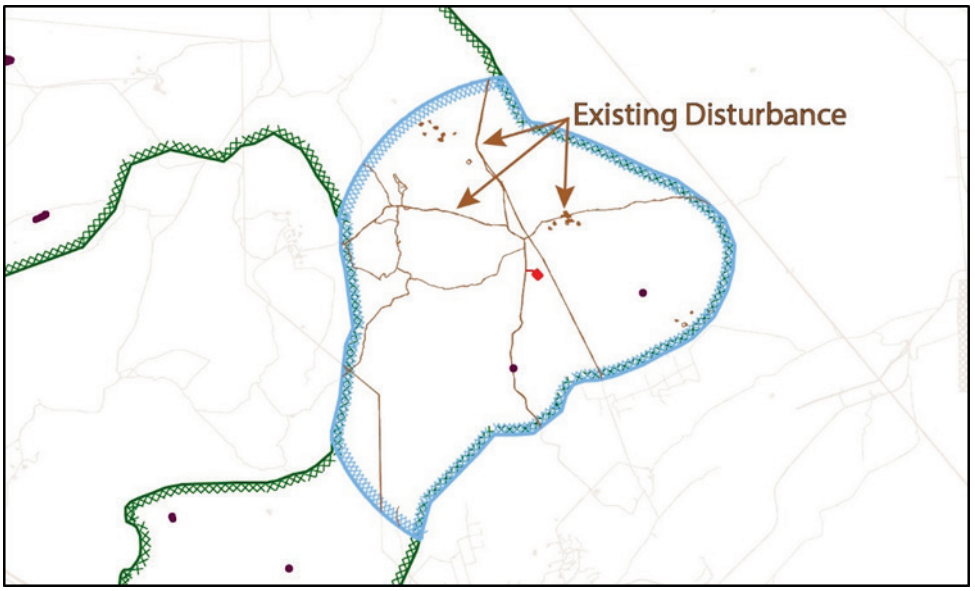


Figure Y-6. DDCT Assessment Area – Existing Disturbance with Buffer

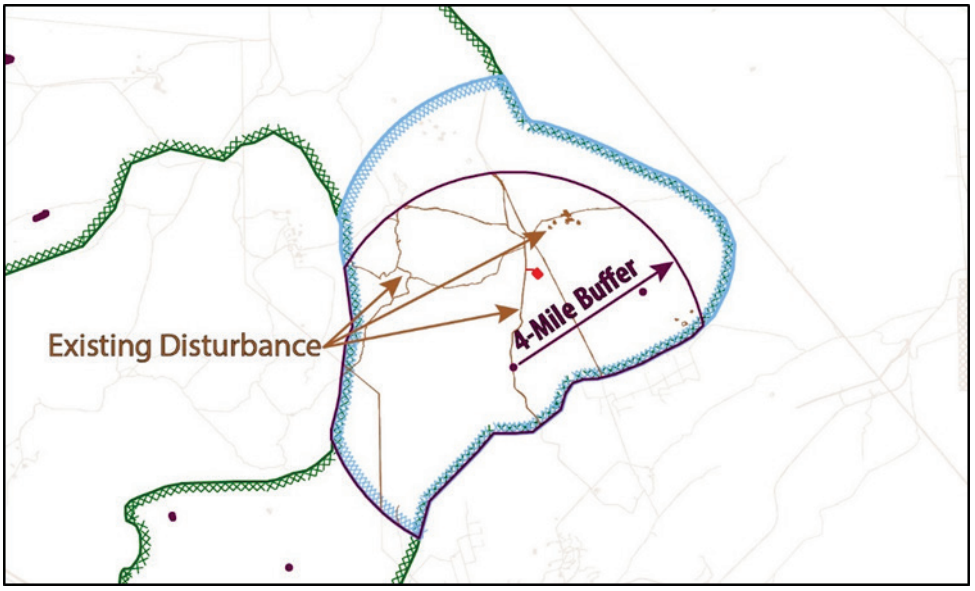
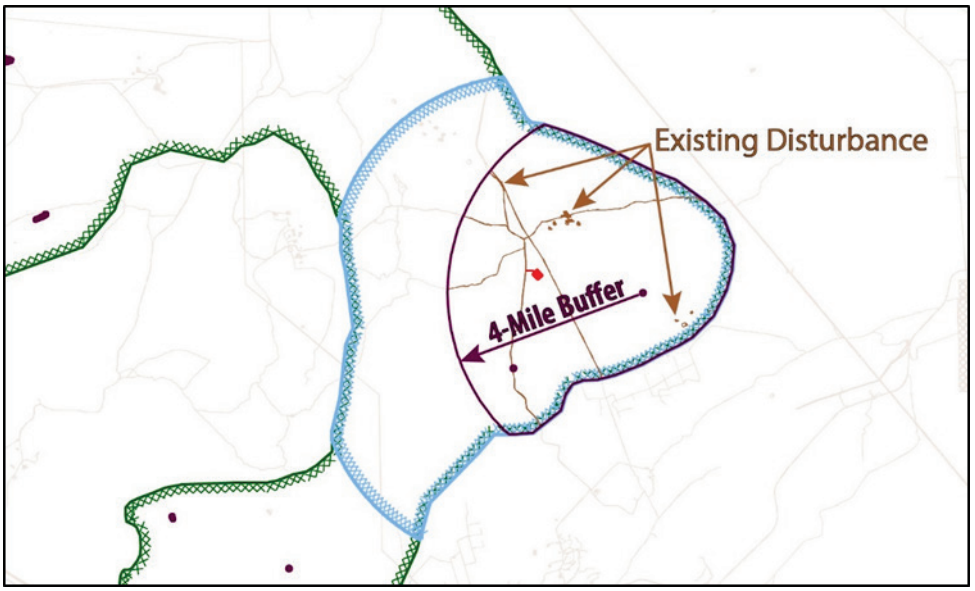


Figure Y-7. DDCT Assessment Area – Existing Disturbance with Buffer (cont.)



Density of disruptive features will be analyzed for the DDCT assessment area as a whole and for each individual lek within the DDCT assessment area Figures Y-8 through Y-10).

Figure Y-8. DDCT Assessment Area – Existing Disruptive Features

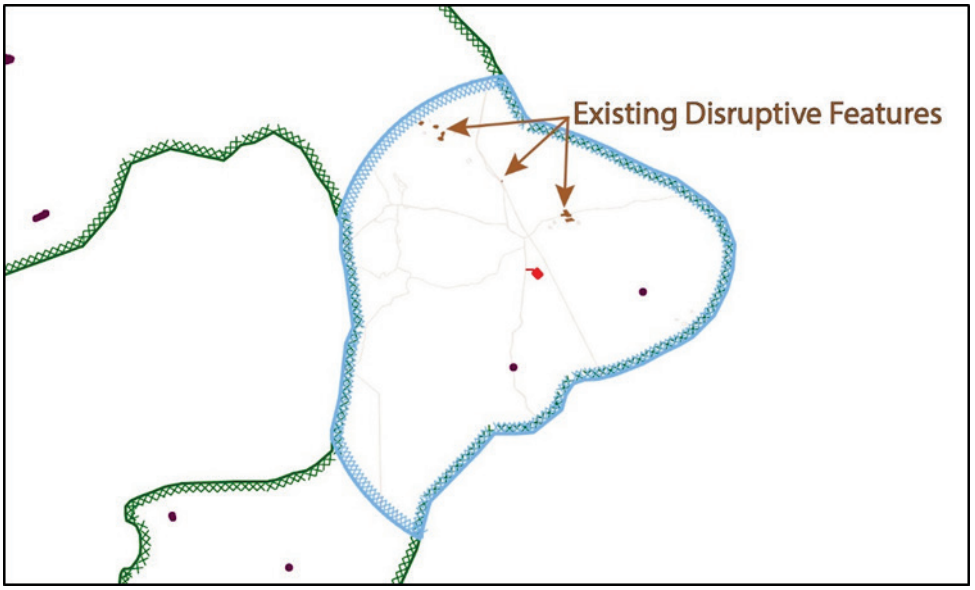


Figure Y-9. DDCT Assessment Area – Existing Disruptive Features Buffer

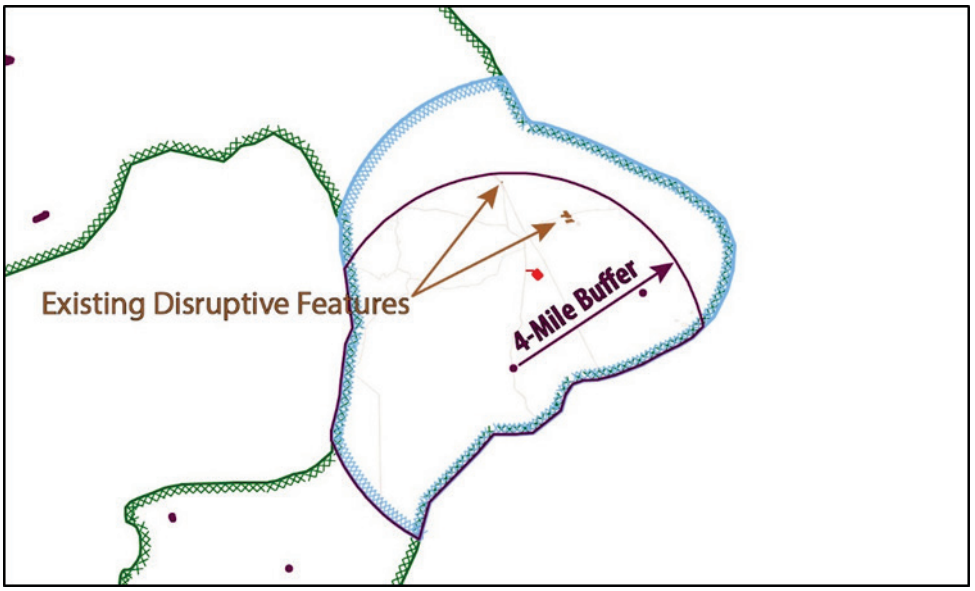
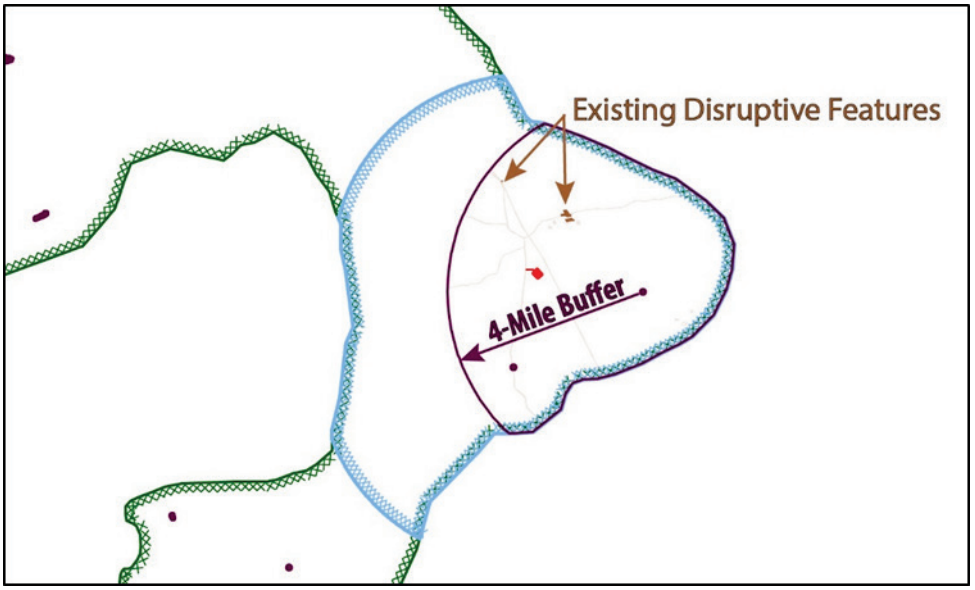


Figure Y-10. DDCT Assessment Area – Existing Disruptive Features Buffer (cont.)



If there are no leks identified for this assessment within the 4-mile boundary around the project boundary, the DDCT assessment area will be that portion of the 4-mile project boundary within the PHMAs.

2. Density and Disturbance analysis: The total number of discrete disruptive activity features, as well as the total disturbance acres within the DDCT assessment area will be determined through an evaluation of:

    a. Existing disturbance (greater sage-grouse habitat that is disturbed due to existing anthropogenic activity and wildfire);

    b. Approved permits (that have approval for on the ground activity) not yet implemented; and

    c. Validating digitized disturbance through on the ground evaluation.

The complete analysis package (DDCT results, mapbook, and Worksheet), and recommendations developed by consultation and review outlined herein will be forwarded to the appropriate permitting agency(s). WGFD recommendations will be included, as will other recommendations from project proponents and other appropriate agencies. Project proponent shall have access to all information used in developing recommendations. Where possible and when requested by the project proponent, State agencies shall provide the project proponent with potential development alternatives other than those contained in the project proposal.

If the permit for which a proponent has applied expires, another DDCT analysis is required before issuing a new permit. An additional DDCT is not required for Permit extensions or renewals when no changes are being authorized. Any project will need to comply with the current Executive Order.

Step 2.3 – The BLM/USFS's goal for any new activity or development proposal within PHMAs is to provide consistent implementation of project proposals which meet the BLM's LUP goals and the population management objectives of the State. Activities would be consistent with the strategy where it can be sufficiently demonstrated that no declines to PHMA populations would be expected as a result of the proposed action. Published research suggests that impacts to greater sage-grouse leks associated primarily with infrastructure and energy development are discernible at a distance of at least 4 miles and that many leks within this radius have been extirpated as a direct result of development (Walker et al. 2007, Walker 2008). Research also suggests that an evaluation of habitats and greater sage-grouse populations that attend leks within an 11-mile radius from the project boundary in the context of "large" projects may be appropriate in order to consider all seasonal habitats that may be affected for birds that use the habitats associated with the proposal during some portion of the life-cycle of seasonally migratory greater sage-grouse (Connelly et al. 2000).

To determine the manner in which greater sage-grouse may be impacted by proposed undertakings, the following will be reviewed in the site specific NEPA analysis to quantify the effects:

- Greater Sage-Grouse Habitat delineation maps.
- Current science recommendations.
- The 'Base Line Environment Report' (USGS) which identifies areas of direct and indirect effect for various anthropogenic activities.
- Consultation with agency or State Wildlife Agency biologist.
- Other methods needed to provide an accurate assessment of impacts.

If the proposal will not have a direct or indirect impact on either the habitat or population, document the findings in the NEPA and proceed with the appropriate process for review, decision and implementation of the project.

Step 3 – Apply Avoidance and Minimization Measures to Comply with Sage-Grouse Goals and Objectives

If the project can be relocated so as to not have an impact on greater sage-grouse and still achieve objectives of the proposal and the disturbance limitations, relocate the proposed activity and proceed with the appropriate process for review, decision and implementation (NEPA and Decision Record). This Step does not consider redesign of the project to reduce or eliminate direct and indirect impacts, but rather authorization of the project in a physical location that will not impact greater sage-grouse. If the preliminary review of the proposal concludes that there may be adverse impacts to greater sage-grouse habitat or populations in Step 2 and the project cannot be effectively relocated to avoid these impacts, proceed with the appropriate process for review, decision and implementation (NEPA and Decision Record) with the inclusion of appropriate mitigation requirements to further reduce or eliminate impacts to greater sage-grouse habitat and populations and achieve compliance with greater sage-grouse objectives. Mitigation measures could include design modifications of the proposal, site disturbance restoration, post-project reclamation, etc. (see Appendix L). Compensatory or offsite mitigation may be required (Step 4) in situations where residual impacts remain after application of all avoidance and minimization measures.

Step 4 – Apply Compensatory Mitigation or Reject/Defer Proposal

If screening of the proposal has determined that direct and indirect impacts cannot be eliminated through avoidance or minimization, evaluate the proposal to determine if compensatory mitigation can be used to offset the remaining adverse impacts and achieve greater sage-grouse goals and objectives. If the impacts cannot be effectively mitigated, reject or defer the proposal. The criteria for determining this situation could include but are not limited to:

- The current trend within the Priority Habitat is down and additional impacts, whether mitigated or not, could lead to further decline of the species or habitat.
- The proposed mitigation is inadequate in scope or duration, has proven to be ineffective or is unproven is terms of science based approach.
- The project would impact habitat that has been determined to be a limiting factor for species sustainability.
- Other site specific information and analysis that determined the project would lead to a downward change of the current species population or habitat and not comply with greater sage-grouse goals and objectives.

If, following application of available impact avoidance and minimization measures, the project can be mitigated to fully offset impacts and assure conservation gain to the species and comply with greater sage-grouse goals and objectives, proceed with the appropriate process for review, decision and implementation (NEPA and Decision Record).

Mitigation

General

In undertaking BLM/USFS management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM/USFS will require and assure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by

avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR 1508.20; e.g., avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy. If impacts from BLM/USFS management actions and authorized third party actions that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation (see Glossary).

The BLM/USFS, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision making process including the application of the mitigation hierarchy for BLM/USFS management actions and third party actions that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to greater sage-grouse habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to greater sage-grouse and its habitat.

The BLM's Regional Mitigation Manual MS-1794 serves as a framework for developing and implementing a Regional Mitigation Strategy. The following sections provide additional guidance specific to the development and implementation of a WAFWA Management Zone Regional Mitigation Strategy.

Developing a WAFWA Management Zone Regional Mitigation Strategy

The BLM/USFS, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy to guide the application of the mitigation hierarchy for BLM/USFS management actions and third party actions that result in habitat loss and degradation. The Strategy should consider any State-level greater sage-grouse mitigation guidance that is consistent with the requirements identified in this Appendix. The Regional Mitigation Strategy should be developed in a transparent manner, based on the best science available and standardized metrics.

As described in Chapter 2, the BLM/USFS will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of greater sage-grouse, within 90 days of the issuance of the Record of Decision. The Strategy will be developed within one year of the issuance of the Record of Decision.

The Regional Mitigation Strategy should include mitigation guidance on avoidance, minimization, and compensation, as follows:

- Avoidance
  - Include avoidance areas (e.g., right-of-way avoidance/exclusion areas, no surface occupancy areas) already included in laws, regulations, policies, and/or land use plans (e.g., Resource Management Plans, Forest Plans, State Plans); and,
  - Include any potential, additional avoidance actions (e.g., additional avoidance best management practices) with regard to greater sage-grouse conservation.
- Minimization
  - Include minimization actions (e.g., required design features, best management practices) already included in laws, regulations, policies, land use plans, and/or land-use authorizations; and,
  - Include any potential, additional minimization actions (e.g., additional minimization best management practices) with regard to greater sage-grouse conservation.

- Compensation
  - Include discussion of impact/project valuation, compensatory mitigation options, siting, compensatory project types and costs, monitoring, reporting, and program administration. Each of these topics is discussed in more detail below.
    - Residual Impact and Compensatory Mitigation Project Valuation Guidance
    - A common standardized method should be identified for estimating the value of the residual impacts and value of the compensatory mitigation projects, including accounting for any uncertainty associated with the effectiveness of the projects.
    - This method should consider the quality of habitat, scarcity of the habitat, and the size of the impact/project.
    - For compensatory mitigation projects, consideration of durability (see glossary), timeliness (see glossary), and the potential for failure (e.g., uncertainty associated with effectiveness) may require an upward adjustment of the valuation.
    - The resultant compensatory mitigation project will, after application of the above guidance, result in proactive conservation measures for greater sage-grouse (consistent with BLM Manual 6840 – Special Status Species Management, section .02).
- Compensatory Mitigation Options
  - Options for implementing compensatory mitigation should be identified, such as:
    - Utilizing certified mitigation/conservation bank or credit exchanges.
    - Contributing to an existing mitigation/conservation fund.
- Compensatory Mitigation Siting
  - Sites should be in areas that have the potential to yield a net conservation gain to the greater sage-grouse, regardless of land ownership.
  - Sites should be durable (see glossary).
  - Sites identified by existing plans and strategies (e.g., fire restoration plans, invasive species strategies, healthy land focal areas) should be considered, if those sites have the potential to yield a net conservation gain to greater sage-grouse and are durable.
- Compensatory Mitigation Project Types and Costs
  - Project types should be identified that help reduce threats to greater sage-grouse (e.g., protection, conservation, and restoration projects).
  - Each project type should have a goal and measurable objectives.
  - Each project type should have associated monitoring and maintenance requirements, for the duration of the impact.
  - To inform contributions to a mitigation/conservation fund, expected costs for these project types (and their monitoring and maintenance), within the WAFWA Management Zone, should be identified.
- Compensatory Mitigation Compliance and Monitoring
  - Mitigation projects should be inspected to ensure they are implemented as designed, and if not, there should be methods to enforce compliance.
  - Mitigation projects should be monitored to ensure that the goals and objectives are met and that the benefits are effective for the duration of the impact.

- Compensatory Mitigation Reporting
  - Standardized, transparent, scalable, and scientifically-defensible reporting requirements should be identified for mitigation projects.
  - Reports should be compiled, summarized, and reviewed in the WAFWA Management Zone in order to determine if greater sage-grouse conservation has been achieved and/or to support adaptive management recommendations.
- Compensatory Mitigation Program Implementation Guidelines
  - Guidelines for implementing the State-level compensatory mitigation program should include holding and applying compensatory mitigation funds, operating a transparent and credible accounting system, certifying mitigation credits, and managing reporting requirements.

Incorporating the Regional Mitigation Strategy into NEPA Analyses

The BLM/USFS will include the avoidance, minimization, and compensatory recommendations from the Regional Mitigation Strategy in one or more of the NEPA analysis' alternatives for BLM/USFS management actions and third party actions that result in habitat loss and degradation and the appropriate mitigation actions will be carried forward into the decision.

Implementing a Compensatory Mitigation Program

The BLM/USFS need to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. In order to align with existing compensatory mitigation efforts, this compensatory mitigation program will be managed at a State-level (as opposed to a WAFWA Management Zone, a Field Office, or a Forest), in collaboration with our partners (e.g., Federal, Tribal, and State agencies).

To ensure transparent and effective management of the compensatory mitigation funds, the BLM/USFS will enter into a contract or agreement with a third-party to help manage the State-level compensatory mitigation funds, within one year of the issuance of the Record of Decision. The selection of the third-party compensatory mitigation administrator will conform to all relevant laws, regulations, and policies. The BLM/USFS will remain responsible for making decisions that affect Federal lands.

3.0 COT OBJECTIVE 2: IMPLEMENT TARGETED HABITAT MANAGEMENT AND RESTORATION

> *"Some sage-grouse populations warrant more than the amelioration of the impacts from stressors to maintain sage-grouse on the landscape. In these instances, and particularly with impacts resulting from wildfire, it may be critical to not only remove or reduce anthropogenic threats to these populations but additionally to improve population health through active habitat management (e.g., habitat restoration). This is particularly important for those populations that are essential to maintaining range-wide redundancy and representation." (COT Report, 2013)*

In many areas of Wyoming, amelioration of threats isn't enough. Activities must be taken to enhance the habitat for continued success of greater sage-grouse. This objective identifies the areas where RMPs will put forth the commitments for habitat restoration and enhancement.

The Wyoming Game and Fish Department established local greater sage-grouse working groups over 10 years ago. Each of these local working groups developed conservation plans which have served to guide conservation of greater sage-grouse habitat at a local level. The management objectives for this federal

land use plan were developed in coordination with the State of Wyoming, recognizing the ongoing work which has been done over the last 10 years in Wyoming as a result of the conservation efforts identified by each of the local working groups.

Upon completion of the planning process, with issuance of an Approved Plan and Record of Decision, subsequent implementation decisions will be put into effect by developing implementation (activity-level or project-specific) plans. These implementation decisions will be based upon the objectives identified in the Approved Plan and Record of Decisions, and will be coordinated with local working groups.

4.0 COT OBJECTIVE 3: DEVELOP AND IMPLEMENT STATE AND FEDERAL CONSERVATION STRATEGIES AND ASSOCIATED INCENTIVE-BASED CONSERVATION ACTIONS AND REGULATORY MECHANISMS

"To conserve sage-grouse and habitat redundancy, representation, and resilience, state and federal agencies, along with interested stakeholders within range of the sage-grouse should work together to develop a plan, including any necessary regulatory or legal tools (or use an existing plan, if appropriate) that includes clear mechanisms for addressing the threats to sage-grouse within PACs. Where consistent with state conservation plans, sage grouse habitats outside of PACs should also be addressed. We recognize that threats can be ameliorated through a variety of tools within the purview of states and federal agencies, including incentive-based conservation actions or regulatory mechanisms. Federal land management agencies should work with states in developing adequate regulatory mechanisms. Federal land management agencies should also contribute to the incentive-based conservation and habitat restoration and rehabilitation efforts. In the development of conservation plans, entities (states, federal land management agencies, etc.) should coordinate with FWS. This will ensure that the plans address the threats contributing to the 2010 warranted but precluded determination, and that conservation strategies will meaningfully contribute to future listing analyses." (COT Report, 2013)

4.1 Implementation Working Groups

National Level

In December 2011, Wyoming Governor Matt Mead and Secretary of the Interior Ken Salazar co-hosted a meeting to address coordinated conservation of the greater sage-grouse across its range. Ten states within the range of the greater sage-grouse were represented, as were the U.S. Forest Service (FS), the Natural Resources Conservation Service (NRCS), and the Department of the Interior (DOI) — including representatives from the DOI's Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (FWS). The primary outcome of the meeting was the creation of a Sage-Grouse Task Force (Task Force) chaired by Governors Mead (WY) and Hickenlooper (CO) and the Director of the BLM. The Task Force was directed to develop recommendations on how to best advance a coordinated, multi-state, range-wide effort to conserve the greater sage-grouse, including the identification of conservation objectives to ensure the long-term viability of the species.

Regional Level

Regional Level Teams (Sage Grouse Implementation Group)

State Level

The Sage Grouse Implementation Team (SGIT) has been established through Wyoming Legislature (Wyoming Statute 9-19-101(a)) to review data and make recommendations to the Governor of Wyoming regarding actions and funding to enhance and restore greater sage-grouse habitats in Wyoming. Additionally, the SGIT is responsible for making recommendations to the Governor regarding regulatory actions necessary to maintain greater sage-grouse populations and greater sage-grouse habitats.

Adaptive Management Working Group has been established in consultation with the SGIT to provide appropriate guidance for agencies with the ability to affect greater sage-grouse populations and/or habitat through their permitting authority. The AMWG includes BLM, FS, FWS, and State of Wyoming.

Local Level

In 2000, a Local Working Group was established by the Wyoming Game and Fish Department to develop and facilitate implementation of local conservation plans for the benefit of greater sage-grouse, their habitats, and whenever feasible, other species that use sagebrush habitats. This group prepared the Wyoming Greater Sage-grouse Conservation Plan (Wyoming Sage-Grouse Working Group 2003) to provide coordinated management and direction across the state. In 2004, local greater sage-grouse working groups were formed to develop and implement local conservation plans. Eight local working groups around Wyoming have completed conservation plans, many of which prioritize addressing past, present, and reasonably foreseeable threats at the state and local levels, and prescribe management actions for private landowners to improve greater sage-grouse conservation at the local scale, consistent with Wyoming's Core Population Area Strategy.

4.2 Implementation Tracking

Because the State of Wyoming continues to retain management of the species, and through implementation of the Executive Order, BLM Wyoming will continue to coordinate tracking of populations, disturbance and conservation actions.

- DDCT GIS for tracking disturbance
- Population Counts
- Lek counts
- Conservation Actions

In addition to the tracking databases being maintained by the State of Wyoming, a national- Greater Sage-grouse Land Use Plan Decision Monitoring and Reporting Tool is being developed to describe how the BLM and the USFS will consistently and systematically monitor and report implementation-level activity plans and implementation actions for all plans within the range of greater sage-grouse. A description of this tool for collection and reporting of tabular and spatially explicit data will be included in the ROD or approved plan. The BLM and the USFS will provide data that can be integrated with other conservation efforts conducted by state and federal partners.

4.3 Public Involvement

A website where the public can quickly and easily access data concerning implementation will be developed and kept current on the Wyoming BLM database. Creating this website and maintaining it through the implementation cycle will be a vital part of implementation success. The public is welcome to provide implementation comments to the BLM any time during the cycle, but schedules for implementation planning decisions will be posted so the public can make timely comments. All Activity Plan Working Group meetings where recommendations are made to the BLM will be open to the public, and will provide for specific and helpful public involvement. This includes providing web-based information to the public prior to any Activity Plan Working Group meetings; such that members of the public can provide input to the working session, both early and mid-way through the scheduled meetings.

The state sponsored LWG and SGIT meetings are advertised and open to the public.

5.0 COT OBJECTIVE 4: PROACTIVE CONSERVATION ACTIONS

> *"Proactive, incentive based, voluntary conservation actions (e.g., Candidate Conservation Agreements with Assurances, Natural Resources Conservation Service programs) should be developed and/or implemented by interested stakeholders and closely coordinated across the range of the species to ensure they are complimentary and address sage-grouse conservation needs and threats. These efforts need to receive full funding, including funding for necessary personnel." (COT Report, 2013)*

In addition to the conservation activities identified through implementation of the Resource Management Plan in coordination with the Local Working Group Conservation Plans, BLM and USFS will continue to partner with other agencies and stakeholders to identify conservation actions to benefit greater sage-grouse habitat. Actions which may occur could include Candidate Conservation Agreements with accompanying Candidate Conservation Agreements with Assurances and designation of conservation easements.

Candidate Conservation Agreements are entered into when a potential threat to habitat is identified. BLM enters into CCAs with USFWS to identify potential threats and plan for conservation measures to address potential threats. The purpose of CCAs and the accompanying CCAAs for private lands is to prevent listing of any sensitive species under ESA.

BLM Wyoming has already entered into a Statewide CCA for range management on BLM lands in Wyoming. This CCA promotes proper livestock grazing and management through implementation of voluntary conservation measures and management practices that are consistent with greater sage-grouse population management and habitat conservation objectives on BLM lands.

Conservation Easements are identified private lands with greater sage-grouse habitat where the private landowners enter into voluntary agreements with the government to give up developmental rights which may adversely affect habitat. The most common way these areas may be used in Wyoming is for mitigation banks. Allowing development within some areas of historic greater sage-grouse habitat or marginal habitat will require appropriate mitigation. In some cases the most appropriate mitigation may be for project proponents to buy credits at a conservation easement, thus creating a mitigation bank. Overall, the benefit is to the greater sage-grouse, as it reduces the overall potential for fragmented habitat by ensuring there are areas with no development potential which could adversely affect the viability of the species.

Sweetwater River Conservancy Habitat Conservation Bank

The Sweetwater River Conservancy Habitat Conservation Bank is the first conservation bank established for greater sage-grouse. Located in central Wyoming, the bank manages habitat for greater sage-grouse allowing energy development and other activities to proceed on other lands within Wyoming. A conservation bank is a site or suite of sites established under an agreement with the USFWS, intended to protect, and improve habitat for species. Credits may be purchased which result in perpetual conservation easements and conservation projects on the land to offset impacts occurring elsewhere. The Sweetwater River Conservancy Habitat Conservation Bank launched with 55,000 deeded acres of greater sage-grouse habitat, and could expand up to 700,000 acres on other lands owned by the Sweetwater River Conservancy contingent upon demand (USFWS 2015).

Wyoming Landscape Conservation Initiative

The Wyoming Landscape Conservation Initiative is a long-term science based effort to assess and enhance aquatic and terrestrial habitats at a landscape scale in southwest Wyoming, while facilitating responsible development through local collaboration and partnership. Collaborative efforts address multiple concerns at a scale that considers all activities on the landscape, and can leverage resources that might not be available for single agency projects. Greater sage-grouse initiatives from the Wyoming Landscape Conservation Initiative have included habitat enhancement efforts (e.g., invasive weed treatment, prescribed grazing strategies), and greater sage-grouse research studies (Wyoming Landscape Conservation Initiative 2013).

Powder River Basin Restoration Program

The Powder River Basin Restoration Program is a collaborative partnership to restore and enhance greater sage-grouse habitat on a landscape level in the Powder River Basin. The basin encompasses 13,493,840 acres in northeast Wyoming and southeast Montana. Surface ownership is composed of approximately 70 percent private lands, 14 percent BLM-administered lands (including 8 percent in Wyoming and 6 percent in Montana), 8 percent Forest Service lands, and 8 percent States of Wyoming and Montana lands. Subsurface mineral ownership is 50 to 60 percent federal (BLM 2014).

The Powder River Basin Restoration Program is focusing on areas affected by the federal oil and gas development that has occurred over the past decade in the Powder River Basin in northeastern Wyoming. Its objectives are restoring or enhancing disturbed previously suitable habitat to suitable habitat for sagebrush obligate species, primarily greater sage-grouse. This includes multiple sites affected by coal bed natural gas abandonment reclamation efforts, wildfires, and noxious and invasive plants. Priority will be given to those areas recognized as priority habitats (e.g., PHMAs).

Habitat objectives are meeting the needs for nesting, brood-rearing, and late brood-rearing. The program would contribute to efforts focused on the management and control of mosquitoes carrying West Nile virus and would include funding, labor, treatment locations, and other needs as determined.

Additionally, efforts would be coordinated to reduce fuels in and near greater sage-grouse habitat, to enhance sagebrush stands, support restoration efforts, and reduce the risk of high-severity wildfire. Pine stands and juniper woodlands would be managed for structural diversity and to reduce fuels, especially near PHMA, human developments, and recreation areas.

Natural Resource Conservation Service Sage Grouse Initiative

The US Department of Agriculture, Natural Resources Conservation Service's Sage-Grouse Initiative (SGI) is working with private landowners in 11 western states to improve habitat for greater sage-grouse (Manier et al. 2013). With 13.5 million acres of greater sage-grouse habitat in private ownership within MZ II/VII (Manier et al. 2013, p. 118), a unique opportunity exists for the Natural Resources Conservation Service to benefit greater sage-grouse and to ensure the persistence of large and intact rangelands by implementing the SGI.

Participation in the SGI program is voluntary, but willing participants enter into binding contracts or easements to ensure that conservation practices that enhance greater sage-grouse habitat, such as fence marking, protecting riparian areas, and maintaining vegetation in nesting areas, are implemented. Participating landowners are bound by a contract (usually 3 to 5 years) to implement, in consultation with Natural Resources Conservation Service staff, conservation practices if they wish to receive the financial incentives offered by the SGI. These financial incentives generally take the form of payments to offset costs of implementing conservation practices and easements or rental payments for long-term conservation.

While potentially effective at conserving greater sage-grouse populations and habitat on private lands, incentive-based conservation programs that fund the SGI generally require reauthorization from Congress under subsequent farm bills, meaning future funding is not guaranteed.

6.0 COT OBJECTIVE 5: DEVELOPMENT OF MONITORING PLANS

> *"A robust range-wide monitoring program must be developed and implemented for sage-grouse conservation plans, which recognizes and incorporates individual state approaches. A monitoring program is necessary to track the success of conservation plans and proactive conservation activities. Without this information, the actual benefit of conservation activities cannot be measured and there is no capacity to adapt if current management actions are determined to be ineffective." (COT Report, 2013)*

6.1 Greater Sage-Grouse Monitoring Framework

Introduction

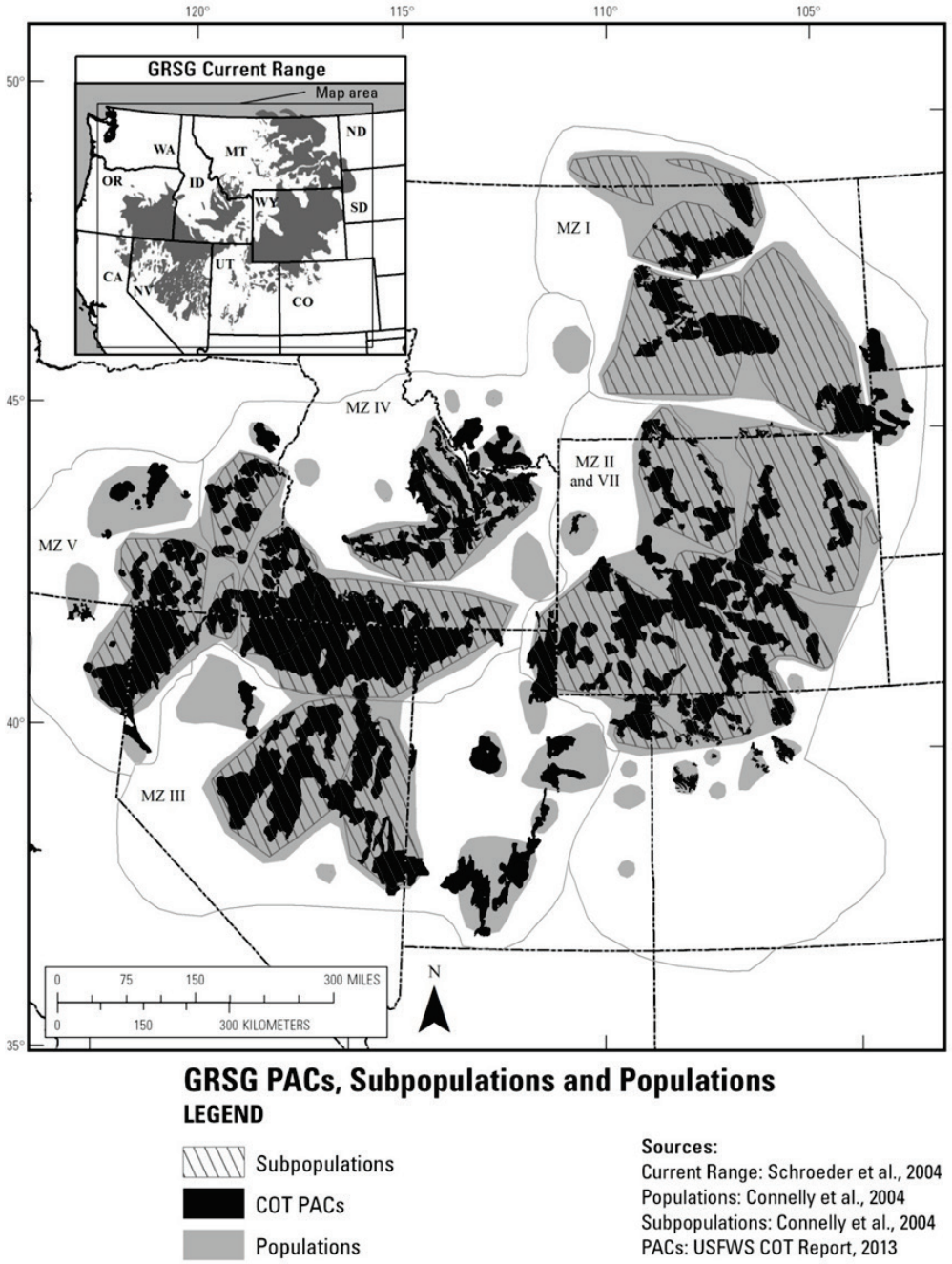
The purpose of this U.S. Bureau of Land Management (BLM) and U.S. Forest Service (USFS) Greater Sage-grouse Monitoring Framework (hereafter, monitoring framework) is to describe the methods to monitor habitats and evaluate the implementation and effectiveness of the BLM planning strategy (BLM IM 2012-044) and the USFS Land Use Plans to conserve the species and its habitat. The regulations for the BLM (43 CFR 1610.4-9) and the USFS (36 CFR part 209, published July 1, 2010) require that land use plans establish intervals and standards, as appropriate, for monitoring and evaluations, based on the sensitivity of the resource to the decisions involved. Therefore, BLM and USFS will use the methods described herein to collect monitoring data to evaluate implementation and effectiveness of the greater sage-grouse (hereafter, greater sage-grouse) planning strategy and the conservation measures contained in land use plans. The type of monitoring data to be collected at the land use plan scale will be described in the monitoring plan which will be developed after the signing of the ROD. For a summary of the frequency of reporting see Attachment A. Adaptive management will be informed by data collected at any and all scales.

To ensure the BLM and USFS have the ability to make consistent assessments about greater sage-grouse habitats across the range of the species, this framework lays out the methodology for monitoring the implementation and evaluating the effectiveness of BLM/USFS actions to conserve the species and its habitat through monitoring that informs effectiveness at multiple scales. Monitoring efforts will include data for measurable quantitative indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions. Implementation monitoring results will provide information to allow the BLM and USFS to evaluate the extent that decisions from the BLM RMP and USFS land management plans (LMP) to conserve greater sage-grouse and its habitat have been implemented. Population monitoring information will be collected by state fish and wildlife agencies and will be incorporated into effectiveness monitoring as it is made available.

This multi-scale monitoring approach is necessary as greater sage-grouse are a landscape species and conservation is scale-dependent whereby conservation actions are implemented within seasonal habitats to benefit populations. The four orders of habitat selection (Johnson 1980) used in this monitoring framework are described by Connelly et al. (2003) and Stiver et al. (2014) as first order (broad scale), second order (mid-scale), third order (fine scale), and fourth order (site scale) to apply them to greater sage-grouse habitat selection. The various scales may show differences because of the methods used. The broad and mid-scale may provide a generalize direction, however the suitability baseline (pre-euro) is not considered an accurate baseline. The current baseline will provide better information on trends provided the data used in the analysis is sound. Based upon the management actions related to the BLM and Wyoming SGEO, the broad and mid-scale may greatly underestimate the impacts of the threats outlined in the COT report. Habitat selection and habitat use by greater sage-grouse occurs at multiple scales and is driven by multiple environmental and behavioral factors. Managing and monitoring greater sage-grouse habitats are complicated by the differences in habitat selection across the range and habitat utilization by individual birds within a given season. Therefore, the tendency to look at a single indicator of habitat suitability or only one scale limits the ability for managers to identify the threats to greater sage-grouse and to respond at the appropriate scale. For descriptions of these habitat suitability indicators for each scale, see the Sage-grouse Habitat Assessment Framework (HAF; Stiver et al. in press).

Monitoring methods and indicators in this monitoring framework are derived from the current peer-reviewed science. Range wide best-available datasets for broad and mid-scale monitoring will be acquired. If these exiting datasets are not readily available or are inadequate, but are necessary to effectively inform the three measurable quantitative indicators (sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions), the BLM will strive to develop datasets or obtain information to fill these data gaps. Datasets that are not readily available to inform the fine and site scale indicators will be developed. These data will be used to generate monitoring reports at the appropriate and applicable geographic scales, boundaries and analysis units: across the range of greater sage-grouse as defined by Schroeder et al. (2004), and clipped by WAFWA Management Zone (MZ) (Stiver et al. 2006) boundaries and other areas as appropriate for size (e.g., populations based on Connelly et al. 2004; Figure Y-11). This broad and mid-scale monitoring data and analysis will provide context for RMP/LMP areas; states; greater sage-grouse Priority Habitat, General Habitat and other greater sage-grouse designated management areas; and Priority Areas for Conservation (PACs) as defined in the Greater Sage-grouse Conservation Objectives: Final Report (COT, U.S. Fish and Wildlife Service 2013). Throughout the remainder of the document, all of these areas will be referred to as "sage-grouse areas".

Figure Y-11. Greater Sage-Grouse Range, Populations, Subpopulations and Priority Areas for Conservation as of 2013



This monitoring framework is divided into two sections. The broad- and mid-scale methods, described in Section 4.2, provide a consistent approach across the range of the species to monitor implementation decisions and actions, mid-scale habitat attributes (e.g., sagebrush availability and habitat degradation), and population changes to determine the effectiveness of the planning strategy and management decisions. (See Table Y-3, Indicators for monitoring implementation of the national planning strategy, RMP/LMP decisions, greater sage-grouse habitat, and greater sage-grouse populations at the broad and

mid-scales.) For greater sage-grouse habitat at the fine and site scales, described in Section 4.3, this monitoring framework describes a consistent approach (e.g., indicators and methods) for monitoring greater sage-grouse seasonal habitats. Funding, support, and dedicated personnel for broad- and mid-scale monitoring will be renewed annually through the normal budget process. For an overview of BLM and USFS multiscale monitoring commitments, see Attachment A.

Table Y-3. Indicators for Monitoring Implementation of the Strategy, Decisions, Greater Sage-Grouse Habitat, and Greater Sage- Grouse Populations at the Broad and Mid-scales

	Implementation	**Habitat**		**Population (State Wildlife Agencies)**
Geographic Scales		***Availability***	***Degradation***	***Demographics***
Broad Scale: From the range of greater sage-grouse to WAFWA Management Zones	BLM/USFS Planning Strategy goal and objectives	Distribution and amount of sagebrush within the range	Distribution and amount of energy, mining and infrastructure facilities	WAFWA Management Zone population trend
Mid-scale: From WAFWA Management Zone to populations	An analysis of RMP/LRMP decisions across the designated scale	Mid-scale habitat indicators (HAF 2014; Table 2, e.g., percent of sagebrush per unit area)	Distribution and amount of energy, mining and infrastructure facilities (Table 2)*	Individual population trend
Fine Scale: Pacs	A summary of DDCT actions related to BLM mineral and surface resources in conjunction with other ownerships	Areas that have greater than 5% sagebrush cover and non-habitat (unsuitable) that is less than 0.6miles from the suitable habitat.	Distribution and amount of anthropogenic disturbances and wildfire occurrences impacting specific PACs	PAC Trends
Site Scale: DDCT level	A summary of DDCT actions related to BLM mineral and surface resources	The available occupied habitat using the DDCT process	Distribution and amount of anthropogenic disturbances and wildfire occurrences impacting specific PACs	Individual lek Trends
Broad Scale: From the range of greater sage-grouse to WAFWA Management Zones	BLM/USFS Planning Strategy goal and objectives	Distribution and amount of sagebrush within the range	Distribution and amount of energy, mining and infrastructure facilities	WAFWA Management Zone population trend
Mid-scale: From WAFWA Management Zone to populations; PACs	RMP/LRMP decisions	Mid-scale habitat indicators (HAF 2014; Table 2, e.g., percent of sagebrush per unit area)	Distribution and amount of energy, mining and infrastructure facilities (Table 2)*	Individual population trend

*HAF 2014; Table 2

Broad and Mid-Scales

First-order habitat selection, the broad scale, describes the physical or geographical range of a species. The first-order habitat of the greater sage-grouse is defined by populations of greater sage-grouse associated with sagebrush landscapes, based on Schroeder et al. 2004, and Connelly et al. 2004, and on population or habitat surveys since 2004. An intermediate scale between the broad and mid-scales was delineated by WAFWA from floristic provinces within which similar environmental factors influence vegetation communities. This scale is referred to as the WAFWA Sage-Grouse Management Zones (MZs). Although no indicators are specific to this scale, these MZs are biologically meaningful as reporting units.

Second-order habitat selection, the mid-scale, includes greater sage-grouse populations and PACs. The second order includes at least 40 discrete populations and subpopulations (Connelly et al. 2004). Populations range in area from 150 to 60,000 mi2 and are nested within MZs. PACs range from 20 to 20,400 mi2 and are nested within population areas.

Other mid-scale landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. in press) will also be assessed. The methods used to calculate these metrics will be derived from existing literature (Knick et al. 2011, Leu and Hanser 2011, Knick and Hanser 2011).

Midscale indicators using the HAF can grossly underestimate the occupation of anthropogenic activities because of the use of 30m pixels (page Table II – X). The HAF removes 'non'habitat from the suitability availability. There are no parameters that are provided to protect adjacent suitable habitat from development on these nonhabitat parcels, thus making the adjacent nonhabitat a potential threat by indirect impacts.

The Wyoming BLM and USFS Offices will be actively participating in a fine and site scale monitoring that will more accurately reflect the impacts associated with direct and indirect effects of anthropogenic and wildfire impacts.

6.2 Implementation (Decision) Monitoring

Implementation monitoring is the process of tracking and documenting the implementation (or the progress toward implementation) of RMP/LMP decisions. The BLM and the USFS will monitor implementation of project-level and/or site-specific actions and authorizations, with their associated conditions of approval/stipulations for greater sage-grouse, spatially (as appropriate) within Priority Habitat, General Habitat, and other greater sage-grouse designated management areas, at a minimum, for the Bighorn Basin Planning Area. These actions and authorizations, as well as progress toward completing and implementing activity-level plans, will be monitored consistently across all planning units and will be reported to BLM and USFS headquarters annually, as well as reported to the State of Wyoming with numerical and spatial data twice a year, and a HQ summary report every 5 years, for the Bighorn Basin Planning Area. A national-level Greater Sage-grouse Land Use Plan Decision Monitoring and Reporting Tool is being developed to describe how the BLM and the USFS will consistently and systematically monitor and report implementation-level activity plans and implementation actions for all plans within the range of greater sage-grouse. A description of this tool for collection and reporting of tabular and spatially explicit data will be included in the Record of Decision or approved plan. The BLM will provide data that can be integrated with other conservation efforts conducted by state and federal partners.

6.3 Habitat (Vegetation) Monitoring

The USFWS, in its 2010 listing decision for the sage-grouse, identified 18 threats contributing to the destruction, modification, or curtailment of greater sage-grouse habitat or range (75 FR 13910 2010). The BLM will, therefore, monitor the relative extent of these threats that remove sagebrush, both spatially and temporally, on all lands within an analysis area, and will report on amount, pattern, and condition at the appropriate and applicable geographic scales and boundaries. These 18 threats have been aggregated into three broad- and mid-scale measures to account for whether the threat predominantly removes sagebrush or degrades habitat. (See Table 4, Relationship between the 18 Threats and the 3 Habitat Disturbance Measures for Monitoring.) The three measures are:

1. Sagebrush Availability (percent of sagebrush per suitable unit area)
2. Habitat Degradation (percent of human activity per unit area)
3. Energy and Mining Density (facilities and locations per suitable unit area)

These three habitat disturbance measures will evaluate disturbance on all lands within priority habitat, regardless of land ownership. The direct area of influence will be assessed with the goal of accounting for actual removal of sagebrush on which greater sage-grouse depend (Connelly et al. 2000) and for habitat degradation as a surrogate for human activity. Measure 1 (sagebrush availability) examines where disturbances have removed plant communities that support sagebrush (or have broadly removed sagebrush from the landscape). Measure 1, therefore, monitors the change in sagebrush availability–or, specifically, where and how much of the sagebrush community is available on lands that can support sagebrush within the range of greater sage-grouse. The sagebrush community is defined as the ecological systems that have the capability of supporting sagebrush vegetation and seasonal greater sage-grouse habitats within the range of greater sage-grouse (see Section B.1., Sagebrush Availability). Measure 2 (see Section B.2., Habitat Degradation Monitoring) and Measure 3 (see Section B.3., Energy and Mining Density) focus on where habitat degradation is occurring within suitable sagebrush soils by using the footprint/area of direct disturbance and the number of facilities at the mid-scale to identify the relative amount of degradation per geographic area of interest and in areas that have the capability of supporting sagebrush and seasonal greater sage-grouse use. Measure 2 (habitat degradation) not only quantifies footprint/area of direct disturbance but also establishes a surrogate for those threats most likely to have ongoing activity. Because energy development and mining activities are typically the most intensive activities in sagebrush habitat, Measure 3 (the density of active energy development, production, and mining sites) will help identify areas of particular concern for such factors as noise, dust, traffic, etc., that degrade greater sage-grouse habitat.

Table Y-4. Relationship between the 18 Threats and the 3 Habitat Disturbance Measures for Monitoring

FWS Listing Decision Threat	Sagebrush Availability	Habitat Degradation	Density of Energy and Mining
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and salable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights of ways		X	

Note: Data availability may preclude specific analysis of individual layers. See the detailed methodology for more information.

The methods to monitor disturbance found herein differ slightly from methods used in the Sage-Grouse Baseline Environmental Report (BER; Manier et al. 2013) that provided a baseline of datasets of disturbance across jurisdictions. One difference is that, for some threats, the data in the BER were for federal lands only. In addition, threats were assessed individually in that report, using different assumptions from those in this monitoring framework about how to quantify the location and magnitude of threats. The methodology herein builds on the BER methodology and identifies datasets and procedures to utilize the best available data across the range of the greater sage-grouse and to formulate a consistent approach to quantify impact of the threats through time. This methodology also describes an approach to combine the threats and calculate the three measures.

6.3.1 Sagebrush Availability (Measure 1)

Greater sage-grouse populations have been found to be more resilient where a percentage of the landscape is maintained in sagebrush (Knick and Connelly 2011), which will be determined by sagebrush availability. Measure 1 has been divided into two sub measures to describe sagebrush availability on the landscape:

- Measure 1a: the current amount of sagebrush on the geographic area of interest, and
- Measure 1b: the amount of sagebrush on the geographic area of interest compared with the amount of sagebrush the landscape of interest could ecologically support.

Measure 1a (the current amount of sagebrush on the landscape) will be calculated using this formula: [the existing updated sagebrush layer] divided by [the geographic area of interest]. The appropriate geographic areas of interest for sagebrush availability include the species' range, WAFWA MZs, populations, and PACs. In some cases these greater sage-grouse areas will need to be aggregated to provide an estimate of sagebrush availability with an acceptable level of accuracy.

Measure 1b (the amount of sagebrush for context within the geographic area of interest) will be calculated using this formula: [existing sagebrush divided by [pre-EuroAmerican settlement geographic extent of lands that could have supported sagebrush]. This measure will provide information to set the context for a given geographic area of interest during evaluations of monitoring data. The information could also be used to inform management options for restoration or mitigation and to inform effectiveness monitoring.

The sagebrush base layer for Measure 1 will be based on geospatial vegetation data adjusted for the threats listed in Table Y-4. The following subsections of this monitoring framework describe the methodology for determining both the current availability of sagebrush on the landscape and the context of the amount of sagebrush on the landscape at the broad and mid-scales.

6.3.1.1 Establishing the Sagebrush Base Layer

The current geographic extent of sagebrush vegetation within the rangewide distribution of greater sage-grouse populations will be ascertained using the most recent version of the Existing Vegetation Type (EVT) layer in LANDFIRE (2013). LANDFIRE EVT was selected to serve as the sagebrush base layer for five reasons: 1) it is the only nationally consistent vegetation layer that has been updated multiple times since 2001; 2) the ecological systems classification within LANDFIRE EVT includes multiple sagebrush type classes that, when aggregated, provide a more accurate (compared with individual classes) and seamless sagebrush base layer across jurisdictional boundaries; 3) LANDFIRE performed a rigorous accuracy assessment from which to derive the rangewide uncertainty of the sagebrush base layer; 4) LANDFIRE is consistently used in several recent analyses of sagebrush habitats (Knick et al. 2011, Leu and Hanser 2011, Knick and Hanser 2011); and 5) LANDFIRE EVT can be compared against the geographic extent of lands that are believed to have had the capability of supporting sagebrush vegetation pre-EuroAmerican settlement [LANDFIRE Biophysical Setting (BpS)]. This fifth reason provides a reference point for understanding how much sagebrush currently remains in a defined geographic area of interest compared with how much sagebrush existed historically (Measure 1b). Therefore, the BLM and the USFS have determined that LANDFIRE provides the best available data at broad and mid-scales to serve as a sagebrush base layer for monitoring changes in the geographic extent of sagebrush. The BLM and the USFS, in addition to aggregating the sagebrush types into the sagebrush base layer, will aggregate the accuracy assessment reports from LANDFIRE to document the cumulative accuracy for the sagebrush base layer. The BLM—through its Assessment, Inventory, and Monitoring

(AIM) program and, specifically, the BLM's landscape monitoring framework (Taylor et al. 2014)—will provide field data to the LANDFIRE program to support continuous quality improvements of the LANDFIRE EVT layer. The sagebrush layer based on LANDFIRE EVT will allow for the mid-scale estimation of the existing percent of sagebrush across a variety of reporting units. This sagebrush base layer will be adjusted by changes in land cover and successful restoration for future calculations of sagebrush availability (Measures 1a and 1b).

This layer will also be used to determine the trend in other landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. in press). In the future, changes in sagebrush availability, generated annually, will be included in the sagebrush base layer. The landscape metrics will be recalculated to examine changes in pattern and abundance of sagebrush at the various geographic boundaries. This information will be included in effectiveness monitoring (See Section D., Effectiveness Monitoring).

Within the BLM, field office-wide existing vegetation classification mapping and inventories are available that provide a much finer level of data than what is provided through LANDFIRE. Where available, these finer-scale products will be useful for additional and complementary mid-scale indicators and local-scale analyses (see Section 4.3, Fine and Site Scales). The fact that these products are not available everywhere limits their utility for monitoring at the broad and mid-scale, where consistency of data products is necessary across broader geographies.

The sagebrush layer based on LANDFIRE EVT will allow for the mid-scale estimation of existing percent sagebrush across a variety of reporting units. This sagebrush base layer will be adjusted by changes in land cover and successful restoration for future calculations of sagebrush availability (Measures 1a and 1b).

This layer will be used to determine the trend in other landscape indicators, e.g., patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. in press). In the future, changes in sagebrush availability, generated bi-annually, will be included in the sagebrush base layer. The landscape metrics will be recalculated to examine changes in pattern and abundance of sagebrush at the various geographic boundaries. This information will be included in effectiveness monitoring (See Section D).

Data Sources for Establishing and Monitoring Sagebrush Availability

In much the same manner as how the LANDFIRE data was selected as the data source, described above, the criteria for selecting the datasets (Table Y-5) for establishing and monitoring the change in sagebrush availability, Measure 1, were threefold:

- Nationally consistent dataset available across the range
- Known level of confidence or accuracy in the dataset
- Continual maintenance of dataset and known update interval

Table Y-5. Datasets for Establishing and Monitoring Changes in Sagebrush Availability

Dataset	Source	Update Interval	Most Recent Version Year	Use
BioPhysical Setting (BpS) v1.1	LANDFIRE	Static	2008	Denominator for sagebrush availability (1.b.)
Existing Vegetation Type (EVT) v1.2	LANDFIRE	Static	2010	Numerator for sagebrush availability
Cropland Data Layer (CDL)	National Agricultural Statistics Service (NASS)	Annual	2012	Agricultural Updates; removes existing sagebrush from numerator of sagebrush availability
National Land Cover Dataset (NLCD) Percent Imperviousness	Multi-Resolution Land Characteristics Consortium (MRLC)	5 Year	2011 available in March 2014	Urban Area Updates; removes existing sagebrush from numerator of sagebrush availability
Fire Perimeters	GeoMac	Annual	2013	< 1,000 acres Fire updates; removes existing sagebrush from numerator of sagebrush availability
Burn Severity	Monitoring Trends in Burn Severity (MTBS)	Annual	2012 available in April 2014	> 1,000 acres Fire Updates; removes existing sagebrush from numerator of sagebrush availability except for unburned sagebrush islands

LANDFIRE Existing Vegetation Type (EVT) Version 1.2

LANDFIRE EVT represents existing vegetation types on the landscape derived from remote sensing data. Initial mapping was conducted using imagery collected in approximately 2001. Since the initial mapping there have been two update efforts: version 1.1 represents changes before 2008, and version 1.2 reflects changes on the landscape before 2010. Version 1.2 will be used as the starting point to develop the sagebrush base layer.

Ecological systems from the LANDFIRE EVT to be used in the sagebrush base layer were determined by greater sage-grouse subject matter experts through the identification of the ecological systems that have the capability of supporting sagebrush vegetation and could provide suitable seasonal habitat for the greater sage-grouse (Table Y-6). Two additional vegetation types that are not ecological systems were added to the EVT and are Artemisia tridentata ssp. vaseyana Shrubland Alliance and Quercus gambelii Shrubland Alliance. These alliances have species composition directly related to the Rocky Mountain Lower Montane - Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system, both of which are ecological systems in LANDFIRE BpS. In LANDFIRE EVT however, in some map zones, the Rocky Mountain Lower Montane - Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system were named Artemisia tridentata ssp. vaseyana Shrubland Alliance and Quercus gambelii Shrubland Alliance respectively.

Table Y-6. Ecological Systems in BpS and EVT Capable of Supporting Sagebrush Vegetation and Could Provide Suitable Seasonal Habitat for Greater Sage-Grouse

Ecological System	Sagebrush Vegetation that the Ecological System has the Capability to Produce
Colorado Plateau Mixed Low Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longiloba* *Artemisia bigelovii* *Artemisia nova* *Artemisia frigida* *Artemisia tridentata* ssp. *wyomingensis*
Columbia Plateau Scabland Shrubland	*Artemisia rigida*
Great Basin Xeric Mixed Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longicaulis* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis*
Inter-Mountain Basins Big Sagebrush Shrubland	*Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis*
Inter-Mountain Basins Mixed Salt Desert Scrub	*Artemisia tridentata* ssp. *wyomingensis* *Artemisia spinescens*
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	*Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *rupicola*
Columbia Plateau Low Sagebrush Steppe	*Artemisia arbuscula* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova*
Inter-Mountain Basins Big Sagebrush Steppe	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *tripartita* *Artemisia frigida*
Inter-Mountain Basins Montane Sagebrush Steppe	*Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia nova* *Artemisia arbuscula* *Artemisia tridentata* ssp. *spiciformis*
Northwestern Great Plains Mixed grass Prairie	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *vaseyana* *Artemisia frigida*
Northwestern Great Plains Shrubland	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *wyomingensis*
Western Great Plains Sand Prairie	*Artemisia cana* ssp. *cana*
Western Great Plains Floodplain Systems	*Artemisia cana* ssp. *cana*
Columbia Plateau Steppe and Grassland	*Artemisia* spp.

Table Y-6. Ecological Systems in BpS and EVT Capable of Supporting Sagebrush Vegetation and Could Provide Suitable Seasonal Habitat for Greater Sage-Grouse (Continued)

Ecological System	Sagebrush Vegetation that the Ecological System has the Capability to Produce
Inter-Mountain Basins Semi-Desert Shrub-Steppe	*Artemisia tridentata* *Artemisia bigelovii* *Artemisia tridentata* ssp. *wyomingensis*
Rocky Mountain Lower Montane-Foothill Shrubland	*Artemisia nova* *Artemisia tridentata* *Artemisia frigida*
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	*Artemisia tridentata*
Inter-Mountain Basins Curl-Leaf Mountain Mahogany Woodland and Shrubland	*Artemisia tridentata* ssp. *vaseyana* *Artemisia arbuscula* *Artemisia tridentata*
Artemisia tridentata ssp. *vaseyana* Shrubland Alliance (EVT only)	*Artemisia tridentata* ssp. *vaseyana*
Quercus gambelii Shrubland Alliance (EVT only)	*Artemisia tridentate*

Accuracy and Appropriate Use of LANDFIRE Datasets

Because of concerns over the thematic accuracy of individual classes mapped by LANDFIRE, all ecological systems listed in Table Y-6 will be merged into one value that represents the sagebrush base layer. With all ecological systems aggregated, the combined accuracy of the sagebrush base layer (EVT) will be much greater than if all categories were treated separately.

LANDFIRE performed the original accuracy assessment of their EVT product on a map zone basis. There are 20 LANDFIRE map zones that cover the historic range of greater sage-grouse as defined by Schroeder (2004). Attachment C lists the user and producer accuracies for the aggregated ecological systems that make up the sagebrush base layer and also defines user and producer accuracies. The aggregated sagebrush base layer for monitoring had producer accuracies ranging from 56.7% to 100% and user accuracies ranging from 57.1% to 85.7%.

LANDFIRE EVT data are not designed to be used at a local level. In reports of the percent sagebrush statistic for the various reporting units (Measure 1a), the uncertainty of the percent sagebrush will increase as the size of the reporting unit gets smaller. LANDFIRE data should never be used at the 30m pixel level (900m2 resolution of raster data) for any reporting. The smallest geographic extent for using the data to determine percent sagebrush is at the PAC level; for the smallest PACs, the initial percent sagebrush estimate will have greater uncertainties compared with the much larger PACs.

Agricultural Adjustments for the Sagebrush Base Layer

The dataset for the geographic extent of agricultural lands will come from the National Agricultural Statistics Service (NASS) Cropland Data Layer (CDL) (http://www.nass.usda.gov/research/Cropland/Release/index.htm). CDL data are generated annually, with estimated producer accuracies for "large area row crops ranging from the mid 80% to mid-90%," depending on the state (http://www.nass.usda.gov/research/Cropland/sarsfaqs2.htm#Section3_18.0). Specific information on accuracy may be found on the NASS metadata website (http://www.nass.usda.gov/research/Cropland/metadata/meta.htm). CDL provided the only dataset that matches the three criteria (nationally consistent, known level of accuracy, and periodically updated) for use in this monitoring framework and represents the best available agricultural lands mapping product.

The CDL data contain both agricultural classes and nonagricultural classes. For this effort, and in the baseline environmental report (Manier et al. 2013), nonagricultural classes were removed from the original dataset. The excluded classes are:

- Barren (65 & 131), Deciduous Forest (141), Developed/High Intensity (124), Developed/Low Intensity (122), Developed/Med Intensity (123), Developed/Open Space (121), Evergreen Forest (142), Grassland Herbaceous (171), Herbaceous Wetlands (195), Mixed Forest (143), Open Water (83 & 111), Other Hay/Non Alfalfa (37), Pasture/Hay (181), Pasture/Grass (62), Perennial Ice/Snow (112), Shrubland (64 & 152), Woody Wetlands (190).

The rule set for adjusting the sagebrush base layer for agricultural lands (and for updating the base layer for agricultural lands in the future) is that once an area is classified as agriculture in any year of the CDL, those pixels will remain out of the sagebrush base layer even if a new version of the CDL classifies that pixel as one of the nonagricultural classes listed above. The assumption is that even though individual pixels may be classified as a nonagricultural class in any given year, the pixel has not necessarily been restored to a natural sagebrush community that would be included in Table Y-6. A further assumption is that once an area has moved into agricultural use, it is unlikely that the area would be restored to sagebrush. Should that occur, however, the method and criteria for adding pixels back into the sagebrush base layer would follow those found in the sagebrush restoration monitoring section of this monitoring framework.

Urban Adjustments for the Sagebrush Base Layer

The National Land Cover Dataset (NLCD) Percent Imperviousness was selected as the best available dataset to be used for urban updates. These data are generated on a five-year cycle and specifically designed to support monitoring efforts. Other datasets were evaluated and lacked the spatial specificity that was captured in the NLCD product. Any new impervious pixel will be removed from the sagebrush base layer during the update process. Although the impervious surface layer includes a number of impervious pixels outside of urban areas, there are two reasons why this is acceptable for this process. First, an evaluation of national urban area datasets did not reveal a layer that could be confidently used in conjunction with the NLCD product to screen impervious pixels outside of urban zones because unincorporated urban areas were not being included thus leaving large chunks of urban pixels unaccounted for in this rule set. Secondly, experimentation with setting a threshold on the percent imperviousness layer that would isolate rural features proved to be unsuccessful. No combination of values could be identified that would result in the consistent ability to limit impervious pixels outside urban areas. Therefore, to ensure consistency in the monitoring estimates, it was determined to include all impervious pixels.

Fire Adjustments for the Sagebrush Base Layer

Two datasets were selected for performing fire adjustments and updates: GeoMac fire perimeters and Monitoring Trends in Burn Severity (MTBS). An existing data standard in the BLM requires that all fires of more than 10 acres are to be reported to GeoMac; therefore, there will be many small fires of less than 10 acres that will not be accounted for in the adjustment and monitoring attributable to fire. Using fire perimeters from GeoMac, all sagebrush pixels falling within the perimeter of fires less than 1,000 acres will be used to adjust and monitor the sagebrush base layer.

For fires greater than 1,000 acres, MTBS was selected as a means to account for unburned sagebrush islands during the update process of the sagebrush base layer. The MTBS program (http://www.mtbs.gov) is an ongoing, multiyear project to map fire severity and fire perimeters consistently across the United States. One of the burn severity classes within MTBS is an unburned to low-severity class. This burn severity class will be used to represent unburned islands of sagebrush within the fire perimeter for the sagebrush base layer. Areas within the other severity classes within the fire perimeter will be removed from the base sagebrush layer during the update process. Not all wildfires, however, have the same impacts on the recovery of sagebrush habitat, depending largely on soil moisture and temperature regimes. For example, cooler, moister sagebrush habitat has a higher potential for recovery or, if needed, restoration than does the warmer, dryer sagebrush habitat. These cooler, moister areas will likely be detected as sagebrush in future updates to LANDFIRE.

Conifer Encroachment Adjustment for the Sagebrush Base Layer

Conifer encroachment into sagebrush vegetation reduces the spatial extent of greater sage-grouse habitat (Davies et al. 2011, Baruch-Mordo et al. 2013). Conifer species that show propensity for encroaching into sagebrush vegetation resulting in greater sage-grouse habitat loss include various juniper species, such as Utah juniper (*Juniperus osteosperma*), western juniper (*Juniperus occidentalis*), Rocky Mountain juniper (*Juniperus scopulorum*), pinyon species, including singleleaf pinyon (*Pinus monophylla*) and pinyon pine (*Pinus edulis*), ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*), and Douglas-fir (*Pseudotsuga menziesii*) (Gruell et al. 1986, Grove et al. 2005, Davies et al. 2011).

A rule set for conifer encroachment was developed to be used for determination of the existing sagebrush base layer. To capture the geographic extent of sagebrush that is likely to experience conifer encroachment, ecological systems within LANDFIRE EVT version 1.2 (NatureServe 2011) were identified if they have the capability of supporting the conifer species (listed above) and have the capability of supporting sagebrush vegetation. Those ecological systems (Table Y-7) were deemed to be the plant communities with conifers most likely to encroach into sagebrush vegetation. Sagebrush vegetation was defined as including sagebrush species (Attachment B) that provide habitat for the greater sage-grouse and are included in the Sage-Grouse Habitat Assessment Framework. An adjacency analysis was conducted to identify all sagebrush pixels that were directly adjacent to these conifer ecological systems and these immediately adjacent sagebrush pixels were removed from the sagebrush base layer.

Table Y-7. Ecological Systems with Conifers Most Likely to Encroach into Sagebrush Vegetation

EVT Ecological Systems	Coniferous Species and Sagebrush Vegetation that the Ecological System has the Capability to Produce
Colorado Plateau Pinyon-Juniper Woodland	*Pinus edulis* *Juniperus osteosperma* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia nova* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tridentata* ssp. *vaseyana* *Artemisia bigelovii* *Artemisia pygmaea*
Columbia Plateau Western Juniper Woodland and Savanna	*Juniperus occidentalis* *Pinus ponderosa* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia rigida* *Artemisia tridentata* ssp. *vaseyana*
East Cascades Oak-Ponderosa Pine Forest and Woodland	*Pinus ponderosa* *Pseudotsuga menziesii* *Artemisia tridentata* *Artemisia nova*
Great Basin Pinyon-Juniper Woodland	*Pinus monophylla* *Juniperus osteosperma* *Artemisia arbuscula* *Artemisia nova* *Artemisia tridentata* *Artemisia tridentata* ssp. *vaseyana*
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	*Pinus ponderosa* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia tridentata* ssp. *vaseyana*
Rocky Mountain Foothill Limber Pine-Juniper Woodland	*Juniperus osteosperma* *Juniperus scopulorum* *Artemisia nova* *Artemisia tridentata*
Rocky Mountain Poor-Site Lodgepole Pine Forest	*Pinus contorta* *Pseudotsuga menziesii* *Pinus ponderosa* *Artemisia tridentata*
Southern Rocky Mountain Pinyon-Juniper Woodland	*Pinus edulis* *Juniperus monosperma* *Artemisia bigelovii* *Artemisia tridentata* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tridentata* ssp. *vaseyana*

Table Y-7. Ecological Systems with Conifers Most Likely to Encroach into Sagebrush Vegetation (Continued)

EVT Ecological Systems	Coniferous Species and Sagebrush Vegetation that the Ecological System has the Capability to Produce
Southern Rocky Mountain Ponderosa Pine Woodland	*Pinus ponderosa* *Pseudotsuga menziesii* *Pinus edulis* *Pinus contorta* *Juniperus* spp. *Artemisia nova* *Artemisia tridentata* *Artemisia arbuscula* *Artemisia tridentata* ssp. *Vaseyana*

Invasive Annual Grasses Adjustments for the Sagebrush Base Layer

There are no invasive species datasets from 2010 to the present (beyond the LANDFIRE data) that meet the three criteria (nationally consistent, known level of accuracy, and periodically updated) for use in the determination of the sagebrush base layer. For a description of how invasive species land cover will be incorporated in the sagebrush base layer in the future, see Section B.1.b., Monitoring Sagebrush Availability.

Sagebrush Restoration Adjustments for the Sagebrush Base Layer

There are no datasets from 2010 to the present that could provide additions to the sagebrush base layer from restoration treatments that meet the three criteria (nationally consistent, known level of accuracy, and periodically updated); therefore, no adjustments were made to the sagebrush base layer calculated from the LANDFIRE EVT (version 1.2) attributable to restoration activities since 2010. Successful restoration treatments before 2010 are assumed to have been captured in the LANDFIRE refresh.

6.3.1.2 Monitoring Sagebrush Availability

Updating the Sagebrush Availability Sagebrush Base Layer

Sagebrush availability will be updated annually by incorporating changes to the sagebrush base layer attributable to agriculture, urbanization, and wildfire. The monitoring schedule for the existing sagebrush base layer updates is as follows:

- ***2010 Existing Sagebrush Base Layer*** = [Sagebrush EVT] minus [2006 Imperviousness Layer] minus [2009 and 2010 CDL] minus [2009/10 GeoMac Fires < 1,000 acres] minus [2009/10 MTBS Fires excluding unburned sagebrush islands] minus [Conifer Encroachment Layer]
- ***2012 Existing Sagebrush Update*** = [Base 2010 Existing Sagebrush Layer] minus [2011 Imperviousness Layer] minus [2011 and 2012 CDL] minus [2011/12 GeoMac Fires < 1,000 acres] minus [2011/12 MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter]

- ***2013 and beyond Existing Sagebrush Updates*** = [Previous Existing Sagebrush Update Layer] minus [Imperviousness Layer (if new data are available)] minus [Next 2 years of CDL] minus [Next 2 years of GeoMac Fires < 1,000 acres] minus [Next 2 years MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter] plus [restoration/monitoring data provided by the field]

Sagebrush Restoration Updates

Restoration after fire, after agricultural conversion, after seedings of introduced grasses, or after treatments of pinyon pine and/or juniper, are examples of updates to the sagebrush base layer that can add sagebrush vegetation back in. When restoration has been determined to be successful through range wide, consistent, interagency fine and site-scale monitoring, the polygonal data will be used to add sagebrush pixels back into the broad and mid-scale sagebrush base layer.

Measure 1b – Context for the change in the amount of sagebrush in a landscape of interest

Measure 1b describes the amount of sagebrush on the landscape of interest compared with the amount of sagebrush the landscape of interest could ecologically support. Areas with the potential to support sagebrush were derived from the BpS data layer that describes sagebrush pre Euro-American settlement (biophysical setting (BpS) v1.2 of LANDFIRE). This measure (1b) will provide information during evaluations of monitoring data to set the context for a given geographic area of interest. The information could also be used to inform management options for restoration, mitigation and inform effectiveness monitoring.

The identification and spatial locations of natural plant communities (vegetation) that are believed to have existed on the landscape (BpS) were constructed based on an approximation of the historical (pre Euro-American settlement) disturbance regime and how the historical disturbance regime operated on the current biophysical environment. BpS is composed of map units which are based on NatureServe's (2011) terrestrial ecological systems classification.

The ecological systems within BpS used for this monitoring framework are those ecological systems that have the capability of supporting sagebrush vegetation and could provide seasonal habitat for the greater sage-grouse. These ecological systems are listed in Table Y-6 with the exception of the Artemisia tridentata ssp. vaseyana Shrubland Alliance and the Quercus gambelii Shrubland Alliance. Ecological systems selected included sagebrush species or subspecies that are included in the Sage-Grouse Habitat Assessment Framework and are found in Attachment B.

Attributable to the lack of any reference data, the BpS layer does not have an associated accuracy assessment. Visual inspection, however, of the BpS data reveals inconsistencies in the labeling of pixels among LANDFIRE map zones. The reason for these inconsistencies between map zones are the decision rules used to map a given ecological system will vary between map zones based on different physical, biological, disturbance and atmospheric regimes of the region. This can result in artificial edges in the map that are an artifact of the mapping process. However, metrics will be calculated at broad spatial scales using BpS potential vegetation type, not small groupings or individual pixels, therefore, the magnitude of these observable errors in the BpS layer is minor compared with the size of the reporting units. Therefore, since BpS will be used to identify broad landscape patterns of dominant vegetation, these inconsistencies will only have a minor impact on the percent sagebrush availability calculation.

LANDFIRE BpS data are not designed to be used at a local level. In reporting the percent sagebrush statistic for the various reporting units, the uncertainty of the percent sagebrush will increase as the size

of the reporting unit gets smaller. LANDFIRE data should never be used at the pixel level (30m2) for any reporting. The smallest geographic extent use of the data for this purpose is at the PAC level and for the smallest PACs the initial percent sagebrush remaining estimate will have greater uncertainties compared with the much larger PACs.

Tracking

BLM and USFS will analyze and monitor sagebrush availability (Measure 1) on a bi-annual basis and it will be used to inform effectiveness monitoring and initiate adaptive management actions as necessary. The 2010 estimate of sagebrush availability will serve as the base year and an updated estimate for 2012 will be reported in 2014 after all datasets become available. The 2012 estimate will capture changes attributable to fire, agriculture, and urban development. Subsequent updates will always include new fire and agricultural data and new urban data when available. Restoration data that meets criteria of adding sagebrush areas back into the sagebrush base layer will begin to be factored in as data allows. Attributable to data availability, there will be a two year lag (approximately) between when the estimate is generated and when the data used for the estimate becomes available (e.g., the 2014 sagebrush availability will be included in the 2016 estimate).

Future Plans

Geospatial data used to generate the sagebrush base layer will be available through BLM's EGIS Web Portal and Geospatial Gateway or through the authoritative data source. Legacy datasets will be preserved, so that trends may be calculated. Additionally, accuracy assessment data for all source datasets will be provided on the portal either spatially, where applicable, or through the metadata. Accuracy assessment information was deemed vital to share to help users understand the limitation of the sagebrush estimates and will be summarized spatially by map zone and included in the Portal.

LANDFIRE plans to begin a remapping effort in 2015. This remapping has the potential to greatly improve overall quality of the data products primarily through the use of higher quality remote sensing datasets. Additionally, BLM and the Multi-Resolution Land Characteristics Consortium (MRLC) are working to improve the accuracy of vegetation map products for broad and mid-scale analyses through the Grass/Shrub mapping effort in partnership with the MRLC. The Grass/Shrub mapping effort applies the Wyoming multi-scale sagebrush habitat methodology (Homer et al. 2009) to spatially depict fractional percent cover estimates for five components range and west-wide. These five components are percent cover of sagebrush vegetation, percent bare ground, percent herbaceous vegetation (grass and forbs combined), annual vegetation, and percent shrubs. One of the benefits of the design of these fractional cover maps is that they facilitate monitoring "with-in" class variation (e.g., examination of declining trend in sagebrush cover for individual pixels). This "with-in" class variation can serve as one indicator of sagebrush quality that cannot be derived from LANDFIRE's EVT information. The Grass/Shrub effort is not a substitute for fine scale monitoring, but will leverage fine scale data to support the validation of the mapping products. An evaluation will be conducted to determine if either dataset is of great enough quality to warrant replacing the existing sagebrush layers. The earliest possible date for this evaluation will not occur until 2018 or 2019 depending on data availability.

6.3.2 Habitat Degradation Monitoring (Measure 2)

The measure of habitat degradation will be calculated by combining the footprints of threats identified in Table Y-4. The footprint is defined as the direct area of influence of "active" energy and infrastructure; it is used as a surrogate for human activity. Although these analyses will try to summarize results at the aforementioned meaningful geographic areas of interest, some may be too small to report the metrics appropriately and may be combined (smaller populations, PACs within a population, etc.). Data sources for each threat are found in Table Y-8, Geospatial data sources for habitat degradation. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodology for each threat, and the combined measure, are detailed below. All datasets will be updated annually to monitor broad- and mid-scale year-to-year changes and to calculate trends in habitat degradation to inform adaptive management. A 5-year summary report will be provided to the USFWS.

Habitat Degradation Datasets and Assumptions

Energy (oil and gas wells and development facilities): This dataset will compile information from three oil and gas databases: the proprietary IHS Enerdeq database, the BLM Automated Fluid Minerals Support System (AFMSS) database, and the proprietary Platts (a McGraw-Hill Financial Company) GIS Custom Data (hereafter, Platts) database of power plants. Point data from wells active within the last 10 years from IHS and producing wells from AFMSS will be considered as a 5-acre (2.0ha) direct area of influence centered on the well point, as recommended by the BLM WO-300 (Minerals and Realty Management). Plugged and abandoned wells will be removed if the date of well abandonment was before the first day of the reporting year (i.e., for the 2015 reporting year, a well must have been plugged and abandoned by 12/31/2014 to be removed). Platts oil and gas power plants data (subset to operational power plants) will also be included as a 5-acre (2.0ha) direct area of influence.

Additional Measure: Reclaimed Energy-related Degradation. This dataset will include those wells that have been plugged and abandoned. This measure thereby attempts to measure energy-related degradation that has been reclaimed but not necessarily fully restored to greater sage-grouse habitat. This measure will establish a baseline by using wells that have been plugged and abandoned within the last 10 years from the IHS and AFMSS datasets. Time lags for lek attendance in response to infrastructure have been documented to be delayed 2–10 years from energy development activities (Harju et al. 2010). Reclamation actions may require 2 or more years from the Final Abandonment Notice. Sagebrush seedling establishment may take 6 or more years from the point of seeding, depending on such variables as annual precipitation, annual temperature, and soil type and depth (Pyke 2011). This 10-year period is conservative and assumes some level of habitat improvement 10 years after plugging. Research by Hemstrom et al. (2002), however, proposes an even longer period—more than 100 years—for recovery of sagebrush habitats, even with active restoration approaches. Direct area of influence will be considered 3 acres (1.2ha) (J. Perry, personal communication, February 12, 2014). This additional layer/measure could be used at the broad and mid-scale to identify areas where sagebrush habitat and/or potential sagebrush habitat is likely still degraded. This layer/measure could also be used where further investigation at the fine or site scale would be warranted to: 1) quantify the level of reclamation already conducted, and 2) evaluate the amount of restoration still required for sagebrush habitat recovery. At a particular level (e.g., population, PACs), these areas and the reclamation efforts/success could be used to inform reclamation standards associated with future developments. Once these areas have transitioned from reclamation standards to meeting restoration standards, they can be added back into the sagebrush availability layer using the same methodology as described for adding restoration treatment areas lost to wildfire and agriculture conversion (see

Monitoring Sagebrush Restoration in Section B.1.b., Monitoring Sagebrush Availability). This dataset will be updated annually from the IHS dataset.

Energy (coal mines): Currently, there is no comprehensive dataset available that identifies the footprint of active coal mining across all jurisdictions. Therefore, point and polygon datasets will be used each year to identify coal mining locations. Data sources will be identified and evaluated annually and will include at a minimum: BLM coal lease polygons, U.S. Energy Information Administration mine occurrence points, U.S. Office of Surface Mining Reclamation and Enforcement coal mining permit polygons (as available), and U.S. Geological Survey (USGS) Mineral Resources Data System mine occurrence points. These data will inform where active coal mining may be occurring. Additionally, coal power plant data from Platts power plants database (subset to operational power plants) will be included. Aerial imagery will then be used to digitize manually the active coal mining and coal power plants surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to locate (generally at 1:50,000 and below) and digitize (generally at 1:10,000 and below) active coal mine and power plant direct area of influence. Coal mine location data source and imagery date will be documented for each digitized coal polygon at the time of creation. Subsurface facility locations (polygon or point location as available) will also be collected if available, included in density calculations, and added to the active surface activity layer as appropriate (if an actual direct area of influence can be located).

Energy (wind energy facilities): This dataset will be a subset of the Federal Aviation Administration (FAA) Digital Obstacles point file. Points where "Type_" = "WINDMILL" will be included. Direct area of influence of these point features will be measured by converting to a polygon dataset as a direct area of influence of 3 acres (1.2ha) centered on each tower point. See the BLM's "Wind Energy Development Programmatic Environmental Impact Statement" (BLM 2005). Additionally, Platts power plants database will be used for transformer stations associated with wind energy sites (subset to operational power plants), also with a 3-acre (1.2ha) direct area of influence.

Energy (solar energy facilities): This dataset will include solar plants as compiled with the Platts power plants database (subset to operational power plants). This database includes an attribute that indicates the operational capacity of each solar power plant. Total capacity at the power plant was based on ratings of the in-service unit(s), in megawatts. Direct area of influence polygons will be centered over each point feature representing 7.3ac (3.0ha) per megawatt of the stated operational capacity, per the report of the National Renewable Energy Laboratory (NREL), "Land-Use Requirements for Solar Power Plants in the United States" (Ong et al. 2013).

Energy (geothermal energy facilities): This dataset will include geothermal wells in existence or under construction as compiled with the IHS wells database and power plants as compiled with the Platts database (subset to operational power plants). Direct area of influence of these point features will be measured by converting to a polygon dataset of 3 acres (1.2ha) centered on each well or power plant point.

Mining (active developments; locatable, leasable, salable): This dataset will include active locatable mining locations as compiled with the proprietary InfoMine database. Aerial imagery will then be used to digitize manually the active mining surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to locate (generally at 1:50,000 and below) and digitize (generally at 1:10,000 and below) active mine direct area of influence. Mine location data source and imagery date will be documented for each digitized polygon at the time of creation. Currently, there are no known compressive databases available for leasable or salable mining sites beyond coal mines. Other data sources will be evaluated

and used as they are identified or as they become available. Point data may be converted to polygons to represent direct area of influence unless actual surface disturbance is available.

Infrastructure (roads): This dataset will be compiled from the proprietary Esri StreetMap Premium for ArcGIS. Dataset features that will be used are: Interstate Highways, Major Roads, and Surface Streets to capture most paved and "crowned and ditched" roads while not including "two-track" and 4-wheel-drive routes. These minor roads, while not included in the broad- and mid-scale monitoring, may support a volume of traffic that can have deleterious effects on greater sage-grouse leks. It may be appropriate to consider the frequency and type of use of roads in a NEPA analysis for a proposed project. This fine- and site-scale analysis will require more site-specific data than is identified in this monitoring framework. The direct area of influence for roads will be represented by 240.2ft, 84.0ft, and 40.7ft (73.2m, 25.6m, and 12.4m) total widths centered on the line feature for Interstate Highways, Major Roads, and Surface Streets, respectively (Knick et al. 2011). The most current dataset will be used for each monitoring update. Note: This is a related but different dataset than what was used in BER (Manier et al. 2013). Individual BLM/USFS planning units may use different road layers for fine- and site-scale monitoring.

Infrastructure (railroads): This dataset will be a compilation from the Federal Railroad Administration Rail Lines of the USA dataset. Non-abandoned rail lines will be used; abandoned rail lines will not be used. The direct are of influence for railroads will be represented by a 30.8ft (9.4m) total width (Knick et al. 2011) centered on the non-abandoned railroad line feature.

Infrastructure (power lines): This line dataset will be derived from the proprietary Platts transmission lines database. Linear features in the dataset attributed as "buried" will be removed from the disturbance calculation. Only "In Service" lines will be used; "Proposed" lines will not be used. Direct area of influence will be determined by the kV designation: 1–199 kV (100ft/30.5m), 200–399 kV (150ft/45.7m), 400–699 kV (200ft/61.0m), and 700-or greater kV (250ft/76.2m) based on average right-of-way and structure widths, according to BLM WO-300 (Minerals and Realty Management).

Infrastructure (communication towers): This point dataset will be compiled from the Federal Communications Commission (FCC) communication towers point file; all duplicate points will be removed. It will be converted to a polygon dataset by using a direct area of influence of 2.5 acres (1.0ha) centered on each communication tower point (Knick et al. 2011).

Infrastructure (other vertical structures): This point dataset will be compiled from the FAA's Digital Obstacles point file. Points where "Type_" = "WINDMILL" will be removed. Duplicate points from the FCC communication towers point file will be removed. Remaining features will be converted to a polygon dataset using a direct area of influence of 2.5 acres (1.0ha) centered on each vertical structure point (Knick et al. 2011).

Other Developed Rights-of-Way: Currently, no additional data sources for other rights-of-way have been identified; roads, power lines, railroads, pipelines, and other known linear features are represented in the categories described above. The newly purchased IHS data do contain pipeline information; however, this database does not currently distinguish between above-ground and underground pipelines. If additional features representing human activities are identified, they will be added to monitoring reports using similar assumptions to those used with the threats described above.

6.3.2.1 Habitat Degradation Threat Combination and Calculation

The threats targeted for measuring human activity (Table Y-4) will be converted to direct area of influence polygons as described for each threat above. These threat polygon layers will be combined and features dissolved to create one overall polygon layer representing footprints of active human activity in the range of greater sage-grouse. Individual datasets, however, will be preserved to indicate which types of threats may be contributing to overall habitat degradation. This measure has been divided into three sub measures to describe habitat degradation on the landscape. Percentages will be calculated as follows:

- **Measure 2a.** Footprint by geographic area of interest: Divide area of the active/direct footprint by the total area of the geographic area of interest (% disturbance in geographic area of interest).
- **Measure 2b.** Active/direct footprint by historical sagebrush potential: Divide area of the active footprint that coincides with areas with historical sagebrush potential (BpS calculation from habitat availability) within a given geographic area of interest by the total area with sagebrush potential within the geographic area of interest (% disturbance on potential historical sagebrush in geographic area of interest).
- **Measure 2c.** Active/direct footprint by current sagebrush: Divide area of the active footprint that coincides with areas of existing sagebrush (EVT calculation from habitat availability) within a given geographic area of interest by the total area that is current sagebrush within the geographic area of interest (% disturbance on current sagebrush in geographic area of interest).

Table Y-8. Geospatial Data Sources for Habitat Degradation (Measure 2)

Degradation Type	Subcategory	Data Source	Direct Area of Influence	Area Source
Energy (oil & gas)	Wells	IHS; BLM (AFMSS)	5.0ac (2.0ha)	BLM - WO-300
	Power Plants	Platts (power plants)	5.0ac (2.0ha)	BLM - WO-300
Energy (coal)	Mines	BLM; USFS; Office of Surface Mining Reclamation and Envofrement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/ Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Energy (wind)	Wind Turbines	Federal Aviation Administration	3.0ac (1.2ha)	BLM - WO-300
	Power Plants	Platts (power plants)	3.0ac (1.2ha)	BLM - WO-300
Energy (solar)	Fields/Power Plants	Platts (power plants)	7.3ac - (3.0 ha)/MW	NREL
Energy (geothermal)	Wells	IHS	3.0ac (1.2ha)	BLM - WO-300
	Power Plants	Platts (power plants)	Polygon area (digistized)	Esri Imagery
Mining	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
Infrastructure (roads)	Surface Streets (Minor Roads)	Esri StreetMap Premium	40.7 ft (12.4m)	USGS
	Major Roads	Esri StreetMap Premium	84.0 ft (25.6m)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2 ft (73.2m)	USGS
Infrastructure (railroads)	ActiveLines	Federal Railroad Administration	30.8ft (9.4m)	USGS
Infrastructure (powerlines)	1-199 kV Lines	Platts (transmission lines)	100 ft (30.5 m)	BLM - WO-300
	200-399 kV Lines	Platts (transmission lines)	150 ft (45.7m)	BLM - WO-300
	400-699 kV Lines	Platts (transmission lines)	200 ft (61.0m)	BLM - WO-300
	700+ kV Lines	Platts (transmission lines)	250 ft (76.2m)	BLM - WO-300
Infrastructure (communication	Towers	Federal Communications Commission	2.5 ac (1.0 ha)	BLM - WO-300

6.3.3 Energy and Mining Density (Measure 3)

The measure of density of energy and mining will be calculated by combining the locations of energy and mining threats identified in Table Y-4. This measure will provide an estimate of the intensity of human activity or the intensity of habitat degradation. The number of energy facilities and mining locations will be summed and divided by the area of meaningful geographic areas of interest to calculate density of these activities. Data sources for each threat are found in Table Y-8. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodology for each threat, and the combined measure, are detailed below. All datasets will be updated annually to monitor broad- and mid-scale year-to-year changes and 5-year (or longer) trends in habitat degradation.

Energy and Mining Density Datasets and Assumptions

- ***Energy (oil and gas wells and development facilities)*** (See Section B.2., Habitat Degradation Monitoring.)
- ***Energy (coal mines)*** (See Section B.2., Habitat Degradation Monitoring.)
- ***Energy (wind energy facilities)*** (See Section B.2., Habitat Degradation Monitoring.)
- ***Energy (solar energy facilities)*** (See Section B.2., Habitat Degradation Monitoring.)
- ***Energy (geothermal energy facilities)*** (See Section B.2., Habitat Degradation Monitoring.)
- ***Mining (active developments; locatable, leasable, salable)*** (See Section B.2., Habitat Degradation Monitoring.)

Energy and Mining Density Threat Combination and Calculation

Datasets for energy and mining will be collected in two primary forms: point locations (e.g., wells) and polygon areas (e.g., surface coal mining). The following rule set will be used to calculate density for meaningful geographic areas of interest including standard grids and per polygon:

1. Point locations will be preserved; no additional points will be removed beyond the methodology described above. Energy facilities in close proximity (an oil well close to a wind tower) will be retained.
2. Polygons will not be merged, or features further dissolved. Thus, overlapping facilities will be retained, such that each individual threat will be a separate polygon data input for the density calculation.
3. The analysis unit (polygon or 640-acre section in a grid) will be the basis for counting the number of mining or energy facilities per unit area. Within the analysis unit, all point features will be summed, and any individual polygons will be counted as one (e.g., a coal mine will be counted as one facility within population). Where polygon features overlap multiple units (polygons or pixels), the facility will be counted as one in each unit where the polygon occurs (e.g., a polygon crossing multiple 640-acre sections would be counted as one in each 640-acre section for a density per 640-acre-section calculation).
4. In methodologies with different-sized units (e.g., MZs, populations, etc.) raw facility counts will be converted to densities by dividing the raw facility counts by the total area of the unit. Typically this will be measured as facilities per 640 acres.
5. For uniform grids, raw facility counts will be reported. Typically this number will also be converted to facilities per 640 acres.
6. Reporting may include summaries beyond the simple ones above. Zonal statistics may be used to smooth smaller grids to help display and convey information about areas within meaningful geographic areas of interest that have high levels of energy and/or mining activity.
7. Additional statistics for each defined unit may also include adjusting the area to include only the area with the historical potential for sagebrush (BpS) or areas currently sagebrush (EVT).

Individual datasets and threat combination datasets for habitat degradation will be available through the BLM's EGIS web portal and geospatial gateway. Legacy datasets will be preserved so that trends may be calculated.

6.4 Population (Demographics) Monitoring

State wildlife management agencies are responsible for monitoring greater sage-grouse populations within their respective states. WAFWA will coordinate this collection of annual population data by state agencies. These data will be made available to the BLM according to the terms of the forthcoming Greater Sage-Grouse Population Monitoring Memorandum of Understanding (MOU) (2014) between WAFWA and the BLM. The MOU outlines a process, timeline, and responsibilities for regular data sharing of greater sage-grouse population and/or habitat information for the purposes of implementing greater sage-grouse LUPs/amendments and subsequent effectiveness monitoring. Population areas were refined from the *"Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report"* (COT 2013) by individual state wildlife agencies to create a consistent naming nomenclature for future data analyses. These population data will be used for analysis at the applicable scale to supplement habitat effectiveness monitoring of management actions and to inform the adaptive management responses.

6.5 Effectiveness Monitoring

Effectiveness monitoring will provide the data needed to evaluate BLM and USFS actions toward reaching the objective of the national planning strategy (BLM IM 2012-044) – to conserve greater sage-grouse populations and their habitat– and the objectives for the land use planning area. Effectiveness monitoring methods described here will encompass multiple larger scales, from areas as large as the WAFWA MZ to the scale of the Bighorn Basin LUP. Effectiveness data used for these larger-scale evaluations will include all lands in the area of interest, regardless of surface ownership/management, and will help inform where finer-scale evaluations are needed, such as population areas smaller than an LUP or PACs within an LUP (described in Section 4.2, Fine and Site Scales). Data will also include the trend of disturbance within these areas of interest to inform the need to initiate adaptive management responses as described in the Bighorn Basin land use plan.

The BLM and the USFS will coordinate with the State of Wyoming in evaluating the compliance of all actions within greater sage-grouse PHMAs. Evaluation of current disturbance, disruptions and conservation actions within a greater sage-grouse PHMA will be conducted to determine if all entities are in compliance with their specific standards and whether or not it indeed has not caused declines of greater sage-grouse populations. This approach also helps focus scarce resources to areas experiencing habitat loss, degradation, or population declines, without excluding the possibility of concurrent, finer-scale evaluations as needed where habitat or population anomalies have been identified through some other means.

To determine the effectiveness of the greater sage-grouse national planning strategy, the BLM and the USFS will evaluate the answers to the following questions and prepare a broad- and mid-scale effectiveness report:

1. Sagebrush Availability and Condition:
    a. What is the amount of sagebrush availability and the change in the amount and condition of sagebrush?
    b. What is the existing amount of sagebrush on the landscape and the change in the amount relative to the pre-EuroAmerican historical distribution of sagebrush (BpS)?
    c. What is the trend and condition of the indicators describing sagebrush characteristics important to greater sage-grouse?

2. Habitat Degradation and Intensity of Activities:
    a. What is the amount of habitat degradation and the change in that amount?
    b. What is the intensity of activities and the change in the intensity?
    c. What is the amount of reclaimed energy-related degradation and the change in the amount?
    d. What is the population estimation of greater sage-grouse and the change in the population estimation?
3. How are the BLM and the USFS contributing to changes in the amount of sagebrush?
4. How are the BLM and the USFS contributing to disturbance?

The compilation of broad- and mid-scale data (and population trends as available) into an effectiveness monitoring report will occur on a 5-year reporting schedule (see Attachment A), which may be accelerated to respond to critical emerging issues (in consultation with the USFWS and state wildlife agencies). In addition, effectiveness monitoring results will be used to identify emerging issues and research needs and inform the BLM and the USFS adaptive management strategy (see the adaptive management section of this Environmental Impact Statement).

To determine the effectiveness of the greater sage-grouse objectives of the land use plan, the BLM and the USFS will evaluate the answers to the following questions and prepare a plan effectiveness report:

1. Is this plan meeting the greater sage-grouse habitat objectives?
2. Are greater sage-grouse areas within the LUP meeting, or making progress toward meeting, land health standards, including the Special Status Species/wildlife habitat standard?
3. Is the plan meeting the disturbance objective(s) within greater sage-grouse areas?
4. Are the greater sage-grouse populations within this plan boundary and within the greater sage-grouse areas increasing, stable, or declining?

The effectiveness monitoring report for this LUP will occur on a 5-year reporting schedule (see Attachment A) or more often if habitat or population anomalies indicate the need for an evaluation to facilitate adaptive management or respond to critical emerging issues. Data will be made available through the BLM's EGIS web portal and the geospatial gateway.

Methods

At the broad and mid-scales (PACs and above) the BLM and the USFS will summarize the vegetation, disturbance, and (when available) population data. Although the analysis will try to summarize results for PACs within each greater sage-grouse population, some populations may be too small to report the metrics appropriately and may need to be combined to provide an estimate with an acceptable level of accuracy. Otherwise, they will be flagged for more intensive monitoring by the appropriate landowner or agency. The BLM and the USFS will then analyze monitoring data to detect the trend in the amount of sagebrush; the condition of the vegetation in the greater sage-grouse areas (MacKinnon et al. 2011); the trend in the amount of disturbance; the change in disturbed areas owing to successful restoration; and the amount of new disturbance the BLM and/or the USFS has permitted. These data could be supplemented with population data (when available) to inform an understanding of the correlation between habitat and PACs within a population. This overall effectiveness evaluation must consider the lag effect response of populations to habitat changes (Garton et al. 2011).

Calculating Question 1, National Planning Strategy Effectiveness: The amount of sagebrush available in the large area of interest will use the information from Measure 1a (I.B.1., Sagebrush Availability) and calculate the change from the 2012 baseline to the end date of the reporting period. To calculate the change in the amount of sagebrush on the landscape to compare with the historical areas with potential to support sagebrush, the information from Measure 1b (I.B.1., Sagebrush Availability) will be used. To calculate the trend in the condition of sagebrush at the mid-scale, three sources of data will be used: the BLM's Grass/Shrub mapping effort (Future Plans in Section B.1., Sagebrush Availability); the results from the calculation of the landscape indicators, such as patch size (described below); and the BLM's Landscape Monitoring Framework (LMF) and greater sage-grouse intensification effort (also described below). The LMF and greater sage-grouse intensification effort data are collected in a statistical sampling framework that allows calculation of indicator values at multiple scales.

Beyond the importance of sagebrush availability to greater sage-grouse, the mix of sagebrush patches on the landscape at the broad and mid-scale provides the life requisite of space for greater sage-grouse dispersal needs (see the HAF). The configuration of sagebrush habitat patches and the land cover or land use between the habitat patches at the broad and mid-scales also defines suitability. There are three significant habitat indicators that influence habitat use, dispersal, and movement across populations: the size and number of habitat patches, the connectivity of habitat patches (linkage areas), and habitat fragmentation (scope of unsuitable and non-habitats between habitat patches). The most appropriate commercial software to measure patch dynamics, connectivity, and fragmentation at the broad and mid-scales will be used, along with the same data layers derived for sagebrush availability.

The BLM initiated the LMF in 2011 in cooperation with the Natural Resources Conservation Service (NRCS). The objective of the LMF effort is to provide unbiased estimates of vegetation and soil condition and trend using a statistically balanced sample design across BLM lands. Recognizing that greater sage-grouse populations are more resilient where the sagebrush plant community has certain characteristics unique to a particular life stage of greater sage-grouse (Knick and Connelly 2011, Stiver et al. in press), a group of greater sage-grouse habitat and sagebrush plant community subject matter experts identified those vegetation indicators collected at LMF sampling points that inform greater sage-grouse habitat needs. The experts represented the Agricultural Research Service, BLM, NRCS, USFWS, WAFWA, state wildlife agencies, and academia. The common indicators identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, intercanopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of greater sage-grouse, additional plot locations in occupied greater sage-grouse habitat (Sage-Grouse Intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS National Resources Inventory Rangeland Resource Assessment (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/nri/?&cid=stelprdb1041620).

The greater sage-grouse intensification baseline data will be collected over a 5-year period, and an annual greater sage-grouse intensification report will be prepared describing the status of the indicators. Beginning in year 6, the annual status report will be accompanied with a trend report, which will be available on an annual basis thereafter, contingent on continuation of the current monitoring budget. This information, in combination with the Grass/Shrub mapping information, the mid-scale habitat suitability indicator measures, and the sagebrush availability information will be used to answer Question 1 of the National Planning Strategy Effectiveness Report.

Calculating Question 2, National Planning Strategy Effectiveness: Evaluations of the amount of habitat degradation and the intensity of the activities in the area of interest will use the information from Measure 2 (Section B.2., Habitat Degradation Monitoring) and Measure 3 (Section B.3., Energy and

Mining Density). The field office will collect data on the amount of reclaimed energy-related degradation on plugged and abandoned and oil/gas well sites. The data are expected to demonstrate that the reclaimed sites have yet to meet the habitat restoration objectives for greater sage-grouse habitat. This information, in combination with the amount of habitat degradation, will be used to answer Question 2 of the National Planning Strategy Effectiveness Report.

Calculating Question 3, National Planning Strategy Effectiveness: The change in greater sage-grouse estimated populations will be calculated from data provided by the state wildlife agencies, when available. This population data (Section C., Population [Demographics] Monitoring) will be used to answer Question 3 of the National Planning Strategy Effectiveness Report.

Calculating Question 4, National Planning Strategy Effectiveness: The estimated contribution by the BLM or the USFS to the change in the amount of sagebrush in the area of interest will use the information from Measure 1a (Section B.1., Sagebrush Availability). This measure is derived from the national datasets that remove sagebrush (Table Y-5). To determine the relative contribution of BLM and USFS management, the current Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for this measure in the geographic areas of interest. This information will be used to answer Question 4 of the National Planning Strategy Effectiveness Report.

Calculating Question 5, National Planning Strategy Effectiveness: The estimated contribution by the BLM or the USFS to the change in the amount of disturbance in the area of interest will use the information from Measure 2a (Section B.2., Monitoring Habitat Degradation) and Measure 3 (Section B.3., Energy and Mining Density). These measures are all derived from the national disturbance datasets that degrade habitat (Table Y-8). To determine the relative contribution of BLM and USFS management, the current Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for these two measures in the geographic areas of interest. This information will be used to answer Question 5 of the National Planning Strategy Effectiveness Report.

Answers to the five questions for determining the effectiveness of the national planning strategy will identify areas that appear to be meeting the objectives of the strategy and will facilitate identification of population areas for more detailed analysis. Conceptually, if the broad-scale monitoring identifies increasing sagebrush availability and improving vegetation conditions, decreasing disturbance, and a stable or increasing population for the area of interest, there is evidence that the objectives of the national planning strategy to maintain populations and their habitats have been met. Conversely, where information indicates that sagebrush is decreasing and vegetation conditions are degrading, disturbance in greater sage-grouse areas is increasing, and/or populations are declining relative to the baseline, there is evidence that the objectives of the national planning strategy are not being achieved. Such a determination would likely result in a more detailed analysis and could be the basis for implementing more restrictive adaptive management measures.

With respect to the land use plan area, the BLM and the USFS will summarize the vegetation, disturbance, and population data to determine if the LUP is meeting the plan objectives. Effectiveness information used for these evaluations includes BLM/USFS surface management areas and will help inform where finer-scale evaluations are needed, such as seasonal habitats, corridors, or linkage areas. Data will also include the trend of disturbance within the greater sage-grouse areas, which will inform the need to initiate adaptive management responses as described in the Bighorn Basin land use plan.

Calculating Question 1, Land Use Plan Effectiveness: The condition of vegetation and the allotments meeting land health standards (as articulated in "BLM Handbook 4180-1, Rangeland Health Standards") in greater sage-grouse areas will be used to determine the LUP's effectiveness in meeting the vegetation

objectives for greater sage-grouse habitat set forth in the plan. The field office/ranger district will be responsible for collecting this data. In order for this data to be consistent and comparable, common indicators, consistent methods, and an unbiased sampling framework will be implemented following the principles in the BLM's AIM strategy (Taylor et al. 2014; Toevs et al. 2011; MacKinnon et al. 2011), in the BLM's Technical Reference "Interpreting Indicators of Rangeland Health" (Pellant et al. 2005), and in the HAF (Stiver et al. in press) or other approved WAFWA MZ–consistent guidance to measure and monitor greater sage-grouse habitats. This information will be used to answer Question 1 of the Land Use Plan Effectiveness Report.

Calculating Question 2, Land Use Plan Effectiveness: Sage-grouse areas within the LUP that are achieving land health stands (or, if trend data are available, that are making progress toward achieving them)—particularly the Special Status Species/wildlife habitat land health standard—will be used to determine the LUP's effectiveness in achieving the habitat objectives set forth in the plan. Field offices will follow directions in "BLM Handbook 4180-1, Rangeland Health Standards," to ascertain if greater sage-grouse areas are achieving or making progress toward achieving land health standards. One of the recommended criteria for evaluating this land health standard is the HAF indicators.

Calculating Question 3, Land Use Plan Effectiveness: The amount of habitat disturbance in greater sage-grouse areas identified in this LUP will be used to determine the LUP's effectiveness in meeting the plan's disturbance objectives. National datasets can be used to calculate the amount of disturbance, but field office data will likely increase the accuracy of this estimate. This information will be used to answer Question 3 of the Land Use Plan Effectiveness Report.

Calculating Question 4, Land Use Plan Effectiveness: The change in estimated greater sage-grouse populations will be calculated from data provided by the state wildlife agencies, when available, and will be used to determine LUP effectiveness. This population data (Section C., Population [Demographics] Monitoring) will be used to answer Question 4 of the Land Use Plan Effectiveness Report.

Results of the effectiveness monitoring process for the LUP will be used to inform the need for finer-scale investigations, initiate adaptive management actions as described in the Bighorn Basin land use plan, initiate causation determination, and/or determine if changes to management decisions are warranted. The measures used at the broad and mid-scales will provide a suite of characteristics for evaluating the effectiveness of the adaptive management strategy.

6.5.1 Fine and Site Scales

Fine-scale (third-order) habitat selected by greater sage-grouse is described as the physical and geographic area within home ranges during breeding, summer, and winter periods. At this level, habitat suitability monitoring should address factors that affect greater sage-grouse use of, and movements between, seasonal use areas. The habitat monitoring at the fine and site scale (fourth order) should focus on indicators to describe seasonal home ranges for greater sage-grouse associated with a lek or lek group within a population or subpopulation area. Fine- and site-scale monitoring will inform LUP effectiveness monitoring (see Section D., Effectiveness Monitoring) and the hard and soft triggers identified in the LUP's adaptive management section.

The BLM and USFS will coordinate with the State of Wyoming to share conservation, disturbance and vegetation analysis data to provide a core by core evaluation to make necessary adjustments in activity, priorities and other actions.

Site-scale habitat selected by greater sage-grouse is described as the more detailed vegetation characteristics of seasonal habitats. Habitat suitability characteristics include canopy cover and height of

sagebrush and the associated understory vegetation. They also include vegetation associated with riparian areas, wet meadows, and other mesic habitats adjacent to sagebrush that may support greater sage-grouse habitat needs during different stages in their annual cycle.

As described in the Conclusion (Section 3.4), details and application of monitoring at the fine and site scales will be described in the implementation-level monitoring plan for the Bighorn Basin land use plan. The need for fine- and site-scale-specific habitat monitoring will vary by area, depending on proposed projects, existing conditions, habitat variability, threats, and land health. Examples of fine- and site-scale monitoring include: habitat vegetation monitoring to assess current habitat conditions; monitoring and evaluation of the success of projects targeting greater sage-grouse habitat enhancement and/or restoration; and habitat disturbance monitoring to provide localized disturbance measures to inform proposed project review and potential mitigation for project impacts. Monitoring plans should incorporate the principles outlined in the BLM's AIM strategy (Toevs et al. 2011) and in "AIM-Monitoring: A Component of the Assessment, Inventory, and Monitoring Strategy" (Taylor et al. 2014). Approved monitoring methods are:

- "BLM Core Terrestrial Indicators and Methods" (MacKinnon et al. 2011);
- The BLM's Technical Reference "Interpreting Indicators of Rangeland Health" (Pellant et al. 2005); and,
- "Sage-Grouse Habitat Assessment Framework: Multiscale Assessment Tool" (Stiver et al. in press).

Other state-specific disturbance tracking models include: the BLM's Wyoming Density and Disturbance Calculation Tool (http://ddct.wygisc.org/) and the BLM's White River Data Management System in development with the USGS. Population monitoring data (in cooperation with state wildlife agencies) should be included during evaluation of the effectiveness of actions taken at the fine and site scales.

Fine- and site-scale greater sage-grouse habitat suitability indicators for seasonal habitats are identified in the HAF. The HAF has incorporated the Connelly et al. (2000) greater sage-grouse guidelines as well as many of the core indicators in the AIM strategy (Toevs et al. 2011). There may be a need to develop adjustments to height and cover or other site suitability values described in the HAF; any such adjustments should be ecologically defensible. To foster consistency, however, adjustments to site suitability values at the local scale should be avoided unless there is strong, scientific justification for making those adjustments. That justification should be provided. WAFWA MZ adjustments must be supported by regional plant productivity and habitat data for the floristic province. If adjustments are made to the site-scale indicators, they must be made using data from the appropriate seasonal habitat designation (breeding/nesting, brood-rearing, winter) collected from greater sage-grouse studies found in the relevant area and peer-reviewed by the appropriate wildlife management agency(ies) and researchers.

When conducting land heath assessments, the BLM should follow, at a minimum, "Interpreting Indicators of Rangeland Health" (Pellant et. al. 2005) and the "BLM Core Terrestrial Indicators and Methods" (MacKinnon et al. 2011). For assessments being conducted in greater sage-grouse designated management areas, the BLM should collect additional data to inform the HAF indicators that have not been collected using the above methods. Implementation of the principles outlined in the AIM strategy will allow the data to be used to generate unbiased estimates of condition across the area of interest; facilitate consistent data collection and rollup analysis among management units; help provide consistent data to inform the classification and interpretation of imagery; and provide condition and trend of the indicators describing sagebrush characteristics important to greater sage-grouse habitat (see Section D., Effectiveness Monitoring).

6.5.2 Conclusion

This Greater Sage-Grouse Monitoring Framework was developed for all of the Final Environmental Impact Statements involved in the greater sage-grouse planning effort. As such, it describes the monitoring activities at the broad and mid-scales and provides a guide for the BLM to collaborate with partners/other agencies to develop the Bighorn Basin land use plan-specific monitoring plan.

6.5.3 The BLM Greater Sage-Grouse Disturbance and Monitoring Sub Team Membership

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ATTACHMENT A: AN OVERVIEW OF MONITORING COMMITMENTS

	Broad and Mid-scales					Fine & Site Scales
	Implement-ation	**Sagebrush Availability**	**Habitat Degradation**	**Population**	**Effectiveness**	
How will the data be used?	Tracking and documenting implementation of land use plan decisions and inform adaptive management	Tracking changes in land cover (sagebrush) and inform adaptive management	Tracking changes in disturbance (threats) to sage-grouse habitat and inform adaptive management	Tracking trends in sage-grouse populations (and/or leks; as determined by state wildlife agencies) and inform adaptive management	Characterizing the relationship among disturbance, implementation actions, and sagebrush metrics and inform adaptive management	Measuring seasonal habitat, connectivity at the fine scale, and habitat conditions at the site scale, calculating disturbance and inform adaptive management
Who is collecting the data?	BLM FO and FS Forest	NOC and NIFC	National data sets (NOC), BLM FOs and FS Forests as applicable	State wildlife agencies through WAFWA	Comes from other broad and mid-scale monitoring types, analyzed by the NOC	BLM FO and SO, FS Forests and RO (with partners) including disturbance
How often are the data collected, reported and made available to FWS?	Collected and reported annually; summary every 5 years	Updated and changes reported annually; summary reports every 5 years	Collected and changes reported annually; summary reports every 5 years	State data reported annually per WAFWA MOU; summary reports every 5 years	Collected and reported every 5 years (coincident with LUP evaluations)	Collection and trend analysis ongoing, reported every 5 years or as needed to inform adaptive management
What is the spatial scale?	Summarized by LUP with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by MZ, and LUP with flexibility for reporting by other units (e.g., PAC)	Variable (e.g., projects and seasonal habitats)
What are the potential personnel and budget impacts?	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	At a minimum, current skills and capacity must be maintained; data mgmt cost are TBD	At a minimum, current skills and capacity must be maintained; data mgmt and data layer purchase cost are TBD	No additional personnel or budget impacts for BLM or USFS	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment
Who has primary and secondary responsibilities for reporting?	1) BLM FO & SO; FS Forest & RO 2) BLM & FS Planning	1) NOC 2) WO	1) NOC 2) BLM SO, FS RO & appropriate programs	1) WAFWA & state wildlife agencies 2) BLM SO, FS RO, NOC	1) Broad and mid-scale at the NOC, LUP at BLM SO, USFS RO	1) BLM FO & FS Forests 2) BLM SO & FS RO
What new processes/ tools are needed?	National implementation data sets and analysis tools	Updates to national land cover data	Data standards and roll-up methods for these data	Standards in population monitoring (WAFWA)	Reporting methodologies	Data standards data storage; and reporting

ATTACHMENT B: LIST OF ALL SAGEBRUSH SPECIES AND SUBSPECIES INCLUDED IN THE SELECTION CRITERIA FOR BUILDING THE EVT AND BPS LAYERS

- *Artemisia arbuscula* subspecies *longicaulis*
- *Artemisia arbuscula* subspecies *longiloba*
- *Artemisia bigelovii*
- *Artemisia nova*
- *Artemisia papposa*
- *Artemisia pygmaea*
- *Artemisia rigida*
- *Artemisia spinescens*
- *Artemisia tripartita* subspecies *rupicola*
- *Artemisia tripartita* subspecies *tripartita*
- *Tanacetum nuttallii*
- *Artemisia cana* subspecies *bolanderi*
- *Artemisia cana* subspecies *cana*
- *Artemisia cana* subspecies *viscidula*
- *Artemisia tridentata* subspecies *wyomingensis*
- *Artemisia tridentata* subspecies *tridentata*
- *Artemisia tridentata* subspecies *vaseyana*
- *Artemisia tridentata* subspecies *spiciformis*
- *Artemisia tridentata* subspecies *xericensis*
- *Artemisia tridentata* variety *pauciflora*
- *Artemisia frigida*
- *Artemisia pedatifida*

ATTACHMENT C: USER AND PRODUCER ACCURACIES FOR AGGREGATED ECOLOGICAL SYSTEMS WITHIN LANDFIRE MAP ZONES

LANDFIRE Map Zone Name	User Accuracy	Producer Accuracy	% of Map Zone within Historic Schroeder
Wyoming Basin	76.9%	90.9%	98.5%
Snake River Plain	68.8%	85.2%	98.4%
Missouri River Plateau	57.7%	100.0%	91.3%
Grand Coulee Basin of the Columbia Plateau	80.0%	80.0%	89.3%
Wyoming Highlands	75.3%	85.9%	88.1%
Western Great Basin	69.3%	75.4%	72.9%
Blue Mountain Region of the Columbia Plateau	85.7%	88.7%	72.7%
Eastern Great Basin	62.7%	80.0%	62.8%
Northwestern Great Plains	76.5%	92.9%	46.3%
Northern Rocky Mountains	72.5%	89.2%	42.5%
Utah High Plateaus	81.8%	78.3%	41.5%
Colorado Plateau	65.3%	76.2%	28.8%
Middle Rocky Mountains	78.6%	73.3%	26.4%
Cascade Mountain Range	57.1%	88.9%	17.3%
Sierra Nevada Mountain Range	0.0%	0.0%	12.3%
Northwestern Rocky Mountains	66.7%	60.0%	7.3%
Southern Rocky Mountains	58.6%	56.7%	7.0%
Northern Cascades	75.0%	75.0%	2.6%
Mogollon Rim	66.7%	100.0%	1.7%
Death Valley Basin	0.0%	0.0%	1.2%

There are two anomalous map zones with 0% user and producer accuracies, attributable to no available reference data for the ecological systems of interest.

User accuracy is a map-based accuracy that is computed by looking at the reference data for a class and determining the percentage of correct predictions for these samples. For example, if I select any sagebrush pixel on the classified map, what is the probability that I'll be standing in a sagebrush stand when I visit that pixel location in the field? Commission Error equates to including a pixel in a class when it should have been excluded (i.e., commission error = 1 – user's accuracy).

Producer accuracy is a reference-based accuracy that is computed by looking at the predictions produced for a class and determining the percentage of correct predictions. In other words, if I know that a particular area is sagebrush (I've been out on the ground to check), what is the probability that the digital map will correctly identify that pixel as sagebrush? Omission Error equates to excluding a pixel that should have been included in the class (i.e., omission error = 1 – producer's accuracy).

8.0 COT OBJECTIVE 6: PRIORITIZE, FUND, AND IMPLEMENT RESEARCH TO ADDRESS EXISTING UNCERTAINTIES

> *"Increased funding and support for key research projects that will address uncertainties associated with sage-grouse and sagebrush habitat management is essential. Effective amelioration of threats can only be accomplished if the mechanisms by which those threats are imposed on the redundancy, representation, and resilience of the species and its habitats are understood." (COT Report, 2013)*

In accordance with BLM policy, the Record of Decision and Approved Plan will establish intervals and standards for evaluations as part of the implementation strategy. Priorities will be established based on the identified threats in the Planning Area, the conservation objectives included as part of the Approved Plan, and any potential uncertainties associated with sage-grouse and associated habitat management. A part of this strategy will include development of a budget to accomplish each of the identified tasks and fund potential research topics to address any uncertainties.

As new science pertaining to sage-grouse and habitat is continuously evolving, refined management strategies may be necessary to ensure that BLM and USFS are utilizing the most current science, information, and data regarding sage-grouse. It is for this reason that BLM and USFS have collaborated with the State of Wyoming and USFWS to develop an adaptive management strategy as a part of the planning process.

8.1 Wyoming Greater Sage-Grouse Adaptive Management Plan

The greater sage-grouse adaptive management plan provides regulatory assurance that unintended negative impacts to greater sage-grouse habitat will be addressed before consequences become severe or irreversible. This adaptive management plan:

- utilizes science based soft and hard adaptive management triggers,
- addresses multiple scales of data, and
- utilizes an adaptive management working group.

Adaptive Management Triggers

Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting greater sage-grouse conservation objectives. With respect to sage-grouse, all regulatory entities in Wyoming, including the BLM and FS, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts.

Soft Triggers:

Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. BLM and/or FS field offices, with the assistance of their respective land and resource management plan implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the

Adaptive Management Working Group (AMWG) on an annual basis. The purpose of these strategies is to address localized greater sage-grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold.

Hard Triggers:

Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect.

Within the range of normal population variables, hard triggers shall be determined to take effect when two of the three metrics exceeds 60% of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40% of normal variability for a three year time period within a five-year range of analysis. A minimum of three consecutive years in a five-year period is used to determine trends (i.e., Y1-2-3, Y2-3-4, Y3-4-5).

Adaptive Management Response

Soft Trigger Response:

Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short- or long-term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM and/or FS) and the AMWG will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or state-wide level.

Hard Trigger Response:

Upon determination that a hard trigger has been tripped, the BLM and/or FS will immediately defer issuance of discretionary authorizations for new actions for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the AMWG will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment).

Interim Strategy

An interim response strategy will be developed, and implemented to the extent permitted by law, within 90 days of determination that a hard trigger has been tripped. The technical team (see Implementation Groups below) will be consulted to identify the scope and scale of the interim strategy. Based on the recommendation of the AMWG, the BLM and/or FS will implement an interim response strategy through an Instruction Memorandum or other management mechanisms to direct management until the causal factor(s) and appropriate response(s) can be determined. The interim response strategy will consist of appropriate management measures undertaken at the project stage, supported by the best available science, to address the specific metric which has been tripped and may include deferral of some activities as appropriate. Measures that were analyzed in this EIS and the COT, NTT reports, and NPT guidance will be reviewed in addition to current science to identify the most appropriate measures to be implemented as part of the interim response strategy. The BLM and/or FS will comply with all applicable law in implementing such response(s), and, if applicable, will undertake a plan amendment or revision under BLM and/or FS's planning regulations and policies.

The interim strategy will be implemented for the biologically significant unit (BSU), which, in Wyoming, is PHMAs, regardless of whether PHMAs cross multiple planning boundaries. If it has been identified that more than one PHMA has the same hard triggers being tripped, or is trending towards triggers being tripped, the interim strategy will be implemented at the appropriate scale.

Causal Factor Assessment

The causal factor assessment will be completed within 180 days of determination that a hard trigger threshold has been crossed. Once the causal factor assessment is completed by the AMWG, the interim response strategy will be modified to adequately address the causal factors in consultation with the technical team. If a causal factor or factors cannot be identified, the interim response strategy shall stay in place until the cause can be determined and any new planning decision can be implemented.

EIS Level Projects

Each major project (EIS level) will include adaptive management strategies in support of the population management objectives for greater sage-grouse set by the State of Wyoming, and will be consistent with the Wyoming Greater Sage-Grouse Adaptive Management Plan. These adaptive management strategies will be developed in partnership with the AMWG, WGFD, project proponents, partners, and stakeholders, incorporating the best available science.

Implementation Groups

Sage-Grouse Implementation Team

The State of Wyoming's strategy is implemented by the Sage-Grouse Implementation Team (SGIT), established by Executive Order in 2008 and codified in 2014 by the Wyoming Legislature (W.S. § 9-19-101). The SGIT is a Governor appointed body with representation by federal agencies (BLM, USFS, FWS, Natural Resources Conservation Service), state agencies (Wyoming Game and Fish Commission, Department of Agriculture, Department of Environmental Quality, Wildlife and Natural Resource Trust Fund, Oil and Gas Conservation Commission, and Office of State Lands and Investments), the Wyoming Legislature, county governments, energy developers, mining companies, landowners, and non-governmental organizations. The BLM, US Fish and Wildlife Service NRCS and the US Forest Service all have an equal role in the SGIT.

Land and Resource Management Plan – Implementation Teams

Land and Resource Management Plans are implemented through implementation teams. These implementation teams include cooperating agencies who participated in the development of this land use plan representing local, state, and federal agencies. These implementation teams will coordinate with the AMWG and others to evaluate metrics and management responses necessary to meet greater sage-grouse conservation objectives within their Planning Area.

Adaptive Management Working Group and Technical Team

An Adaptive Management Working Group (AMWG) will be established in consultation with the SGIT to provide appropriate guidance for agencies with the ability to affect sage-grouse populations and/or habitat through their permitting authority. The AMWG will include BLM, USFS, USFWS, and State of Wyoming. The purpose of this group will be to initiate a response strategy should it be determined that a hard trigger has been tripped or if soft triggers are showing a trend across a region. A hard trigger may be tripped at any time, thus, upon identification of such event, current available population and habitat data will be reviewed by the AMWG with the assistance of a technical team comprised of agency

biologists, scientists familiar with the Management Zone in question, and other individuals as appropriate (e.g., habitat managers, respective landowners, other appropriate representatives) to confirm that a hard trigger has been tripped. Upon verification of data showing that a hard trigger has been tripped, the AMWG will convene within 14 days.

The AMWG will review monitoring data which has been collected by the appropriate local sage-grouse working groups in conformance with data collection standards. This group will meet annually to review all data collected in the prior year regarding sage grouse populations and habitats. Monitoring data will have been analyzed (by WGFD for population based metrics (leks, wing counts, etc., and by land managers [BLM, FS, State of Wyoming] for habitat based metrics [DDCT, etc.]) Should the monitoring data suggest a trend toward a soft or hard trigger being tripped, they will 1. Identify what metric is indicating that trend (population or habitat); and 2. Identify a technical team to review the data and compile a range of activities which may be causing the trend. Should review of the monitoring data identify that multiple soft triggers have been tripped in one PHMA, or the same triggers have been tripped across multiple PHMAs, the technical team will be tasked with verifying the scope and intensity of the trends.

Once the analysis of the trends has been completed by the technical team and reported back to the AMWG, the AMWG will make recommendations to the appropriate land managing agency regarding an interim adaptive management strategy to be implemented. Implementation will occur via the appropriate regulations and policy applicable for that agency. At that time, the State of Wyoming will conduct a review of the regulatory authority implementing the Sage Grouse Core Area Strategy to determine if a State of Wyoming adaptive management strategy is warranted.

Upon review of the annual data by the AMWG and technical team, the State of Wyoming, as part of the AMWG, will contact neighboring states within the respective Management Zone to inform them of any findings. Should a hard trigger be tripped, the trigger which has been tripped and any recommended adaptive management strategy being implemented will be shared with the appropriate neighboring state(s). Should the need arise for implementation of a multi-state adaptive management strategy; the AMWG will coordinate to develop an effective response.

Small Leks

Small leks will be given special consideration. Due to geographic variations a definition of “small” is not provided, rather determination of “small” will be made by the AMWG based upon recommendations of the scientific community. Generally, “small” is considered 10 or fewer males for a three year time period within a five-year range of analysis. If a trigger is hit based upon such a lek, then the adaptive management working group will evaluate the site-specific circumstances and determine appropriate remedial action.

9.0 GLOSSARY TERMS

Additionality: The conservation benefits of compensatory mitigation are demonstrably new and would not have resulted without the compensatory mitigation project. (BLM Manual Section1794).

Avoidance mitigation: Avoiding the impact altogether by not taking a certain action or parts of an action. (40 CFR 1508.20(a)) (e.g., may also include avoiding the impact by moving the proposed action to a different time or location.)

Compensatory mitigation: Compensating for the (residual) impact by replacing or providing substitute resources or environments. (40 CFR 1508.20)

Compensatory mitigation projects: Specific, on-the-ground actions to improve and/or protect habitats (e.g., chemical vegetation treatments, land acquisitions, conservation easements).

Compensatory mitigation sites: The durable areas where compensatory mitigation projects will occur.

Durability (protective and ecological): The administrative, legal, and financial assurances that secure and protect the conservation status of a compensatory mitigation site, and the ecological benefits of a compensatory mitigation project, for at least as long as the associated impacts persist. (BLM Manual Section 1794).

Minimization mitigation: Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (40 CFR 1508.20 (b))

Residual impacts: Impacts from an authorized land use that remain after applying avoidance and minimization mitigation; also referred to as unavoidable impacts.

Timeliness: The conservation benefits from compensatory mitigation accruing as early as possible or before impacts have begun. (BLM Manual Section 1794)

Proposed Resource Management Plan and
Final Environmental Impact Statement

Bighorn Basin Resource Management Plan Revision Project

Appendix Z

Federal Oil and Gas Operations on Split-Estate Lands

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APPENDIX Z

FEDERAL OIL AND GAS OPERATIONS ON SPLIT-ESTATE LANDS

1.0 PURPOSE

The purpose of this appendix is to summarize the Bureau of Land Management's (BLM) procedures for considering proposals to conduct exploration and production operations on split-estate federal oil and gas leases. This appendix is provided for information purposes only, and is not necessarily a complete statement of rights, obligations, or processes. This appendix is not a part of the BLM's land use plan decision for the Resource Management Plan (RMP). Any conflict with any statute or regulation is unintentional. In the event of a conflict, the statute or regulation controls. Federal oil and gas lessees and operators, and private surface owners, are advised to confer with the BLM at the time an action is proposed for BLM's consideration, in order to obtain information about the current regulations and policies that may apply to the proposal. Nothing in this appendix affects the authority of any tribe or of the Bureau of Indian Affairs in any way. This RMP applies to federal lands as defined by Federal Land Policy and Management Act, and does not apply to lands held in trust for any Tribe or for any individual Indian or Indians.

2.0 DEFINITIONS

Casual use (operations): "Casual use means activities involving practices that do not ordinarily lead to any appreciable disturbance or damage to lands, resources, or improvements. This term does not apply to private surface. Casual use includes surveying activities." (Onshore Oil and Gas Order No. 1, part II).

Lease: "means any contract, profit share arrangement, joint venture or other agreement issued or approved by the United States under a mineral leasing law that authorizes exploration for, extraction of or removal of oil or gas." (Onshore Oil and Gas Order No. 1, part II).

Lease facility or production facility: "Production facilities means a lessee's or lease operator's pipes and equipment used on the leasehold to aid in extracting, processing, and storing oil and gas…" (64 FR 32140). See also BLM Manual Section 2880 ("Mineral Leasing Act Rights-of-Way") at Page 9.

Lease site: "means any lands, including the surface of a severed mineral estate, on which exploration for, or extraction and removal of, oil or gas is authorized under a lease." (43 CFR 3160.0-5).

Lessee: "means any person holding record title or owning operating rights in a lease issued or approved by the United States." (43 CFR 3160.0-5).

Operator: "means any person or entity including but not limited to the lessee or operating rights owner, who has stated in writing to the authorized officer that it is responsible under the terms and conditions of the lease for the operations conducted on the leased lands or a portion thereof." (43 CFR 3160.0-5).

Public lands: "means any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior through the Bureau of Land Management…" (Federal Land Policy Management Act of 1976, Sec. 103(e)).

Private surface owner: "Private Surface Owner means a non-Federal or non-state owner of the surface estate and includes any Indian owner of surface estate not held in trust by the United States." (Onshore Oil and Gas Order No. 1, part II).

Split-estate: "Split-estate means lands where the surface is owned by an entity or person other than the owner of the Federal or Indian oil and gas." (Onshore Oil and Gas Order No. 1, part II). "When tribal lands are held in trust or are subject to Federal restrictions against alienation the BIA is the Surface Managing Agency, but if lands are held in unrestricted fee, those lands are treated the same as private surface." (Preamble to Onshore Oil and Gas Order No. 1 revisions, 72 FR 10322-10323, March 7, 2007).

Surface Managing Agency: "Surface Managing Agency means any Federal or state agency having jurisdiction over the surface overlying Federal or Indian oil and gas." (Onshore Oil and Gas Order No. 1, part II).

3.0 GENERAL

In considering and authorizing exploration and development of split-estate federal oil and gas leases, the BLM prefers that the operator and split-estate surface owner reach a Surface Access Agreement for proposed oil and gas operations. The BLM coordinates with both the operator and surface owner, in accordance with the requirements of Onshore Oil and Gas Order No. 1, and generally provides the surface owner's lands the same level of resource (soil, water, vegetation, air, visual, cultural, etc.) protection as would be required on BLM-administered public lands.

"The BLM will offer the surface owner the same level of surface protection that the BLM provides on Federal surface. The BLM will not apply standards or conditions that exceed those that would normally be applied to Federal surface, even when requested by the surface owner." (The Gold Book, page 12).

Federal mineral lessees may enter onto a privately-owned surface to the extent necessary to explore and produce the federal minerals in compliance with the relevant statutes and BLM regulations and land use designations. The BLM does not have the authority to regulate a surface owner's use of the surface estate, but does have the authority to regulate the activities of federal mineral lessees and mining claimants. The BLM adds lease stipulations to split-estate federal oil and gas leases, in order to ensure that leasing decisions conform to the approved RMP for the area.

4.0 OPERATIONS

4.1 Geophysical

The BLM's authority to permit geophysical operations is described under 43 CFR §3150.0-1:

> *Geophysical exploration on public lands, the surface of which is administered by the Bureau, requires Bureau approval. The procedures in this part also apply to geophysical exploration conducted under the rights granted by any Federal oil and gas lease unless the surface is administered by the U.S. Forest Service. However, a lessee may elect to conduct exploration operations outside the rights granted by the lease, in which case authorization from the surface managing agency or surface owner may be required… The procedures of this part do not apply to… operations conducted on private surface overlying public lands unless such operations are conducted by a lessee under the rights granted by the Federal oil and gas lease…*

As BLM Handbook H-3150-1[1] at pages 1–2 explains:

> *In those situations where Federal minerals are underlying private surface and the private surface owner's consent is obtained, the BLM is not to become involved. However, when landowner consent for access to the surface cannot be obtained for geophysical exploration operations on a Federal lease by the lease operator, the geophysical operation is to be authorized using the Sundry Notice process…*[2]
>
> *When the geophysical exploration operator is the Federal lessee or designated operator of the lessee, it is to file a Sundry Notice… with the BLM and provide notification to the surface owner by certified mail that it intends to enter onto the lands and conduct lease operations. The lessee/operator must then submit proof to the BLM authorized officer that the surface owner has been notified. The lessee or operator must also submit proof to the BLM authorized officer that it has a current and adequate bond payable to the United States for use by the surface owner for damages caused during exploration operations. The authorized officer must give the surface owner 30 days to comment on the proposed action before approving the Sundry Notice.*

When a surface access agreement is reached to conduct geophysical operations on split-estate lands with leased or unleased federal oil and gas, the BLM does not become involved. The BLM will not accept a Notice of Intent to Conduct Geophysical Operations (NOI), BLM Form 3150-4 or bond to permit entry to split-estate lands with unleased federal oil and gas, since the BLM has not issued an oil and gas lease to allow for operations under 43 CFR Part 3160 (see 43 CFR 3150.0-1).

In order to conduct geophysical operations on split-estate lands where a federal oil and gas lease has been issued and where an agreement with the surface owner has not been reached, the lessee or the operator must first obtain BLM authorization through an NOI that proposes entry to those lands in order to conduct geophysical operations. The lessee or designated operator must provide to the BLM a certification (see Attachment 1) that a good-faith effort was made to: (a) notify the landowner prior to entry; (b) obtain a Surface Access Agreement; and (c) deliver a copy of the proposed NOI to the surface owner.[3] The NOI must also identify the surface owner and include the owner's name, address, and telephone number, if known. A good and sufficient bond to secure payment of applicable damages for the use and benefit of the surface owner must be provided to the BLM on BLM Form 3160-19. The lessee or designated operator must also submit to the BLM evidence of service of a copy of the bond upon the surface owner. Prior to authorizing the NOI proposing entry to the lands for which the bond has been submitted, the BLM notifies the surface owner and provides a 30-day period during which the surface owner may protest the sufficiency of the bond. If the sufficiency of the bond is protested, the BLM reviews the bond amount and determines if it is adequate. That decision by the BLM is subject to State Director Review upon a request by any adversely affected party and the State Director's decision is subject to appeal to the Interior Board of Land Appeals (IBLA).[4]

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[1] *Onshore Oil and Gas Geophysical Exploration Surface Management Requirements. January 9, 2007.*

[2] *In BLM Washington Office Instruction Memorandum (IM) 2009-121, "Approval of Notice of Intent to Conduct Geophysical Exploration to Federal Oil and Gas Lessee on Split Estate", dated May 8, 2009, the BLM recognized that the Sundry Notice form (BLM Form 3160-5) is an imperfect form to use for permitting of geophysical operations. This policy clarified that the BLM will "no longer require the lessee or its operator to file a Sundry Notice" for the purpose of proposing entry to federal leases where a surface owner denies access to the lessee or its operator. In its place the BLM would use the NOI form (BLM Form 3150-4).*

[3] *See Onshore Oil and Gas Order No. 1, Part VI.*

[4] *See 43 CFR §3165.3(b). See, e.g., William P. Maycock, 176 IBLA 206 (2008).*

4.2 Notice of Staking/Application for Permit to Drill

4.2.1 Surveying and Staking Activities

The lessee or operator is encouraged to contact the surface owner of split-estate lands early in the process of planning for exploration and development of a federal lease. This facilitates early discussion about the goals and objectives of both the surface owner and operator. Communication between the lessee or operator and surface owner can reduce potential conflicts, thereby reducing misunderstandings and permit processing times.

For surveying and staking activities, "[t]he operator is responsible for making access arrangements with the appropriate Surface Managing Agency (other than the BLM and the FS) or private surface owner." (Onshore Oil and Gas Order No. 1, part III.D.2.a).

"No entry on split-estate lands for surveying and staking should occur without the operator first making a good faith effort to notify the surface owner. Also, operators are encouraged to notify the BLM or the Forest Service, as appropriate, before entering private lands to stake for federal mineral estate locations." (Onshore Oil and Gas Order No. 1, part III.D.2.b).

Aside from surveying and staking the proposed well location, road, pipeline, and/or other lease facilities, the operator may also be required to conduct resource condition surveys of the leased lands.

"As provided in the oil and gas lease, the BLM may request that the applicant conduct surveys or otherwise provide information needed for the BLM's National Historic Preservation Act consultation with the State Historic Preservation Officer or Indian tribe or its Endangered Species Act consultation with the relevant fisheries agency. The federal mineral lessee has the right to enter the property for this purpose, since it is a necessary prerequisite to development of the dominant mineral estate. Nevertheless, the lessee or operator should seek to reach agreement with the surface owner about the time and method by which any survey would be conducted." (Onshore Oil and Gas Order No. 1, part VI).

4.2.2 Onsite Inspection(s)

On split-estate lands, the onsite inspection provides the opportunity for the BLM, operator, and surface owner to evaluate and discuss the proposed well location or lease facility in the field.

"Within 10 days of receiving the application, the BLM, in coordination with the operator and Surface Managing Agency, including the private surface owner in the case of split-estate minerals, will schedule a date for the onsite inspection (unless the onsite inspection has already been conducted as part of a Notice of Staking)." (Onshore Oil and Gas Order No. 1, part III.E.2.a).

"On non-NFS lands, the BLM will invite the Surface Managing Agency and private surface owner, if applicable, to participate in the onsite inspection. If the surface is privately owned, the operator must furnish to the BLM the name, address, and telephone number of the surface owner if known." (Onshore Oil and Gas Order No. 1, part III.C).

At the onsite inspection, the BLM will consider applicable Best Management Practices (BMPs) that would avoid or mitigate environmental impacts to natural resources. The onsite inspection provides the surface owner with the opportunity to review the proposed well location and/or lease facilities; provide information to the BLM and operator about resources, improvements, and land uses; and express preferences for BMPs to be used for lease operations.

"All parties who attend the onsite inspection will jointly develop a list of resource concerns that the operator must address in the Application for Permit to Drill (APD). The operator will be provided a list of these concerns either during the onsite inspection or within 7 days of the onsite inspection. Surface owner concerns will be considered to the extent practical within the law." (Onshore Oil and Gas Order No. 1, part III.C).

"The BLM will invite the surface owner to the onsite inspection to assure that their concerns are considered." (Onshore Oil and Gas Order No. 1, part VI).

4.2.3 Required Components of a Complete Application for Permit to Drill for Split-estate Operations

4.2.3.1 Description of Surface Ownership

A description of the surface ownership (with name, address, and telephone number, if known) along with a certification must be included in the APD submitted by the operator to the BLM.

"The operator must indicate (in a narrative) the surface ownership at the well location, and of all lands crossed by roads that the operator plans to construct or upgrade, including, if known, the name of the agency or owner, phone number, and address. The operator must certify that they have provided a copy of the Surface Use Plan of Operations required in this section to the private surface owner of the well site location, if applicable, or that they made a good faith effort if unable to provide the document to the surface owner." (Onshore Oil and Gas Order No. 1, part III.D.4.k).

4.2.3.2 Surface Access Agreement or Waiver

For operations on leased split-estate lands, the operator must undertake a good faith effort to reach a Surface Access Agreement.

"[I]n the case of actual oil and gas operations, the operator must make a good faith effort to notify the private surface owner before entry and make a good faith effort to obtain a Surface Access Agreement from the surface owner… The Surface Access Agreement may include terms or conditions of use, be a waiver, or an agreement for compensation. The operator must certify to the BLM that: (1) It made a good faith effort to notify the surface owner before entry; and (2) That an agreement with the surface owner has been reached or that a good faith effort to reach an agreement failed." (Onshore Oil and Gas Order No. 1, part VI).

"The operator must make a good faith effort to provide a copy of their Surface Use Plan of Operations to the surface owner." (Onshore Oil and Gas Order No. 1, part VI). The operator must also provide a copy of any revisions to the SUPO to the surface owner. If required under Onshore Oil and Gas Order No. 6 ("Hydrogen Sulfide Operations"), the BLM requires the operator to provide a copy of the Public Protection Plan to the surface owner.

"The surface use agreement between the surface owner and the operator is confidential. However, the APD Surface Use Plan of Operations must contain sufficient detail about any aspects of the agreement necessary for NEPA documentation and to determine that the operations will be in compliance with laws, regulations, Onshore Orders, and agency policies." (The Gold Book, page 12).

"If the BLM's requirements conflict with provisions in the Surface [Access] Agreement, the operator or surface owner should disclose that conflict at the onsite or to the BLM in writing, and the BLM should

consider those conflicts in making its final decision." (BLM's Split Estate Report to Congress at page 15). Thus, to the extent terms of the agreement may conflict with Conditions of Approval, or COAs, to the APD, the BLM should be made aware of those terms, so that they can be considered in the BLM's final decision.

"The BLM does not review the Surface Use Agreement and does not enforce portions of the Surface Use Agreement that are not contained within the approved APD." (BLM's Split Estate Report to Congress at page 17).

4.2.3.3 Bonding In Lieu of a Surface Access Agreement or Waiver

It is the preference of the BLM that the operator and surface owner reach a Surface Access Agreement. However, in those cases where an agreement is not reached, the BLM follows the procedural requirements in the BLM's regulations and policies. A good and sufficient bond to secure payment of applicable damages for the use and benefit of the surface owner must be provided to the BLM on BLM Form 3160-19. The lessee or designated operator must also submit to the BLM evidence of service of a copy of the bond upon the surface owner. Prior to authorizing the APD proposing entry to the lands for which the bond has been submitted, the BLM notifies the surface owner and provides a 30-day period during which the surface owner may protest the sufficiency of the bond. If the sufficiency of the bond is protested, the BLM reviews the bond amount and determine if it is adequate. That decision by the BLM is subject to State Director Review upon a request by any adversely affected party and the State Director's decision is subject to appeal to the IBLA.5

"If no agreement was reached with the surface owner, the operator must submit an adequate bond (minimum of $1,000) to the BLM for the benefit of the surface owner sufficient to: (1) Pay for loss or damages; or (2) As otherwise required by the specific statutory authority under which the surface was patented and the terms of the lease. Surface owners have the right to appeal the sufficiency of the bond. Before the approval of the APD, the BLM will make a good faith effort to contact the surface owner to assure that they understand their rights to appeal." (Onshore Oil and Gas Order No. 1, part VI).

"The bond amount will be reviewed by the BLM to assure that it is sufficient based on the appropriate law." (Preamble to Onshore Oil and Gas Order No. 1 revisions, 72 FR 10323, March 7, 2007).

If operations under an approved APD result in loss or damages that are compensable under the statutes by which the lands were patented, the surface owner may obtain judgment from a court of competent jurisdiction. The BLM will then release from the bond the amount ordered by the court to the surface owner.

4.2.4 Approval of the Application for Permit to Drill

The BLM considers the views of the surface owner before approving the APD. The BLM must prepare an environmental record of review (43 CFR 3162.5-1(a)) to document its evaluation of potential resource impacts, including documentation of NEPA compliance.

"The BLM must comply with NEPA, the National Historic Preservation Act, the Endangered Species Act, and related Federal statutes when authorizing lease operations on split-estate lands where the surface is not federally owned and the oil and gas is Federal. For split-estate lands within FS administrative

[5] *See 43 CFR §3165.3(b). See, e.g., William P. Maycock, 176 IBLA 206 (2008).*

boundaries, the BLM has the lead responsibility, unless there is a local BLM/FS agreement that gives the FS this responsibility." (Onshore Oil and Gas Order No. 1, part VI).

"After the APD is approved the operator must make a good faith effort to provide a copy of the Conditions of Approval to the surface owner. The APD approval is not contingent upon delivery of a copy of the Conditions of Approval to the surface owner." (Onshore Oil and Gas Order No. 1, part VI).

4.3 Sundry Notices

Operations proposed by Sundry Notice that will result in additional surface disturbance or re-disturbance of previously reclaimed areas require a Surface Use Plan of Operations.

"Prior to commencing any operation on the leasehold which will result in additional surface disturbance, other than those authorized under § 3162.3–1 or § 3162.3–2 of this title, the operator shall submit a proposal on Form 3160–5 to the authorized officer for approval. The proposal shall include a surface use plan of operations." (43 CFR 3162.3-3).

"The operator must certify on Form 3160–5 that they have made a good faith effort to provide a copy of any proposal involving new surface disturbance to the private surface owner in the case of split-estate." (Onshore Oil and Gas Order No. 1, part VIII.A).

For review of Final Abandonment Notices (FANs) submitted by an operator on split-estate lands, the BLM will consider the views of the surface owner.

"If applicable, the private surface owner will be notified and their views will be carefully considered." (Onshore Oil and Gas Order No. 1, part XII).

"In cases where the Surface Managing Agency or private surface owner desires to acquire an oil and gas well and convert it to a water supply well or acquire a water supply well that was drilled by the operator to support lease operations, the Surface Managing Agency or private surface owner must inform the appropriate BLM office of its intent before the approval of the APD in the case of a dry hole and no later than the time a Notice of Intent to Abandon is submitted for a depleted production well… The Surface Managing Agency or private surface owner must reach agreement with the operator as to the satisfactory completion of reclamation operations before the BLM will approve any abandonment or reclamation. The BLM approval of the partial abandonment under this section, completion of any required reclamation operations, and the signed release agreement will relieve the operator of further obligation for the well. If the Surface Managing Agency or private surface owner acquires the well for water use purposes, the party acquiring the well assumes liability for the well." (Onshore Oil and Gas Order No. 1, part IX.B).

"Completion of a well as plugged and abandoned may also include conditioning the well as water supply source for lease operations or for use by the surface owner or appropriate Government Agency, when authorized by the authorized officer. All costs over and above the normal plugging and abandonment expense will be paid by the party accepting the water well." (43 CFR 3162.3-4(b)).

4.3.1 Emergency Operations

"In the event of an emergency, the operator may take immediate action without prior Surface Managing Agency approval to safeguard life or to prevent significant environmental degradation. The BLM or the FS must receive notification of the emergency situation and the remedial action taken by the operator as soon as possible, but not later than 24 hours after the emergency occurred. If the emergency only

affected drilling operations and had no surface impacts, only the BLM must be notified. If the emergency involved surface resources on other Surface Managing Agency lands, the operator should also notify the Surface Managing Agency and private surface owner within 24 hours." (Onshore Oil and Gas Order No. 1, part IV.d).

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